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IMPACT OF EARLY MARRIAGE ON MARITAL RELATIONSHIPS AMONG WOMEN OF A PERI URBAN VILLAGE OF NORTH INDIA

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ABSTRACT

Introduction: Early marriage has long been a problem in developing countries as it not only affects the health of girls but also deprives them of a childhood that they rightfully deserve. Apart from this, marital relationship in case of early marriage is also not as fruitful as compared to late marriages owing to emotional immaturity of the females. **Methods:** This study was conducted to estimate the prevalence of early marriage and its association with marital relationship. It was a community based cross-sectional study conducted among 322 married females in field practice areas of JNU-IMRC, Jaipur, Rajasthan. **Result:** The study found that 53.4% of the females had married before the age of 18 years. Significant association of marital age was observed with education status, socioeconomic status, nature of employment and education status of the male partner ($p<0.05$). Also, choosing friends and expressing opinions to elders, as a part of autonomy and self-efficacy, respectively, were found to be associated with early marriage ($p>0.05$). **Conclusion:**The study established that early marriages are still prevalent in the country. Ongoing efforts through the existing programs in the country need to reach the right audience especially in the rural areas.

Keywords: Early marriage, marital relationship, women autonomy, women self-efficacy

INTRODUCTION

According to UNICEF, any child under the age of 18 years going into an informal union or a formal marriage with an adult or another child, is considered under the definition of Child Marriage (UNICEF India, 2017). It is regarded as a result of deep-rooted gender inequality, which affects girls disproportionately. It has been estimated that, globally, around 21% of girls, some 12 million, get married before their 18th birthday every year(‘Child marriage around the world', | UNICEF, 2020) Currently, India places after Bangladesh, Nepal, and Afghanistan in terms of child marriage prevalence and it is reported that one in every three child brides live in India, accounting for 27% of the total early marriages(UNICEF, 2019).

UNICEF is constantly working toward the goal of elimination of early marriage with various interventions and in collaboration with various governments all

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over the world. The whole world is seriously concerned related to child marriage, especially, since it is included in one of the targets of Sustainable Development Goals. Its focus is to absolutely abolish the practice by 2030 and in this context, an indicator, 5.3.1, is set to measure proportion of women, aged 20 to 24 years, married or in a union, since they were below 15 and 18 years(UNICEF, 2019).

From the statistics for early marriages among girls in India, it can be comprehended that more than 50% of the total early marriages are reported in five states of the country, which include Uttar Pradesh as the leading state, contributing to the burden with 36 million child brides, followed by Bihar, West Bengal, Maharashtra and Madhya Pradesh. More than 40% of young women were married in childhood in Bihar (43%) and West Bengal (42%) compared to a mere 2% in Lakshadweep. Over the decades, however, it has been found that the trend for early marriage has been decreasing from 74% of girls being married before 18 years during the 1970s to 27% of underage marriage in 2015 which can be regarded as a great improvement in this field. However, India has a long way to go to for the elimination of this detrimental practice and it would need dedicated and re-enforced efforts for the same.

Early marriages have been reported to result in higher school dropout rates, low wages and high unemployment rates, not to mention the poor health status and higher crime rates against women(Dahl, 2010). Poverty, protection of the adolescent girls and reinforcement of social ties are considered to be the principal causes which lead to this stigmatized custom (Mahato, 2016). Along with this, girls from rural background are also reported to be at a higher risk of this practice(Child marriage. UNICEF, 2020). Albeit reported primarily among girls, even boys have not been exempted from this tradition, although the prevalence of the same among the males is quite low.

Marital relationship is a multi-dimensional concept, and, for a good relationship, dimensions: like communication, conflict, interactions/activities with the spouse, autonomy in decision-making and self-efficacy play a crucial role. In India, especially in rural background, much of this is rooted with the features of the joint family structure. Timing of marriage was found to be closely associated with the nature of a woman's marital relationship in different aspects like not having a close marital relationship with their spouses (Barua and Kurz, 2001) or facing an increased risk of physical and sexual violence (Joshi et al., 2001; Jejeebhoy and Bott, 2003). It has also been stated before that female empowerment is the process of amassing women's access to control the tactical choices in life that affect them, and access to the opportunities that allow them fully to realize their capabilities(Chen and Tanaka, 2014).

Limited researches are available, especially in India, on how early marriage may limit young women's lives and compromise their choices. Particularly, not much has been documented regarding the association between age at marriage and authority in marital relationships, self-efficacy, communication and interaction with spouse. In India, although the constitution grants gender equality to both the sexes (Saryal, 2014) in its preamble itself, the same is far from achieved owing to various challenges in the society, which majorly include violence against women and gender discrimination (Sama, 2017). Keeping the above discussed social problems in mind, the present study was conducted to find out the prevalence of early marriage in the study area, its socio- demographic determinants,

and its association with measures of marital relationship.

METHODS

This study was a cross-sectional community-based study, which was conducted among the registered families in the field practice areas under JNU-IMSRC, Jaipur, Rajasthan, during first half of 2019 after taking ethical clearance from the concerned committee (JNUIMSRC/IEC/2019/60). Literature review revealed that the prevalence of child marriage in India is 27% *(*National Family Health Survey (NFHS-4) 2015-16 INDIA, 2017). Assuming this prevalence with relative error of 5% at level of significance of 95%, the sample size was calculated.

The equation used for calculating sample size is as follows:

$$n= Z^2 P (1-P)/e^2$$

where,

Z = level of confidence - 95% (1.96)

P = prevalence of early marriage

e = margin of error

The sample size came out to be approximately 303. Assuming non- response rate to be 5%, 322 married females were taken up for the study. A house-to-house survey was conducted by the investigators in the rural field practice area of JNU-IMSRC. A random village from the study area was selected by lottery method and a house in the village was selected randomly for data collection and every alternate house was taken for survey until target sample size was achieved. A semi-coded, pre-designed, pretested questionnaire in local language (Hindi) was used to collect the relevant information (Santhya et al., 2010). For the better understanding of the questions by the participants, required changes were made before the final survey and the questions were rearranged to ensure efficiency. All participants gave the informed consent prior to be a part of the study.

Statistical Package for Social Sciences 20.0 (SPSS 20.0) software was used for data analysis. Categorical data were interpreted by proportions and percentages. Chi-square test was used to find significance and $p < 0.05$ was considered significant.

Inclusion Criteria: In order to minimize recall bias, only women with 10 years of married life were considered for the study. Availability of marriage certificate was sought to confirm age at marriage. Antenatal and child birth related events were established with available record documents, such as antenatal card. In cases of inability to produce these records, oral response from the respondent was noted.

Exclusion Criteria: Those with married life more than 10 years and those not giving consent to participate in the study.

RESULTS

According to the study, it was found that more than half (n= 172, 53.4%) of the study participants reported to have been married before the legal age of 18 years.

The mean age of the women and their counterparts, at the time of conducting this study, was found to be almost the same (figure 1). A difference of more than three years was observed in the mean duration of marriage between females married early and those married after attaining the legal age. The mean marital age of early married females was reported to be less than the legal age of marriage, by more than two years as 15.84±1.92 while male partners had their mean marital age less by more than a year as 19.97±3.49 years, which is 21 years for boys in India.

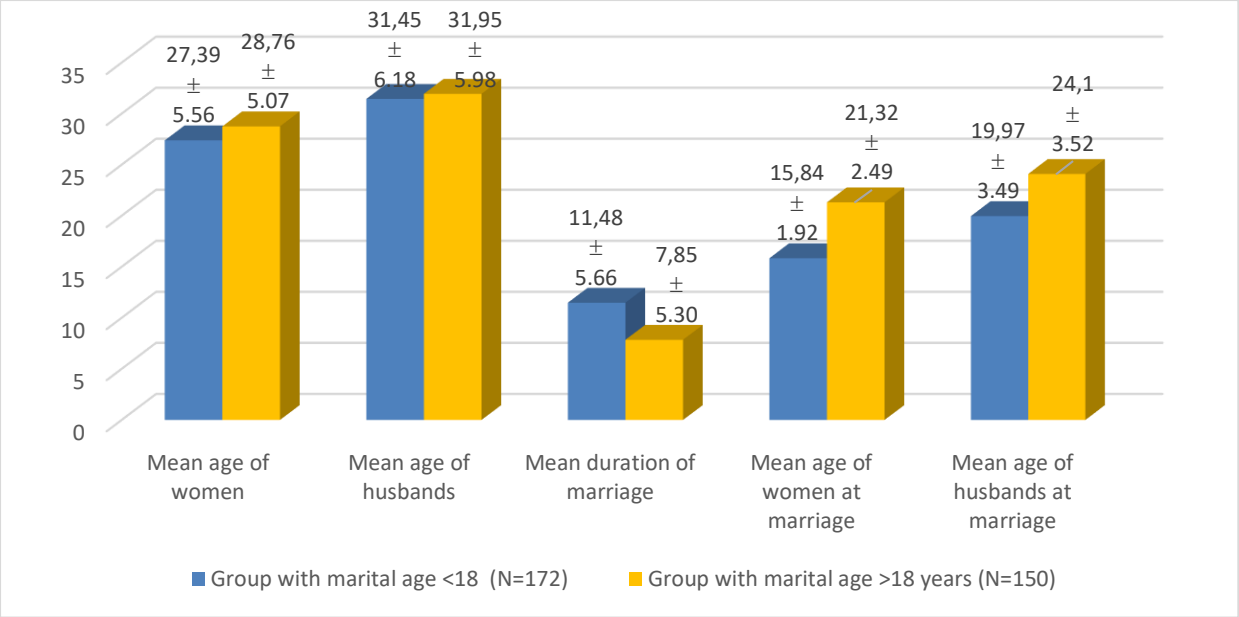

Figure 1. Showing mean age of the participants at the time of study and marriage, as well as mean duration of marriage in the two study groups.

As for the socio-demographic determinants, statistically non-significant association was found between marital age and religion where the majority of females married under 18 years of age belonged to Hinduism while the rest were Muslims. Similarly, in case of females married after 18 years of age, 80% were followers of Hindu religion while the rest were Muslims. Statistically significant associations ($p<0.05$) were found between marital age and educational status, socioeconomic status, nature of employment and education status of the male partner. It was observed that practice of marriage before 18 years of age was more prevalent among females who were illiterate (n= 61, 35.5%), belonged to middle socioeconomic status (n=102, 59.3%), whose husbands were involved in labor (n=81, 47.1%) and had maximum education up to high school (n=138, 80.2%). Statistically non-significant association of early marital age was observed with employment status and marital status of the females ($p>0.05$) (Table 1).

Table 1. Socio-demographic parameters and their association with the marital age

Parameter	Marital age <18 years N (%)	Marital age >18 years) N (%)	P-value
Religion			
Hindu	128 (74.4)	120 (80.0)	0.38
Muslim	44 (25.6)	30 (30.0)	
Educational status			**0.00**
Illiterate	61 (35.5)	25 (16.7)	
Primary	33 (19.2)	14 (9.3)	
High School	58 (33.7)	53 (35.3)	
Senior Secondary	11 (6.4)	14 (9.3)	

Parameter	**Marital age <18 years N (%)**	**Marital age >18 years) N (%)**	**P-value**
Graduate	8 (4.7)	25 (16.7)	
Post Graduate	1 (0.6)	19 (12.7)	
Employment status			0.28
Employed	128 (74.4)	120 (80)	
Home maker	44 (25.6)	30 (30)	
Socioeconomic status			**0.00**
Low	70 (40.7)	28 (18.7)	
Middle	102 (59.3)	122 (81.3)	
Marital status			0.99
Divorced/ Separated	2 (1.2)	2 (1.3)	
Currently Married	170 (98.8)	148 (98.7)	
Husband's Employment			**0.00**
Private Job	49 (28.5)	81 (54.0)	
Driver	31 (18.0)	14 (9.3)	
Government Job	2 (1.2)	12 (8.0)	
Self-Employed	1(0.6)	2 (1.3)	
Labor	81 (47.1)	29 (19.3)	
Others	8 (4.7)	12 (8.0)	
Husband's Education			**0.00**
Illiterate	48 (27.9)	14 (9.3)	
Primary	16 (9.3)	12 (8.0)	
High School	74 (43.0)	40 (26.7)	
Senior Secondary	11 (6.4)	19 (12.7)	
Graduate	18 (10.5)	49 (32.7)	
Postgraduate	5 (2.9)	16 (10.7)	
Total	**172 (100)**	**150 (100)**	

Assessment of relationship with the spouse was made across various themes including communication with him on general concerns, reproductive concerns, interactions with him in the last six months, and physical or sexual violence. Statistically, highly significant ($p<0.001$) association of marital age was observed with communication on general concerns which included whether the spouse discussed how to spend money, about in-laws, and other general matters with the spouse. The majority of the participants, in both the groups, reported their involvement in financial decision-making, but it was comparatively less in early married ones (Table 2). Similarly, in-laws issues were discussed with 51.7% early married women compared to 67.3% late married while communication on general matters with the spouse also reported to be significantly less among the early married females. In case of discussion with spouse regarding reproductive concerns, it was found that half of the early married females discussed when/ whether to have children, compared to 65.3% in the other group ($p<0.001$).Similarly, only 49.4% early married couples had a discussion about contraceptive usage, compared to 62% couples, who married after 18 years

(p=0.02).Also, less than half (44.2%) of the early married respondents discussed reproductive matters with their spouses in the last six months in contrast to 60% females who were considered in the other group (p<0.001). Statistical association was found to be highly significant in case of spousal interactions within the last six months, which included going for movies, other places of entertainment and visiting a woman's natal home (p<0.05). (Table 2)

Statistically, non-significant results (p>0.05) were observed in case of spousal violence when the participants were asked about whether their husbands had taken part in violence against them (n=148, 86.0%) or forced to engage in sex (n= 158, 91.1%) among females having age less than 18 years at the time of marriage (Table 2).

Regarding decision-making autonomy and self-efficacy or subjectivity, it was found that significantly fewer number of females in early married group had the freedom of choosing friends (45.3%) and same trend was observed in autonomy in purchasing clothes for themselves and spending money on other affairs. Both of these associations were statistically not significant (p>0.05). Only 36.6% of the participants, among the early married ones, reported that they were unable to express their opinions to elders (p>0.05). However, the same was the case with being able to confront people who said/ did wrong (57.6%) and expression of the opinions to elders in the family (52.3%), but statistical association in both these cases was not found to be significant (p>0.05).

Table 2. Marital relationship measures and their association with marital age

Marital relationship measures		**Female age at marriage**		**p-value**
		Less than 18 years N (%)	**More than 18 years N (%)**	
Communication on general concerns				
Spouse discusses how to spend money	NO	69 (40.1)	38 (25.3)	**0.00**
	YES	103 (59.9)	112 (74.7)	
Spouse discusses in-law issues	NO	83 (48.3)	49 (32.7)	**0.00**
	YES	89 (51.7)	101 (67.3)	
Spousal communication on other general matters	NO	86 (50.0)	53 (35.3)	**0.00**
	YES	86 (50.0)	97 (64.7)	
Communication on reproductive concerns				
	NO	86 (50.0)	52 (34.7)	**0.00**

Marital relationship measures		**Female age at marriage**		**p-value**
		Less than 18 years N (%)	**More than 18 years N (%)**	
Spouse discussed when/whether to have children	YES	86 (50.0)	98 (65.3)	
Spouse discusses contraceptive use	NO	87 (50.6)	57 (38.0)	**0.02**
	YES	85 (49.4)	93 (62.0)	
Spousal communication on reproductive matters	NO	96 (55.8)	60 (40.0)	**0.00**
	YES	76 (44.2)	90 (60.0)	
Last six months spousal interactions				
Went to see movie together in past 6 months	NO	151 (87.8)	111 (74.0)	**0.00**
	YES	21 (12.2)	39 (26.0)	
Visited other place of entertainment in past 6 months	NO	140 (81.4)	89 (59.3)	**0.00**
	YES	32 (18.6)	61 (40.7)	
Visited woman's natal home in past 6 months	NO	71 (41.3)	40 (26.7)	**0.00**
	YES	101 (58.7)	110 (73.3)	
Spousal violence				
Physical violence*	NO	148 (86.0)	133 (88.7)	0.50
	YES	24 (14.0)	17 (11.3)	
Sexual violence**	NO	14 (8.1)	16 (10.7)	0.45
	YES	158 (91.1)	134 (89.3)	

Marital relationship measures		Female age at marriage		p-value
		Less than 18 years N (%)	More than 18 years N (%)	
Decision-making autonomy				
Autonomy in choosing friends	NO	94 (54.7)	53 (35.3)	**0.00**
	YES	78 (45.3)	97 (64.7)	
Autonomy in purchasing clothes	NO	53 (30.8)	33 (22.0)	0.08
	YES	119 (69.2)	117 (78)	
Autonomy in spending money	NO	48 (27.9)	31 (20.7)	0.15
	YES	124 (72.1)	119 (79.3)	
Self-efficacy				
Able to express opinions to elders or confront them if they are wrong/ challenge individuals who said/did anything unsuitable	NO	63 (36.6)	39 (26.0)	**0.04**
	YES	109 (63.4)	111 (74.0)	

*pushed, punched, slapped, kicked, dragged, choked, shaken or beaten
**ever forced her to have sex

DISCUSSION

A number of laws exist against child marriage, yet this practice remains prevalent. Globally, 1 out of every 5 girls is married or made to be in union before reaching her 18th birthday. In many third world countries, 12% of girls gets married before the age of 15 years and 40%before the age of 18(Child marriage, United Nations Population Fund [UNFPA]-). In India, 40% of the females are reported to be married before reaching the legal age.(National Family Health Survey (NFHS-4) 2015-16 INDIA, 2017) In our study, the prevalence of early marriage was found to be 53.4% in the study population, much higher than the state average, and a lot more than a study conducted in Manipur, which stated prevalence of the same as 36.22% (Singh, Indira and Minita, 2014), Bihar, which has prevalence of 42.5%, Rajasthan- having prevalence of 35.4% as well as above the national average *(National Family Health Survey (NFHS-4) 2015-16 INDIA*, 2017).

According to National Family Health Survey (NFHS) data, the median age at marriage for females in the country has been observed to be 19.0 years, while for men it is 24.5 years; both of which have seen a rise from 17.2 years and 22.6 years, respectively.

In the present study, however, the mean age at marriage of women marrying before the legal age was found to be 15.84±1.92 years, while for men it was 19.97±3.49 years. A study conducted in Sudan reported concordant findings with the present study with mean age of marriage at 15.4 years (Ali et al., 2014). The practice of early marriage was found to be more prevalent in case of Hindus (74.4%) which was concordant with another study which also reported higher prevalence of the same among Hindus, probably because of social, economic and health perspectives (Parab, 2016). A study in Nigeria reported Islam to be a contributor toward higher number of child brides (Ali et al., 2014). In a country like this, religion has a vital role in defining values and practices at personal, family and community level, including the developmental issues of girls and young children (Ali et al., 2014).

As this study was conducted in rural population, the higher prevalence of early marriage (53.4%) is similar to the finding in other studies conducted in countries like Bangladesh and Nigeria (Ali et al., 2014; Haq, 2018). Patriarchy, coercion, social customs, and norms could be mentioned as principal determinants in case of forcing girls into marrying early (Seth et al., 2018) Education, almost universally, plays a protective effect in delaying early marriage, both among girls and boys. In a country like India, where male dominance is very much apparent in the society, gender disparity is intensely ingrained in its social and cultural standards, and, consequently, girls falls short on educational prospects in their upcoming life. School and college dropout, especially before the completion of secondary education, is very much evident because of early marriage (Paul, 2019). In the current study, as well as those done previously, an inverse association of education status has been observed in child marriage prevalence (Ali et al., 2014). Early marriage and socioeconomic status are also found to have a significant association wherein females belonging to lower socioeconomic status have higher chances of getting married early. The same has been depicted in studies conducted in various countries worldwide (Vang and Bogenschutz, 2014; Efevbera et al., 2019) as well as in the country itself (Paul, 2020). Also, in our study, the results have been found to be consistent with other studies primarily because poor families often tend to think that marrying their girl child early will provide social and financial security to their daughters (Sandhu and Geethalakshmi, 2017). Cultural family structure, weak authority of females, and responsibility to fulfill needs also forces parents of a girl child to marry their child at a younger age (Montazeri et al., 2016).

In this study, husbands who were involved in labor as well as those having education until high school were more likely to marry females less than the national legal age of 18 years. This could be due to the societal pressures, and lack of proper education. Due to this, they are also more likely to discontinue their education and not be motivated to finish their studies (Kerckhoff and Parrow, 1979). The responsibility of financial management in our study was found to primarily rest with the male counterpart only, probably because, in Indian society, males are supposed to be playing the role of head of the family (Sharma Biswas and Mukhopadhyay, 2018). Spousal communication in case of contraceptive usage was not as prevalent among females who married early (49.4%). Apart from this, bearing of children (50.0%) was found as one of the areas where more than half of the under 18 brides did not have a say. Communication regarding reproductive matters was also not found to be a topic which was open to discussion with early brides (44.2%), as these females are considered to be subservient, so, decisions

regarding fertility and childbearing largely remained the domain of older female relatives. In case of young females, it has also been observed that they have little choice in selection of life partner as arranged marriages are usually the norm in South Asian countries, and they often do not get a chance to meet with their fiancé before marriage. The notion that the girl is 'old enough' to marry stems from the cultural belief that accomplishment to manage household work and physical maturity are sufficient for a girl to get married (Hamid, Stephenson and Rubenson, 2011).

Spousal violence has been reported to be fairly common in the study area as well as in other studies, including both physical and sexual violence, which may be because those women did not have the capacity in terms of education and income they hold, but also due to having very slim knowledge and awareness about their rights (Nadda et al., 2018). Although we did not find any significant difference between the two groups as far as violence with spouse is concerned, around 86% of the early married and 88.7% of females who married at the right age stated that they had been inflicted with physical violence while 91.1% among early married had suffered from sexual violence at one point of time or another. This reflects inherent gender discrimination that endures across our country. Men dominated society and culture in the family, and the leisure that male counterparts enjoy in rights, privileges, authority and power, reflects the deep-seated gender discrimination that persists across the country. Women's socialization into outranked place and rationalizing men to be the superior half with a right to dominate women consequently resulted in male patriarchy. This ultimately results in incapacity of women, which may promote violence against them and their inability of to defend themselves (Babu and Kar, 2009).

A study done in Cairo (Samari and Pebley, 2018) reported less autonomy for women as compared to men, similar to our study wherein early married females have less control over spending money, as well as choosing friends. It was found to be similar to another study conducted in Nepal wherein it was found that early marriage was significantly associated with younger women having less autonomy over personal and financial matters *(Acharya et al.,* 2010). This may be because of prevalent poverty as well as low socioeconomic status of the families. The social factors, while not straight-away tested in the models, are not encouraging to promote self-sufficiency. Also because of the custom that females are thought be answerable to their families in case of economic independence.

It is an established fact that society of residence determines self-sufficiency, above and beyond that of individual and household factors, and also it is considerably linked to personal, physical, and financial autonomy over time. Findings of our study showed that early married females had limited autonomy, in all aspects, compared to the females in other groups but the significant difference was only in choosing their friends. It was also found in various studies that females had more autonomy over spending money and personal decision-making as their age increases. The potential reason behind older women having more autonomy could be that they are able to win the trust of their husbands and gain stability in the form of children after the passage of time (Akram, 2018). Also, researchers noticed that a girl, who just entered in her new family through marriage, holds less decision-making autonomy in the household, plus a number of household duties are immediately expected from her side in the guidance of the mother-in-law, who usually remains the ultimate decision-maker in the family (Acharya et al., 2010).

As per the taboos prevalent in Indian society, compared to a man, a woman's selection rights are highly compromised in the married life. This makes women think that they not in control as far as the significant life events are concerned, which might become a cause of less self-efficiency. The self-efficiency viewpoints are vital perceptive interpretations which help to construct beliefs about future deeds and individual abilities. Feeling self-efficiency is also helpful for mental and physical health. High self-efficacy in the relationships makes people relatively more broad-minded toward sharing their marital life events and issues (Hamidian and Mousavi, 2015; Pour Fard et al., 2016; Poorbaferani, Mazaheri and Hasanzadeh, 2018).This is similar to the findings done in various other studies wherein it has been depicted that being self-sufficient has had a positive effect in their relationship with their partners as well as in-laws.

CONCLUSION

This study assures the reality that early marriages are very much prevalent in some parts of the country, and, despite the most earnest efforts over a long period of time, is still persisting as a mark of disgrace to our society, especially in the rural areas. Findings of the study stressed the need of programs that should take a note of the needs of these women, which are different from the adult married ones and also persuade the elders in the family to think that marriage before attaining the legal age compromises a young girl's life and choices in many ways. Efforts inclined toward breaking down social seclusion with encouraging couple interaction, cooperation and skills to manage any conflict, should be encouraged, to give these women, a better chance of controlling their lives.

It is evident that, through various existing programs and policies, to address the issue, the country recognizes the significance of preventing early marriages. So, it is imperative that such efforts should reach the right audience, including the decision-makers of their lives and the society as a whole, to achieve a better future perspective for the upcoming generation.

REFERENCES

Acharya, D. R. *et al.* (2010) 'Women's autonomy in household decision-making: A demographic study in Nepal', *Reproductive Health*, 7(1), p. 15. doi: 10.1186/1742-4755-7-15.

Akram, N. (2018) 'Women's Empowerment in Pakistan: Its Dimensions and Determinants', *Social Indicators Research*, 140(2), pp. 755–775. doi: 10.1007/s11205-017-1793-z.

Ali, A. A. A. *et al.* (2014) 'Socio-Demographic Factors Affecting Child Marriage in Sudan', *J Women's Health Care*, 3(4), p. 163. doi: 10.4172/2167-0420.1000163.

Babu, B. V and Kar, S. K. (2009) 'Domestic violence against women in eastern India : a population-based study on prevalence and related issues', 15, pp. 1–15. doi: 10.1186/1471-2458-9-129.

Barua, A. and Kurz, K. (2001) 'Reproductive health-seeking by married adolescent girls in Maharashtra, India', *Reproductive health matters*, 9(17), pp. 53–62. doi: 10.1016/S0968-8080(01)90008-4.

Chen, Y.-Z. and Tanaka, H. (2014) 'Women's Empowerment', in *Encyclopedia of Quality of Life and Well-Being Research*. Springer Netherlands, pp. 7154–7156. doi: 10.1007/978-94-007-0753-5_3252.

Child marriage | UNFPA - United Nations Population Fund (no date). Available

at: https://www.unfpa.org/child-marriage (Accessed: 7 January 2021).

Child marriage | UNICEF (no date).

'Child marriage around the world | UNICEF' (no date).

Dahl, G. B. (2010) 'Early teen marriage and future poverty', *Demography*, 47(3), pp. 689–718. doi: 10.1353/dem.0.0120.

Efevbera, Y. *et al.* (2019) 'Girl child marriage, socioeconomic status, and undernutrition: evidence from 35 countries in Sub-Saharan Africa', *BMC Medicine*, 17(1), p. 55. doi: 10.1186/s12916-019-1279-8.

Hamid, S., Stephenson, R. and Rubenson, B. (2011) 'Marriage decision making, spousal communication, and reproductive health among married youth in Pakistan.', *Global health action*, 4, p. 5079. doi: 10.3402/gha.v4i0.5079.

Hamidian, S. and Mousavi, F. (2015) 'Emotional intelligence and the mediated role of Self-effectiveness described by marriage satisfaction model', *undefined*.

Haq, M. (2018) 'Relationship Between Age at Marriage, Education and Fertility Among Residence of Bangladesh', *American Journal of Social Science Research*, 4(2), pp. 33–39.

Jejeebhoy, S. J. and Bott, S. (2003) 'Non-consensual sexual experiences of young people: A review of evidence from developing countries.', *South & East Asia Regional Working Paper*, (16).

Joshi, A. *et al.* (2001) 'Experiences and perceptions of marital sexual relationships among rural women in Gujarat, India', *Asia-Pacific Population Journal*, 16(2), pp. 177–194. doi: 10.18356/B39B70AB-EN.

Kerckhoff, A. C. and Parrow, A. A. (1979) 'The Effect of Early Marriage on the Educational Attainment of Young Men', *Journal of Marriage and the Family*, 41(1), p. 97. doi: 10.2307/351735.

Mahato, S. K. (2016) 'Causes and Consequences of Child Marriage: A Perspective', *International Journal Of Scientific & Engineering Research*, 7(7). Available at: http://www.ijser.org (Accessed: 7 January 2021).

Montazeri, S. *et al.* (2016) 'Determinants of Early Marriage from Married Girls' Perspectives in Iranian Setting: A Qualitative Study', *Journal of Environmental and Public Health*, 2016. doi: 10.1155/2016/8615929.

Nadda, A. *et al.* (2018) 'Study of domestic violence among currently married females of Haryana, India', *Indian Journal of Psychological Medicine*, 40(6), pp. 534–539. doi: 10.4103/IJPSYM.IJPSYM_62_18.

National Family Health Survey (NFHS-4) 2015-16 INDIA (2017).

Parab (2016) *And the I was a Bride: Ana analysis of Incidence of Child Brides across India-A District Level Study*.

Paul, P. (2019) 'Effects of education and poverty on the prevalence of girl child marriage in India: A district–level analysis', *Children and Youth Services Review*, 100, pp. 16–21. doi: 10.1016/j.childyouth.2019.02.033.

Paul, P. (2020) 'Child Marriage Among Girls in India: Prevalence, Trends and Socio-Economic Correlates', *Indian Journal of Human Development*, 14(2), pp. 304–319. doi: 10.1177/0973703020950263.

Poorbaferani, Z., Mazaheri, M. A. and Hasanzadeh, A. (2018) 'Life satisfaction, general self-efficacy, self-esteem, and communication skills in married women.', *Journal of Education and Health Promotion*,

7(1), p. 173. doi: 10.4103/jehp.jehp_108_18.

Pour Fard, M. M. *et al.* (2016) 'The relationship between self-efficacy and marital satisfaction among married students', *International Journal of Pediatrics*, 4(8), pp. 3315–3321. doi: 10.22038/ijp.2016.7384.

Sama, A. A. (no date) 'Women Empowerment: Issues and Challenges', *Article The International Journal of Indian Psychology*, 4(103).

Samari, G. and Pebley, A. R. (2018) 'Longitudinal determinants of married women's autonomy in Egypt', *Gender, Place and Culture*, 25(6), pp. 799–820. doi: 10.1080/0966369X.2018.1473346.

Sandhu, N. K. and Geethalakshmi, R. G. (2017) 'Determinants and impact of early marriage on mother and her newborn in an urban area of Davangere: a cross-sectional study', *International Journal Of Community Medicine And Public Health*, 4(4), p. 1278. doi: 10.18203/2394-6040.ijcmph20171362.

Santhya, K. G. *et al.* (2010) 'Associations between early marriage and young women's marital and reproductive health outcomes: Evidence from India', *International Family Planning Perspectives*, 36(3), pp. 132–139. doi: 10.1363/3613210.

Saryal, S. (2014) *Women's Rights in India: Problems and Prospects*, *International Research Journal of Social Sciences*. Available at: www.isca.me (Accessed: 7 January 2021).

Seth, R. *et al.* (2018) 'Social Determinants of Child Marriage in Rural India'. doi: 10.31486/toj.18.0104.

Sharma Biswas, C. and Mukhopadhyay, I. (2018) 'Marital status and women empowerment in India'. doi: 10.15406/sij.2018.02.00030.

Singh, K. ., Indira, R. and Minita, N. (2014) 'ISSN (o): 2321 – 7251 Prevalence of early marriage among women in a muslim-dominated area of Manipur and its associated factors Abstract : Introduction : Objectives ':, (4), pp. 1180–1184.

UNICEF (2019) 'Ending Child Marriage: A profile of progress in India - UNICEF DATA', pp. 1–28.

UNICEF India (2017) 'Child Marriage | UNICEF', pp. 1–3.

Vang, P. Der and Bogenschutz, M. (2014) 'Teenage Marriage, and the Socioeconomic Status of Hmong Women', *International Migration*, 52(3), pp. 144–159. doi: 10.1111/j.1468-2435.2010.00674.x.

A STUDY OF BLOOD GROUP IN COVID-19 PATIENTS IN TERTIARY CARE HOSPITAL OF AHMEDABAD CITY, GUJARAT, INDIA - AN INSTITUTIONAL STUDY

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ABSTRACT

Introduction: The associations between ABO system of blood and COVID-19 infection in various studies provide reason to think true associations may be in reality between blood type and incidence of COVID-19 and death due to COVID-19. **Objectives:** To estimate frequency of COVID-19 illness in different ABO blood systems and also to find linkage between the ABO system of blood and degree of COVID-19 illness. **Methods:** A prospective cohort study was conducted on all COVID-19 patients (Patients were grouped A positive and A negative blood groups into 1st group and other blood types such as B, AB, and O, irrespective of their Rh status, into 2nd group) admitted at Tertiary Care Hospital of Ahmedabad City, Gujarat, India during the four months of study duration. **Results:** COVID-19 infection was found in 380 (63.3%) male. Mean age was 56.46 ±15.35 years in which 26.8% patients were in age group of 60 to 70 years. Among total 600 patients, 35% of patients were having B positive type of blood followed by O positive type of blood (25%). There were 25% of patients having overall co-morbidity like diabetes. And 8% of B positive patient having co-morbidity and amongst the, 1.2% patients were admitted to Intensive Care Unit. Case fatality rate was 7.5%. Among B positive blood group patients, 37.8% deaths occurred. **Conclusion:** Patients having blood group O may have lower chances of ICU admission as compared to other blood groups.

Keywords: Blood group, COVID-19, Comorbidity, ICU, Mechanical Ventilation

INTRODUCTION

Virus SARS-COV2, the infectious agent for COVID-19 illness, is a great public health threat and the world is facing the COVID-19 pandemic (Rothan and Byrareddy, 2020). The global population is affected greatly by SARS-COV2 virus; those who are elder, male and with associated illnesses such as coronary heart disease, high blood pressure, higher blood sugar, and respiratory diseases have demonstrated additional susceptibility to severe disease (Shi et al., 2020).

Histo-blood group antigens is human cells and tissues that include red cells which contain complex carbohydrate-based antigens. Histo-blood group antigens are expressed on the plane of the red blood cell (RBC) membranes and play a vital part in acquiring or reducing the probability of getting COVID-19 infection (Bai et al., 2020; Lai et al., 2020; J and R, 2017). Various research studies have been done to know the percentage of various types of

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blood groups in COVID-19 patients and to know the impact of the ABO blood system on getting the COVID-19 illness. (Lei and Hilgenfeld, 2017;VM et al., 2018; Lu et al., 2020; S et al., 2020;; N et al., 2020; Wu et al., 2020).

At this time, many research studies have suggested a linkage between various ABO blood grouping and chances to get COVID-19 illness, its importance in the development of the illness in patient, and consequences of the disease. In a number of research findings, the linkage between the ABO blood system and COVID-19 was found. According to various published studies, protective effect was shown by blood group O against COVID-19 illness. People with O type of blood group have low chances of developing COVID-19 illness and those of blood group O are also less susceptible to infection, or most of the patients having O blood group are asymptomatic so these patients do not seek out COVID-19 testing (Zhang et al., 2021).

Various modifiable and non-modifiable factors responsible for development of COVID-19 illness and death are already known, including increasing age, gender, high risk behavior like smoking habit, high blood pressure, diabetes mellitus and chronic coronary and vascular diseases and respiratory illness. The linkage observed between the ABO blood system and COVID-19 infection in various studies provides reason to think true associations may be in reality between the ABO system and incidence of COVID-19 and COVID-19-related death (Zietz, Zucker and Tatonetti, 2020a).

The incidence, severity of the disease, and deaths due to COVID-19 infection were usually found in A or B or AB blood group people while blood type O had protective effect against the COVID-19 illness (Samra, Habeb and Nafae, 2021).

Blood group having Rh - negative may protect against the risk of mechanical ventilation (intubation) and death (Zietz, Zucker and Tatonetti, 2020b).

There are studies done in 2021 which established the linkage between the ABO blood system and development of COVID-19 illness. Linkage of the ABO blood system with severity and deaths in patients of blood transfusion during their admission to hospital was found. A type of blood and O type of blood of COVID-19 blood donors present a high and low possibility of getting COVID-19, respectively. Risk of death among A type group was significantly bigger than in O type patients (Muñiz-Diaz et al., 2021). In a study conducted in the United States of America (USA), blood type O (45%) was the most common reported in COVID-19 patients. But, there was no relationship established between any type of blood and severity of COVID-19 illness even in hospital admission and intubation (CA et al., 2020).

Finding the determinants associated with development of COVID-19 disease is critical to ensure that those people at great probability of getting infection can think of additional steps for prevention of getting the COVID-19 infection. In addition to the above, identifying patients having more chances for development of severe disease or higher risk of death may guide practicing doctors better for anticipating patient end results, permitting for further focused allocation of bounded critical care materials, money and staff of the nation during the global pandemic of COVID-19.

The ABO blood system may impact getting COVID-19 and the severe degree of the disease. This research is to compare whether blood type is linked for risk of developing COVID-19 illness and death.

METHODS

A prospective longitudinal study was conducted on all COVID-19 patients admitted at COVID-19 designated hospital of Ahmedabad City for the study period through pre-tested and pre-structured questionnaire. All COVID-19 patients admitted at the designated tertiary care

hospital of the Ahmedabad city between August and November, 2020 were included in the current study. The selection of the participants was limited to COVID-19 patients who were above 18 years of age with confirmed COVID-19 infection. In this study, patients admitted during the study period were purposively included in the study. Study participants included all COVID-19 positive in-patients (RT-PCR test positive or Rapid Antigen Test - RAT test Positive) admitted at a tertiary care Covid hospital during a four month period.

Patients who have blood disorders like hemoglobinopathies, and also laboratory confirmed negative for COVID-19 by RT-PCR assay for both groups were excluded from the current study. For the association, two groups of patients were made. Patients were grouped A positive and A negative blood groups into 1st group (Exposed) and other blood types such as B, AB, and O, irrespective of their Rh status, into 2nd group (Non-exposed). An assumption was made that the expected proportions to be cured from COVID-19 by day 14 in 1st group (blood group A) and in 2nd group (blood groups B, O, AB) are 70% and 90%, respectively. Thus, we required a total of 527 samples at a 1:2 ratio, which would provide a power of at least 98% in two-tailed tests and a p value less than 0.05, to detect significant differences between the groups. Therefore, considering a 10% dropout rate, we needed 580 samples in total (Sample Size Calculator by Raosoft, Inc., 2022).

Outcomes of all patients were recorded and all patients were followed till discharge or death. No loss to follow-up and drop out of patient happened during the study period. Exposure was defined as patients having blood group "A" while patients having other blood group "Non-A" were unexposed group during the analysis of the data. Out of total 602 patients who were screened, a total of 600 patients were eligible and enrolled in the study. Total 45 patients died due to COVID-19, and 555 patients completed the follow-up. The statistical analysis was done for 600 patients.

Outcome variables were death, discharge patients, ICU admission. Independent variables were age, sex, blood group, Rh status, comorbidity. Data were entered in MS Excel sheet. All statistical analyses (percentage, mean, $\chi 2$ test, p value) were conducted in Microsoft Excel and WHO Epi info version 7.2.The current study was sanctioned by Institutional Committee of Ethics & Clinical Trial Registration (CTRI) number for this COVID-19 trial is CTRI/2021/01/030344.

RESULTS

There were 220 females (36.7%) and 380 males (63.3%) in the current study (n=600).

Table 1. Basic characteristics of COVID-19 patients stratified by types of blood group

Characteristics	Blood Group				$\chi 2$ test (p value)
	O	A	B	AB	
Gender					
Female	60	60	81	19	1.2 (0.76)
Male	107	89	147	37	
Age groups (in years)					
15-25	04	03	08	01	25.7 (0.10)
25-35	18	13	24	03	
35-45	24	17	24	13	
45-55	26	23	35	12	
55-65	51	58	60	10	
65-75	32	22	51	15	
>=85	12	13	26	02	
Comorbidity status					
Present	48	38	57	13	1.0 (0.80)
Absent	119	111	171	43	

As shown in Table 1, the Male : Female ratio was 1.72 having COVID-19 infection (n=600). Males were almost 1.7

times acquiring COVID-19 infection as compared to females. Mean age was 56.46 ±15.35 years in which 29.8% COVID-19 patients fell between 55-65 years of the age group. Distribution of the ABO blood system group in COVID-19 patients was as 35% patients having B+ (positive) blood group followed by O+ (positive) blood group (25%), A+ (positive) blood group (23%), AB positive (25%), B negative (3%), O negative (2%). There were 26% of patients having overall co-morbidity like diabetes, hypertension, kidney injury, coronary artery disease, emphysema, chronic bronchitis, cancer, etc. Among a total 156 COVID-19 patients having comorbidity, death occurred in 18 (11.5%) patients while among a total 444 COVID-19 patients not having any comorbidity, death occurred in 6.1% patients. There were 8% patients of the B blood group positive patients having comorbidity like diabetes, hypertension, etc., and amongst them 1.2 % patients were required to be admitted into Intensive Care Unit (ICU) and 0.8% were on artificial respiration (mechanical ventilation).

Table 2. Outcome of COVID-19 patients in accordance to blood group

Blood group	**Rh status**	**Discharged**	**Death**	**χ2 test (p value)**
A	Positive	129	09	7.74 (0.051)
	Negative	10	01	
	Total	139	10	
B	Positive	194	17	
	Negative	15	02	
	Total	209	19	
AB	Positive	48	04	
	Negative	04	00	
	Total	52	04	
O	Positive	142	12	
	Negative	00	13	
	Total	142	25	

Case fatality rate was 7.5% and amongst 45 total deaths, 37.8% deaths occurred in B positive blood group patients. Table 2 depicts that statistically significant difference was not observed for ABO blood system and survival of patients suffering from COVID-19 illness. (χ2 value 7.74, p value 0.051).

Table 3. Relationship of ABO blood system and comorbidity with the degree of severity of COVID-19

Comorbidity	**Blood group**	**Discharged (%)**	**Death (%)**	**χ2 test (p value)**
Present	A	31 (81.6)	07 (18.4)	4.95 (0.03)
	B	52 (91.2)	05 (8.8)	
	AB	12 (92.3)	01 (7.7)	
	O	43 (89.6)	05 (10.4)	
	Total	138 (88.5)	18 (11.5)	
Absent	A	108 (97.3)	03 (2.7)	
	B	157 (91.8)	14 (8.2)	
	AB	40 (93.0)	03 (7.0)	
	O	112 (94.1)	07 (5.9)	
	Total	417 (93.9)	27 (6.1)	
Total		555 (92.5)	45 (7.5)	

Table 3 shows that outcomes with ABO blood system of COVID-19 patients were significantly associated (p value 0.051). The association of outcome of COVID-19 patients with comorbidity was also significant (χ2 test value 4.95**,** p value 0.03). There were 11.1% patients having comorbidity.

There was no significant linkage established between both ABO-Rh system of blood grouping and severity of COVID-

19 illness ($\chi 2$ 1.6, p value >0.05). In the present research study, 10.7% people having AB blood group were admitted in Intensive Care Unit following A grouping (8.7%), B grouping (8.3%) and lastly amongst O Blood grouping (6.0%). A total 8% COVID-19 patients ICU care facilities as they developed into severe disease.

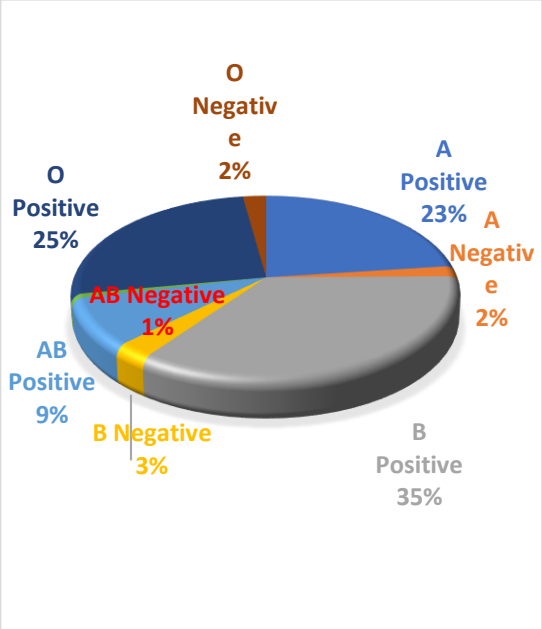

Figure 1. ABO group distribution of COVID-19 indoor patients

Figure 1 shows that the maximum patients were blood group A (35%) followed by O positive (25%).

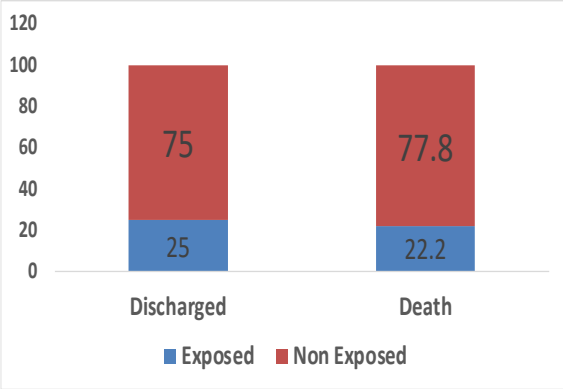

Figure 2. Outcome of COVID-19 patients according to exposure status

Figure 2 shows the outcome (death) was 7.5 % for the total population (n=600), 10 (22.2%) in 1st group, and 35 (77.8%) in 2nd group (RR, 0.87; 95% CI, 0.44–1.70; p = 0.68).

Table 4. Association of ABO blood system with admission in intensive care unit of COVID-19

ABO System Of Blood	ICU admission required (%)		$\chi 2$ test (p value)
	Yes	No	
A	13 (8.7)	136 (91.3)	1.62 (0.66)
B	19 (8.3)	209 (91.7)	
AB	06 (10.7)	50 (89.3)	
O	10 (6.0)	157 (94.0)	
Total	**48 (8.0)**	**552 (92.0)**	

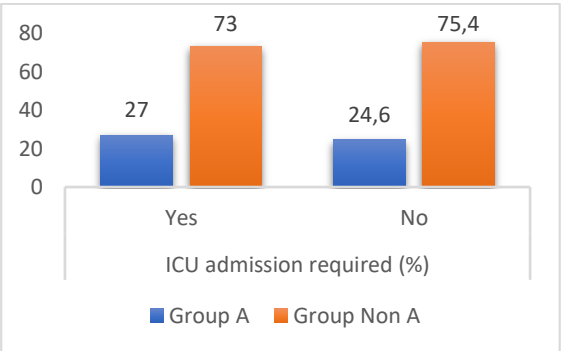

Figure 3. Risk ratio of blood group according to their ICU admission

Figure 3 depicts the Relative Risk (RR) among exposed group A and non-exposed group (Non-A) was found 1.12 (CI 0.61 to 2.06, p value 0.7062).

DISCUSSION

COVID-19 infection was found in 380 (63.3%) males. Mean age was 56.46 ±15.35 years in which 26.8% patients were in age group of 60 to 70 years. Among a total 600 patients, 35% of patients had B positive type of blood followed by O

positive (25%). There were 25% of patients having overall co-morbidity like diabetes and 8% of B positive patients having co-morbidity and, amongst them, 1.2% patients were admitted to Intensive Care Unit. Case fatality rate was 7.5%. Among B positive blood group patients, 37.8% deaths occurred.

The outcome (death) was 7.5% for the total population (n=600), 10 (22.2%) in 1st Group, and 35 (77.8%) in 2nd Group (RR, 0.87; 95% CI, 0.44–1.70; p = 0.68). Numerous research studies have also been found to establish linkage between COVID-19 disease incidence and the ABO blood system. In the current study, 380 male (63.3%) out of total 600 patients were having COVID-19 infection. In another study conducted at the state of Massachusetts, 1289 tested COVID-19 positive with a common studied blood type. A total 123 (9.5%) out of 484 were admitted to the Intensive Care Unit, 108 patients (8.4%) needed intubation to provide mechanical ventilation, three (0.2%) required extracorporeal membrane oxygenation (ECMO) and out of that 89 (6.9%) died. As many as 34.2%, 15.6%, 4.7% and 45.5% COVID-19 patients had blood type of A, B, AB, and O, respectively. No linkage was found between the ABO system and severe condition of COVID-19 illness described as mechanical ventilation - intubation or death (Latz et al., 2020) while in a large multi-institutional retrospective review, data differed to the study of Zhao et al. (2020) in the Wuhan incident as they found a linkage between ABO system of blood and deaths.

In another study, of COVID-19 disease patients, 32.9% were male, and the patients had 52 years of median age (interquartile range (IQR) 40-67) (Barnkob et al., 2020). Most common blood group among COVID-19 patients was B positive (35%) followed by O positive (25%), and blood group A (23%). In a similar type of research study, percentage of A type of blood among COVID-19 disease patient was in range of 28.8% and 44.4% (Pourali et al., 2020). Amongst total participants of the control group, authors found an excessive numbers of blood group O (46.46%), followed by B (24.57%), A (21.91%) and AB (7.06%).

In a study conducted at Dhaka Medical College Hospital, among the infected individuals, patients having blood group A were 32.8%, blood group B were 33.7%, blood group O were 21.5%, and blood group AB were 11.9%. (Mahmud et al., 2021a). In other study carried out by the blood centre of Dhaka Medical College, the percentage of various ABO systems among people were 21.8%, 37.5%, 8.9% and 31.8% blood group A, B, AB, and type O. respectively. Blood group A was observed more among the patients positive for COVID-19. (Karim et al., 2015). In many studies, significant difference was established in the distribution of the ABO system in the COVID-19 patients. In COVID-19 patients the ratio of blood group A to O was the reverse of the ratio observed among healthy volunteers in the control group. Observed results in cohort of convalescent blood donors previously who got infection with virus SARS-CoV2, found group A patients were more common than non-A patients (OR: 1.2; 95% CI: 1.1–1.4; $p<0.05$), while donors having O blood group were under-represented in contrast to non-O donors (OR: 0.8; 95% CI: 9 [0.7–0.8]; $p<0.05$) and the variations were very statistically significant (Muñiz-Diaz et al., 2021).

Data from one study at Vancouver General Hospital found high percentage of COVID-19 patients with blood group A or AB that required mechanical ventilation compared with patients with blood group O or B (Hoiland et al., 2020). Rh status of blood group and severe degree of COVID-19 was not found significant (p value >0.05). ICU admission was required less (6%) in COVID-19 patients having O blood group than other blood group patients. In comparison with type O blood group, blood group A was not linked with hospitalization (OR, 0.89 [95% CI, 0.80-0.99]; p value

0.03), or ICU admission (OR, 0.84 [95% CI, 0.69-1.02], p value 0.08). likewise, types B and AB were not linked with fatal consequences more than type O (Anderson et al., 2021). A total 27% patients admitted in exposed group required ICU admission as compared to 24.6% among non-exposed (Non-A blood group). The Relative Risk (RR) among exposed group A and non-exposed group (Non-A) was found 1.12 (CI 0.61 to 2.06, p value 0.7062).

According to research studies conducted among patients having positive RT-PCR for SARS-Cov 2019, blood group was associated with chances of mechanical ventilation (intubation) or death. A blood group had no significant association with COVID-19 illness, a greater number of COVID-19 illness was found among participants having blood group B; blood group AB was also associated with greater number of positive COVID-19 cases, while blood group O was linked with lower rate of positivity of COVID-19. Patients with blood group types B and type AB who underwent COVID-19 testing were more likely to get positive results as compared to people having Rh+ positive status, and O blood group people were less likely to get positive results. (CA et al., 2020). In a study conducted in Brazil, no such significant relationship between the ABO system with ICU admission rate and deaths was observed in different research studies (Yaylacı et al., 2020)

According to a scientific report published by Marwa Ali Almadhi, of COVID-19 patients requiring ICU admission, 40.8% had blood group O, 30.1% were B group, 23.5% were blood group A, and 5.6% were hAB group. Of the total COVID-19 positive patients who didn't require ICU admission, 45.8% had O type of blood, 27.4% had B type, 21.8% were of blood group A, and 5.0% were of AB type. No significant difference in distribution among blood groups was observed (1.9, p value 0.60). Also there was no significant association found to severe illness of COVID-19 disease with the ABO system (Ali Almadhi et al., 123AD). In other study, it was found probability of testing COVID-19 positive and degree of severe COVID-19 illness may be low among people having O type of blood and Rh-negative blood groups (Ray et al., 2021). There were mostly similar results found in distribution of the blood group B amongst COVID-19 patients (35%) and amongst general population (35.5%) in India (Agrawal et al., 2014). Acik and Bankir (2021) also observed no significant linkage between ABO blood system and other patient's characteristics and other clinical features and deaths in a study conducted in Adana, Turkey (. In a similar study conducted in Bangladesh, 16.1% patients were deteriorated to the next level of severe disease, including 20.6% in 1st group and 13.9% in 2nd group (RR, 1.49; 95% CI, 0.94–2.35; p = 0.09). The number of patients who remained positive after 14 days of testing was 13.7%; among them, 19% patients were in 1st group and 11.1% were in 2nd group (RR, 1.71; 95% CI, 1.04–2.81; p = 0.04).(Mahmud et al., 2021b).

In the present study, there was association found between the incidence of disease, degree of severity, and death rate of COVID-19 with the ABO blood system. There was incidence of severity of disease more common in patients having other than type O blood group while O blood group has protective effect against severe COVID-19 illness. But due to limited sample size it may not be generalized to the general population. More research studies are needed to establish the linkage between the ABO blood system and degree of severity of COVID-19 illness. Here also in the current study, we have included only hospitalized COVID-19 positive cases.

The study may give clues to clinicians about patients' susceptibility and development of severity in respect to blood group. Findings of the study can be incorporated in hospital policy for better patient management. In addition, this was an observational epidemiological research study, and while efforts were done to

control for confounders, there is always the possibility that unmeasured confounding is driving the results of the study.

The present study was conducted only in a tertiary care center among admitted patients. And that was among small sample size. Such type of study may be done at district or state level for the generalization of the study findings.

CONCLUSION

There was maximum COVID-19 infection in patients having B positive blood group (35.2%). Patients having B positive blood group with co-morbidity have more chance of ICU admission. There was no difference found in distribution of the blood group B amongst COVID-19 (35%) and amongst general population (32 to 35%). Patients who have O type of blood may have lower chances of admission in ICU in comparison with the patients having other types of blood group.

REFERENCES

Agrawal, A., Tiwari, A.K., Mehta, N., Bhattacharya, P., Wankhede, R., Tulsiani, S. and Kamath, S., 2014. ABO and Rh (D) group distribution and gene frequency; the first multicentric study in India. Asian Journal of Transfusion Science, [online] 8(2), pp.121–125. https://doi.org/10.4103/0973-6247.137452.

Ali Almadhi, M., Abdulrahman, A., Alawadhi, A., Rabaan, A.A., Atkin, S., AlQahtani, M., bin Khalifa Cardiac Centre, M., Hopkins Aramco Healthcare, J. and Arabia, S., 123AD. The effect of ABO blood group and antibody class on the risk of COVID-19 infection and severity of clinical outcomes Methods OPEN 1 National Taskforce for Combating the Coronavirus (COVID-19). Scientific Reports |, [online] 11, p.5745. https://doi.org/10.1038/s41598-021-84810-9.

Anderson, J.L., May, H.T., Knight, S., Bair, T.L., Muhlestein, J.B., Knowlton, K.U. and Horne, B.D., 2021. Association of Sociodemographic Factors and Blood Group Type With Risk of COVID-19 in a US Population. JAMA Network Open, [online] 4(4), pp.e217429–e217429. https://doi.org/10.1001/JAMANETWORKOPEN.2021.7429.

Anon 2022. Sample Size Calculator by Raosoft, Inc. [online] Available at: <http://www.raosoft.com/samplesize.html> [Accessed 31 Jan. 2022].

Bai, Y., Yao, L., Wei, T., Tian, F., Jin, D.-Y., Chen, L. and Wang, M., 2020. Presumed Asymptomatic Carrier Transmission of COVID-19. JAMA, [online] 323(14), pp.1406–1407. https://doi.org/10.1001/JAMA.2020.2565.

Barnkob, M.B., Pottegård, A., Støvring, H., Haunstrup, T.M., Homburg, K., Larsen, R., Hansen, M.B., Titlestad, K., Aagaard, B., Møller, B.K. and Barington, T., 2020. Reduced prevalence of SARS-CoV-2 infection in ABO blood group O. Blood Advances, [online] 4(20), pp.4990–4993. https://doi.org/10.1182/BLOODADVANCES.2020002657.

CA, L., C, D., L, B., CYM, P., R, P., MF, C., M, E. and A, D., 2020. Blood type and outcomes in patients with COVID-19. Annals of hematology, [online] 99(9), pp.2113–2118. https://doi.org/10.1007/S00277-020-04169-1.

Hoiland, R.L., Fergusson, N.A., Mitra, A.R., Griesdale, D.E.G., Devine, D. v., Stukas, S., Cooper, J., Thiara, S., Foster, D., Chen, L.Y.C., Lee, A.Y.Y., Conway, E.M., Wellington, C.L. and Sekhon, M.S., 2020. The association of ABO blood group with indices of disease severity and

multiorgan dysfunction in COVID-19. Blood Advances, [online] 4(20), pp.4981–4989. https://doi.org/10.1182/BLOODADVANCES.2020002623.

J, L. and R, H., 2017. RNA-virus proteases counteracting host innate immunity. FEBS letters, [online] 591(20), pp.3190–3210. https://doi.org/10.1002/1873-3468.12827.

Karim, S., Hoque, M.M., Hoque, E., Begum, H.A., Rahman, S.M., Shah, T.A. and Hossain, S.Z., 2015. The Distribution of Abo and Rhesus Blood Groups Among Blood Donor Attending Transfusion Medicine Department of Dhaka Medical College Hospital in 2014. Journal of Dhaka Medical College, [online] 24(1), pp.53–56. https://doi.org/10.3329/JDMC.V24I1.29564.

Lai, C.-C., Liu, Y.H., Wang, C.-Y., Wang, Y.-H., Hsueh, S.-C., Yen, M.-Y., Ko, W.-C. and Hsueh, P.-R., 2020. Asymptomatic carrier state, acute respiratory disease, and pneumonia due to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2): Facts and myths. Journal of Microbiology, Immunology, and Infection, [online] 53(3), p.404. https://doi.org/10.1016/J.JMII.2020.02.012.

Latz, C.A., DeCarlo, C., Boitano, L., Png, C.Y.M., Patell, R., Conrad, M.F., Eagleton, M. and Dua, A., 2020. Blood type and outcomes in patients with COVID-19. Annals of Hematology, [online] 99(9), pp.2113–2118. https://doi.org/10.1007/s00277-020-04169-1.

Lei, J. and Hilgenfeld, R., 2017. RNA-virus proteases counteracting host innate immunity. Febs Letters, [online] 591(20), p.3190. https://doi.org/10.1002/1873-3468.12827.

Lu, R., Zhao, X., Li, J., Niu, P., Yang, B., Wu, H., Wang, W., Song, H., Huang, B., Zhu, N., Bi, Y., Ma, X., Zhan, F., Wang, L., Hu, T., Zhou, H., Hu, Z., Zhou, W., Zhao, L., Chen, J., Meng, Y., Wang, J., Lin, Y., Yuan, J., Xie, Z., Ma, J., Liu, W.J., Wang, D., Xu, W., Holmes, E.C., Gao, G.F., Wu, G., Chen, W., Shi, W. and Tan, W., 2020. Genomic characterisation and epidemiology of 2019 novel coronavirus: implications for virus origins and receptor binding. The Lancet, [online] 395(10224), pp.565–574. https://doi.org/10.1016/S0140-6736(20)30251-8.

Mahmud, R., Rassel, M.A., Monayem, F.B., Sayeed, S.K.J.B., Islam, M.S., Islam, M.M., Yusuf, M.A., Rahman, S., Islam, K.M.N., Mahmud, I., Hossain, M.Z., Chowdhury, A.H., Kabir, A.K.M.H., Ahmed, K.G.U. and Rahman, Md.M., 2021a. Association of ABO blood groups with presentation and outcomes of confirmed SARS CoV-2 infection: A prospective study in the largest COVID-19 dedicated hospital in Bangladesh. PLOS ONE, [online] 16(4), p.e0249252. https://doi.org/10.1371/JOURNAL.PONE.0249252.

Mahmud, R., Rassel, M.A., Monayem, F.B., Sayeed, S.K.J.B., Islam, M.S., Islam, M.M., Yusuf, M.A., Rahman, S., Islam, K.M.N., Mahmud, I., Hossain, M.Z., Chowdhury, A.H., Kabir, A.K.M.H., Ahmed, K.G.U. and Rahman, M.M., 2021b. Association of ABO blood groups with presentation and outcomes of confirmed SARS CoV-2 infection: A prospective study in the largest COVID-19 dedicated hospital in Bangladesh. PLOS ONE, [online] 16(4), p.e0249252. https://doi.org/10.1371/JOURNAL.PONE.0249252.

Muñiz-Diaz, E., Llopis, J., Parra, R., Roig, I., Ferrer, G., Grifols, J., Millán, A., Ene, G., Ramiro, L., Maglio, L., García, N., Pinacho, A., Jaramillo, A., Peró, A., Artaza, G., Vallés, R., Sauleda, S., Puig, Ll. and Contreras, E., 2021. Relationship between the ABO blood group and COVID-19 susceptibility, severity and mortality in two cohorts of patients. Blood Transfusion, [online] 19(1), p.54. https://doi.org/10.2450/2020.0256-20.

N, Z., D, Z., W, W., X, L., B, Y., J, S., X, Z., B, H., W, S., R, L., P, N., F, Z., X, M., D, W., W, X., G, W., GF, G. and W, T., 2020. A Novel Coronavirus from Patients with Pneumonia in China, 2019. The New England journal of medicine, [online] 382(8), pp.727–733. https://doi.org/10.1056/NEJMOA2001017.

Pourali, F., Afshari, M., Alizadeh-Navaei, R., Javidnia, J., Moosazadeh, M. and Hessami, A., 2020. Relationship between blood group and risk of infection and death in COVID-19: a live meta-analysis. New Microbes and New Infections, 37, p.100743. https://doi.org/10.1016/j.nmni.2020.100743.

Ray, J.G., Schull, M.J., Vermeulen, M.J. and Park, A.L., 2021. Association Between ABO and Rh Blood Groups and SARS-CoV-2 Infection or Severe COVID-19 Illness : A Population-Based Cohort Study. Annals of internal medicine, [online] 174(3), pp.308–315. https://doi.org/10.7326/M20-4511.

Rothan, H.A. and Byrareddy, S.N., 2020. The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. Journal of Autoimmunity, https://doi.org/10.1016/j.jaut.2020.102433.

S, K., R, S., MA, S., A, A., J, L., Q, B., N, B. and M, X., 2020. Emergence of a Novel Coronavirus, Severe Acute Respiratory Syndrome Coronavirus 2: Biology and Therapeutic Options. Journal of clinical microbiology, [online] 58(5). https://doi.org/10.1128/JCM.00187-20.

Samra, S., Habeb, M. and Nafae, R., 2021. ABO groups can play a role in susceptibility and severity of COVID-19. The Egyptian Journal of Bronchology 2021 15:1, [online] 15(1), pp.1–5. https://doi.org/10.1186/S43168-020-00051-W.

Shi, Y., Yu, X., Zhao, H., Wang, H., Zhao, R. and Sheng, J., 2020. Host susceptibility to severe COVID-19 and establishment of a host risk score: Findings of 487 cases outside Wuhan. Critical Care, [online] 24(1). https://doi.org/10.1186/s13054-020-2833-7.

VM, C., D, M., D, N. and C, D., 2018. Hosts and Sources of Endemic Human Coronaviruses. Advances in virus research, [online] 100, pp.163–188. https://doi.org/10.1016/BS.AIVIR.2018.01.001.

Wu, F., Zhao, S., Yu, B., Chen, Y.-M., Wang, W., Song, Z.-G., Hu, Y., Tao, Z.-W., Tian, J.-H., Pei, Y.-Y., Yuan, M.-L., Zhang, Y.-L., Dai, F.-H., Liu, Y., Wang, Q.-M., Zheng, J.-J., Xu, L., Holmes, E.C. and Zhang, Y.-Z., 2020. A new coronavirus associated with human respiratory disease in China. Nature 2020 579:7798, [online] 579(7798), pp.265–269. https://doi.org/10.1038/s41586-020-2008-3.

Yanardag Acik Mehmet Bankir, D. and Yanardag Acik, D., 2021. Relationship of SARS-CoV-2 Pandemic with Blood Groups. Research Article Transfus Med Hemother, [online] 48, pp.161–167. https://doi.org/10.1159/000515609.

Yaylacı, S., Dheir, H., İşsever, K., Genc, A.B., Şenocak, D., Kocayigit, H.,

Guclu, E., Suner, K., Ekerbicer, H. and Koroglu, M., 2020. The effect of abo and rh blood group antigens on admission to intensive care unit and mortality in patients with COVID-19 infection. Revista da Associação Médica Brasileira, [online] 66(2), pp.86–90. https://doi.org/10.1590/1806-9282.66.S2.86.

Zhang, Y., Garner, R., Salehi, S., la Rocca, M. and Duncan, D., 2021. Association between ABO blood types and coronavirus disease 2019 (COVID-19), genetic associations, and underlying molecular mechanisms: a literature review of 23 studies. Annals of Hematology, https://doi.org/10.1007/s00277-021-04489-w.

Zhao, J., Yang, Y., Huang, H., Li, D., Gu, D., Lu, X., Zhang, Z., Liu, L., Liu, T., Liu, Y., He, Y., Sun, B., Wei, M., Yang, G., Wang, X., Zhang, L., Zhou, X., Xing, M. and Wang, P.G., 2020. Relationship Between the ABO Blood Group and the Coronavirus Disease 2019 (COVID-19) Susceptibility. Clinical Infectious Diseases. [online] https://doi.org/10.1093/cid/ciaa1150.

Zietz, M., Zucker, J. and Tatonetti, N.P., 2020a. Testing the association between blood type and COVID-19 infection, intubation, and death. medRxiv. https://doi.org/10.1101/2020.04.08.20058073.

Zietz, M., Zucker, J. and Tatonetti, N.P., 2020b. Testing the association between blood type and COVID-19 infection, intubation, and death. medRxiv. https://doi.org/10.1101/2020.04.08.20058073.

FOOD ENVIRONMENT OF JUNIOR HIGH SCHOOLS IN TOMOHON CITY, INDONESIA

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ABSTRACT

Introduction: In Indonesia, child obesity is increasing, and children take a substantial amount of daily calorie from food consumption at school. **Methods:** This paper describes school food environment in Tomohon City, North Sulawesi Province. We conducted on-site observation and interview with food vendors at 20 junior high schools, describing the food environment by availability and sales of foods and beverages at schools in urban and rural areas. Rice or noodle meals and deep-fried snacks were sold in all schools. **Result:** The availability and sales of industrial sweets and sugar-sweetened beverages were greater in urban than rural areas, whereas those of fruits were greater in rural areas. Oily and sugary foods and beverages are widely available and consumed by students at schools in the city of Indonesia. **Conclusion:** Such school food environments and dietary habits should be improved in the effort of halting the increasing prevalence of child obesity.

Keywords: Food environment, Junior high school, Adolescent, Obesity, Indonesia

INTRODUCTION

Obesity in children and adolescents has been increasing all over the world, but more rapidly in developing countries than in developed countries (Gupta et al., 2012; World Health Organization - Commission on Ending Childhood Obesity, 2019). In Indonesia, the prevalence of obesity among children aged 10-19 years was nearly zero in 1986 but increased to 5% within three decades (World Health Organization, 2017). Halting the increased obesity among children is an emerging challenge for public health nutrition.

School-based interventions to promote a healthier dietary intake among school-age children is one of major strategies to fight against obesity in children and adolescents (Ochola & Masibo, 2014; World Health Organization - Commission on Ending Childhood Obesity. 2017). Such interventions include healthy foods provision in cafeteria, ban on sugar sweetened beverages (SSBs) and energy-dense junk food, and drinking water provision at school, as well as reduction in taxes and prices of fruits and vegetables.

School-based interventions are a sound approach in Indonesia because the amount of dietary intake at schools is not negligible. A study in West Java of Indonesia reported that food consumption during school recess-times accounted for about half of daily energy intake among schoolchildren, and that their consumption at school of deep-fried snacks and sweets contributed to 60% of daily fat intake (Sekiyama, Roosita, & Ohtsuka, 2012). On the other hand, a recent systematic review highlighted that adolescents in Indonesia tend to consume inadequate portion of fruits and vegetables (Rachmi et al., 2020). Potentially, school food environments would have a large impact on children's dietary intake. Nevertheless, there is no regulation for the sales of foods and beverages in schools. Moreover, little is known about what are sold and consumed among children at schools. Generally, the importance of school

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food environment has not been adequately addressed in Indonesia or any other developing countries despite a rapid increase of obesity in children and adolescents.

To highlight this issue, we investigated the food environment of all junior high schools in Tomohon City of North Sulawesi Province in Indonesia, where the prevalence of obesity among adolescents is much higher than the national average (10% vs. 3% in 2013) (Ministry of Health Republic of Indonesia, 2013a, 2013b). In the present study, we described the school food environment in urban and rural areas of the city in terms of food availability and consumption.

METHODS

Study Setting

This descriptive study was conducted in Tomohon City of North Sulawesi Province, Indonesia. The district of a city is classified into urban or rural areas, based on the classification of Badan Pusat Statistics Indonesia which takes into account the district's population density, proportion of agricultural household, and access to public facilities such as school, hospital, and market (Central Bureau of Statistics, 2010). In 2017, there were 22 junior high schools with 5,822 students: four public and 10 private schools in urban areas, and eight private schools in rural areas.

Data Collection

Between July and October 2017, we conducted on-site observation and interview with food vendors at school. During a typical school day (when no special events were held), the first researcher visited food vendors to list all food and beverage brands and varieties they sold at school, and to ask them the average number of each food and beverage sold per day, and the unit price of each food and beverage. Food vendors are local residents who individually prepare foods and beverages at home or procure foods and beverages from manufacturers, and sell them at school premise during school time (Figure 1, 2).

Since food vendors did not record their daily sale, we asked them to answer an approximate number of each food and beverage sold per day. In case that food vendors were not operating on the day of interview, the first researcher visited schools twice. As a result, two food vendors could not be approached and were excluded from the study as non-regular food vendors. Information on the number of students enrolled and food vendors in the school premise was obtained from each school.

This study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving human subjects were approved by the Research Ethics Committee of the Faculty of Medicine at the University of Tsukuba in Japan (1215) and Sam Ratulangi University in Indonesia (3989/UN12/LL/ 2017). Written informed consent was obtained from all school administrations.

Analyses

First, foods and beverages were grouped into eight categories that were predefined on the basis of cooking methods and ingredients: rice or noodle dishes, deep-fried snacks, fruits, industrial sweets, processed meats, water, SSBs, and milk (Table 1). Based on this information, we identified the number of schools in urban and rural areas where each category of food and beverage was available. Then, we calculated the number of foods and beverages in each category sold per day per 100 students in urban and rural areas. The denominator of this calculation was the total number of students of all schools whether or not each category of food and beverage was sold at schools, to examine whether the availability of foods and beverages reflected students' consumption of these foods and beverages. Finally, we calculated the daily sale of each category in each school (the number of each food and beverage sold was multiplied by the unit price of each food and beverage, which was summed in each category). Based on this information, we

calculated the proportion of the daily sale of each category in each school, and we identified the median and range of the proportion for each category among all schools. In the analyses, we excluded two private schools because the canteen was shared by the students of primary, junior high and high schools in the same vicinity.

Figure 1. Food vendors at junior high schools in Tomohon City

Table 1. Food and beverages categories

Category	Example
Rice or noodle dishes	
Fried rice dish	Fried rice or coconut milk steamed rice with entrees (meats, eggs, fish, or tofu)
Rice meals with deep-fried dish	White rice with entrees (meats, eggs, fish without vegetables)
Rice meals with vegetable	White rice with entrees (meats, eggs, fish with vegetable dish)
Noodle a la carte	Noodles and instant noodles without entrees
Noodle with deep-fried dish	Noodles with entrees (meats, eggs, fish without vegetables)
Porridge with vegetable	Local vegetable porridge with cassava and pumpkin (*Bubur Manado*/*Tinutuan*/*Miedal*)
Deep-fried snacks	
Deep-fried snacks	Homemade fried tofu with rice vermicelli and vegetables, fried cassavas, etc.
Deep-fried fruits or fruit chips	Homemade fried bananas, banana chips, etc.
Chips and crackers	Industrial potato chips, rice crackers
Fruits	Raw fruits, papaya spicy salad (*gohu*), papaya spicy ice (*es pepaya tono*), fruit juices
Industrial sweets	

Category	Example
Chocolate and sweets	Chocolates, biscuits, cookies, cakes, puddings, etc.
Bakery	Sweet breads, doughnuts other industrial bakeries
Candies	Candies and lollipops
Ice creams	Ice creams
Processed meats	
Meatballs and sausages	Chicken nuggets, meatballs, sausages, and egg rolls
Hamburgers and hotdogs	Hamburgers, hotdogs, and sandwiches with meat
Water	Unsweetened drinking water
Sugar sweetened beverages	
Sweetened beverages	Sweet tea, coffee, powdered beverages, ices and beverages
Traditional beverages	Local beverages or ices with coconut milk or green beans
Milk	Whole milk, condensed milk, powdered milk, other dairy products

RESULTS

Among the 20 schools, 12 were located in urban area with a total of 4,422 students, ranging from 38 to 1,188 students to 206. Industrial sweets and SSBs were more available in urban than rural areas, whereas fruits were more available in rural than urban areas. Accordingly, sales of industrial sweets and SSBs were greater in urban than rural areas, whereas sales of fruits were greater in rural than urban areas. For example, the daily sale of industrial sweets was 72 per 100 students in urban areas, while it was only 8 per 100 students in rural areas. Despite their similar availability, deep-fried snacks and processed meats were sold more in rural than urban areas (148 vs. 58 purchases and 17 vs. 5 purchases per 100 students, respectively), whereas the sales of rice or noodle dish and water were equal in urban and rural areas.

Table 3 shows the median and the range of the proportion of the daily sales in each school by food and beverage categories among 20 schools. The proportion varies among the schools. The range of the proportion was very wide for deep-fried snacks, from 2% to 78% (i.e., 78% of the total sales were derived from selling deep-fried snacks in one school, whereas deep-fried snacks accounted for only 2% of the total sales in another). The minimum proportion was 16% for rice or noodle dish, while it was between 0% and 7% for other food and beverage categories. It means that selling rice or noodle dish may be vital for food vendors in all schools. In contrast, the median and the range of proportion of industrial sweets and SSBs was 19% (7% to 25%) and 10% (4% to 40%), respectively.

Table 2. Foods and beverages sold at 12 and eight junior high schools in urban and rural areas of Tomohon City, respectively

Food and beverage category	Number of schools offering		Number of foods and beverages sold daily (per 100 students)	
	Urban (per 12 schools)	Rural (per 8 schools)	Urban	Rural
Rice or noodle dish	12	8	36	36
Deep-fried snacks	12	8	58	148
Fruits	5	6	3	36
Industrial sweets	8	2	72	8
Processed meats	4	3	5	17
Water	11	7	21	21
Sugar-sweetened beverages	10	3	27	19
Milks	3	0	1	0

Figure 2. Foods and drinks sold at junior high schools in Tomohon City

DISCUSSION

In Tomohon City, calorie dense diets such as deep-fried snacks, and sweetened foods and beverages are widely sold in the premise of junior high schools, and many students take such diets while they are at schools. Rice and noodle dishes are also widely sold and consumed, but these dishes are mostly served with deep-fried foods and rarely with vegetables. Availability of these foods and beverages appeared to be different between urban and rural areas, and this seems to have a certain influence on students' dietary intake, especially industrial sweets and fruits. Industrial sweets were more available and consumed in urban areas than rural areas, whereas fruits were more available and consumed in rural areas than urban areas. Indeed, students cannot take nutritious foods at schools where such foods are not available, which might be attributable to the low consumption of fruits and vegetables among adolescents in Indonesia (Rachmi et al., 2020), Our findings support the importance of improving the school food environment in promoting healthy diets among children.

Table 3. Median and range of the proportion of the daily sales in each school by food and beverage categories among 12 and 8 schools in urban and rural areas of Tomohon City, respectively

Food and beverage category	Urban		Rural	
	Median	Range	Median	Range
Rice or noodle dish	36%	(28% — 77%)	30%	(16% — 76%)
Deep-fried snacks	20%	(2% — 45%)	42%	(8% — 78%)
Fruits	2%	(1% — 6%)	9%	(6% — 21%)
Industrial sweets	20%	(8% — 25%)	12%	(7% — 16%)
Processed meats	4%	(1% — 12%)	10%	(10% — 15%)
Water	5%	(1% — 12%)	6%	(0% — 14%)
Sugar-sweetened beverages	16%	(4% — 40%)	8%	(7% — 10%)
Milks	2%	(1% — 3%)	—	—

Tomohon culinary is a typically fat-rich Indonesian culinary due to its common deep-frying cooking method with palm oil for both dishes and snacks. Both deep-fried dishes and snacks were available in all schools in the city. Rice dishes provided at school are mostly served with deep-fried meat or fish, or fried egg. Plain rice may be replaced by Indonesian typical stir-fried rice or *nasi kuning* (rice steamed with turmeric and coconut milk). Noodle dishes are mostly instant noodles served plainly or sometimes with fried egg. Both rice and noodle dishes are seldomly served with vegetables.

Difference in foods and beverages sold in urban and rural schools may be due to the access to food and beverage manufacturers and the school size. In urban schools, bottled soft drinks and industrial sweets such as chocolates, biscuits, and ice creams are more available and various than in rural schools. In urban areas, some soft drink companies even lease refrigerators to schools to sell their SSB products. On the other hand, because of limited access to food and beverage manufacturers in rural areas, vendors tend to offer home-made

foods and drinks. This is feasible for a smaller number of students in rural schools.

Regulation of unhealthy diet rich in oil and sugar is necessary to improve food environment at school (Ochola & Masibo, 2014; World Health Organization - Commission on Ending Childhood Obesity, 2017). This somewhat means to alter the traditional Indonesian culinary. Upon the consideration of Indonesian food culture, providing school meals incorporating traditional menu but in the right portions might be a viable option to promote a healthier food environment at school. To nurture healthy diet habit among students, school meal provision may be combined with nutrition education (French et al., 2003; Ministry of Education, 2013).

There are several considerations or challenges when implementing school meal provision. First, income loss of food vendors should be prevented (French et al., 2003). If food vendors could be somehow involved in school meal provision, their income may be maintained. Second, it is essential that students and their parents accept school meal provision in terms of the menu and price of this service. An opt-out option may be provided, but school meal provision would not be sustainable if many choose this option. Third, appropriate nutritional standard and hygiene protocol should be developed and complied for healthy and safe meal provision (Micha et al., 2018). This requires proper supervision and regular monitoring (Sekiyama et al., 2018).

There were several limitations of this study. First, we only described the availability and consumption of foods and beverages at school. School food environments could be described better if information such as the serving size and calorie of foods and beverages were available. Second, we could not obtain information on net profit of the sales, so we could not discuss to what extent the restriction of certain food and beverage sales might affect food vendors. Moreover, the daily sale was not based on the sales records but recalled by food vendors, so it was a rough estimate and might have been underreported because of their reluctance to reveal their sales. Third, the findings of this study may not be generalizable to other regions of Indonesia with more Muslim population. Since the majority of population in Tomohon City is Christian, there is no diet restriction such as pork prohibition and fasting (*Ramadhan*) among Muslims.

CONCLUSION

In conclusion, calorie dense diets and sweetened foods and beverages are widely available at junior high schools in Tomohon City, and many students take these diets while they are at schools. Such school food environments and dietary habits should be improved in the effort of halting the increasing prevalence of obesity among children and adolescents in Indonesia.

REFERENCES

Central Bureau of Statistics, 2010, *2010 Indonesia Statistics Regulation No. 37 regarding Urban and Rural Classific ation in Indonesia (Peraturan Kepala Badan Pusat Statistik No. 37 Tahun 2010 tentang Klasifikasi Perkotaan dan Pedesaan di Indonesia)*.

French, S.A., Story, M., Fulkerson, J.A. & Gerlach, A.F., 2003, "Food environment in secondary schools: A la carte, vending machines, and food policies and practices," *American Journal of Public Health*, 93(7), 1161–1167.

Gupta, N., Goel, K., Shah, P. & Misra, A., 2012, "Childhood Obesity in Developing Countries: Epidemiology, Determinants, and Prevention," *Endocrine reviews*, 33(1), 48–70.

Micha, R., Karageorgou, D., Bakogianni, I., Trichia, E., Whitsel, L.P., Story, M.,

Penalvo, J.L. & Mozaffarian, D., 2018, "Effectiveness of school food environment policies on children's dietary behaviors: A systematic review and meta-analysis," *Plos One*, 13(3), e0194555.

Ministry of Education, C.S.S. and T.-J.N.I. for E.P.R., 2013, *School Lunch Program in Japan*, 2019(9/18).

Ministry of Health Republic of Indonesia, 2013a, *Basic Health Research 2013 in Numbers (Riset Kesehatan Dasar 2013 dalam Angka)*.

Ministry of Health Republic of Indonesia, 2013b, *North Sulawesi Basic Health Research 2013 in Numbers (Riset Kesehatan Dasar Dalam Angka Provinsi Sulawesi Utara 2013)*.

Ochola, S. & Masibo, P.K., 2014, "Dietary Intake of Schoolchildren and Adolescents in Developing Countries," *Annals of Nutrition & Metabolism*, 64(2), 24–40.

Rachmi, C. N., Jusril, H., Ariawan, I., Beal, T., & Sutrisna, A., 2021, "Eating behaviour of Indonesian adolescents: a systematic review of the literature," *Public Health Nutrition*, *24*(S2).

Sekiyama, M., Kawakami, T., Nurdiani, R., Roosita, K., Rimbawan, R., Murayama, N., Ishida, H. & Nozue, M., 2018, "School Feeding Programs in Indonesia," 栄養学雑誌, 76(Supplement), S86–S97.

Sekiyama, M., Roosita, K. & Ohtsuka, R., 2012, "Snack foods consumption contributes to poor nutrition of rural children in West Java, Indonesia," *Asia Pacific Journal of Clinical Nutrition*, 21(4), 558–567.

World Health Organization, 2017, *Global Health Observatory Data Repository (South-East Asia Region): Prevalence of obesity among children and adolescents, BMI>+2 standard deviation above the median, crude*, 2020(2/23).

World Health Organization - Commission on Ending Childhood Obesity, 2017, *Report of the Commission on Ending Childhood Obesity. Implementation plan: executive summary.*

World Health Organization - Commission on Ending Childhood Obesity, 2019, *Facts and figures on childhood obesity*, 2020(1/7).

MONITORING OF MICROBIOLOGY QUALITY RAW WATER AND REFILLED DRINKING WATER DURING COVID-19

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ABSTRACT

Introduction: Riau province regency / city data for drinking water depots in 2020 show that the largest number of Pekanbaru City in Riau Province has refill drinking water depots, there are 440 depots consisting of 220 feasible depots while 227 depots are not feasible. This research was conducted in the Tampan sub-district which is the most densely populated city of Pekanbaru. The purpose of this study was to evaluate the microbiological quality standards (Coliform) for refill drinking water depot, raw water source quality standards and population well quality standards during Covid-19. **Methods:** This research is quantitative descriptive analytic with triangulation methods observation with laboratory tests, in-depth interviews with correspondents of depot officers and residents of drinking water wells. The test was carried out at the UPT health and environment laboratory of the Riau provincial health office. **Result:** Data analysis compared 7 samples with laboratory test results according to quality standards. The results of the analysis stated that there were no Coliform bacteria in the tested samples. The source of raw water from housing will have better standard of quality the deeper it is. **Conclusion:** There is no periodic supervision from the health office / Puskesmas to drinking water depot during the Covid-19 period which is usually routinely carried out every 3-6 months according to regulation of ministers of health no.736,2010 concerning supervision of drinking water quality. Housing developers are required to provide a clean water source from a proper borehole from the start of housing development.

Keywords: drinking water, water quality, microbiology, coliform, Covid-19

INTRODUCTION

The selection of Refill Drinking Water Depot (DAMIU) as an alternative to meet drinking water needs is a risk that can endanger health. Because the drinking water produced by the refill drinking water depot has recently decreased in quality. General problems include DAMIU which is not equipped with sterilization equipment, has low removing power against bacteria, or entrepreneurs do not yet know the quality of the raw water used, the type of drinking water depot equipment is good and how to maintain it and handle processed water (Nuria, Rosyid and Sumantri, 2009).

According to the UNICEF Joint Monitoring report, the performance of the water and sanitation sector in Indonesia is still considered low compared to other countries in Southeast Asia. In 2015, Indonesia's population of around 218 million people, it is estimated that around 103 million people (47%) do not have access to sanitation and around 47 million people (22%) do not have access to clean water access to drinking water (Ronny and Syam, 2016).

Drinking water depots are required to test the quality of drinking water products at the water quality inspection laboratory appointed by the regency/city government or accredited at least once a year. The test aims to ensure the quality of drinking water products produced, to support the creation of healthy business competition, and as an effort to protect consumer(Regulation of the Minister of Health of the Republic of Indonesia 32, 2017).

Regulation of the Minister of Health of the Republic of Indonesia Number 32 of 2017 concerning environmental health quality standards and water health requirements for hygiene purposes concerning quality standards of bacteriological parameters for raw water is

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0 for coliform bacteria and 50 for E.Coli while based on the Regulation of the Minister of Health of the Republic of Indonesia Number 492/2010 regarding drinking water quality requirements (Regulation of the Minister of Health of the Republic of Indonesia No.492, 2010)

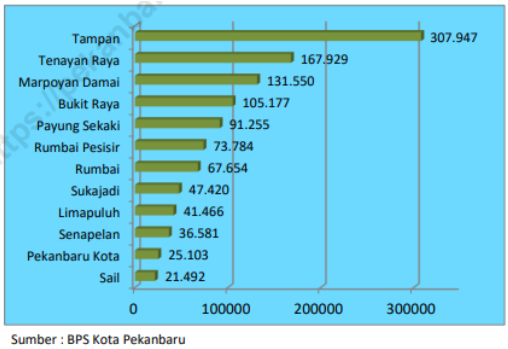

Figure 1. Total Population in 12 Districts in Pekanbaru City. *Source: BPS Pekanbaru City, 2020*

Pekanbaru City BPS data (Fig. 1), there are 12 sub-districts and Tampan Districts with the largest population and also, during the Covid-19 pandemic in 2020, it was often a red zone. Dense population will cause the need for refill drinking water to be higher and it is necessary to monitor the feasibility of bacteriological quality standards from drinking water depots operating in the Tampan sub-district - Pekanbaru City to ensure that it complies with applicable health standards. Therefore, based on this, this research was carried out in Tampan District. – Pekanbaru City represented by Sidomulyo Barat Village for sampling at refill drinking water depots.

The RIAU Provincial TPM data for the Type of TPM for Drinking Water Depots from the Health Service Report 2020 in (Fig. 2) show that the most Pekanbaru City HSP data from 12 districts and cities in Riau Province has DAMIU, namely 440 depots consisting of 220 depots. HSP Eligible and HSP Not Eligible as many as 227 Depots.

To find the number of drinking water depots in Pekanbaru City that are not HSP-worthy, a research was carried out in one of the most densely populated sub-districts in Pekanbaru city, namely Tampan District, precisely in the West Sidomulyo Exit, with the aim of knowing the evaluation of microbiological quality standards for raw water and refill drinking water depots during the Covid-19 pandemic and whether the supervision of the Drinking Water Depot by the Health Service is it still running during the pandemic.

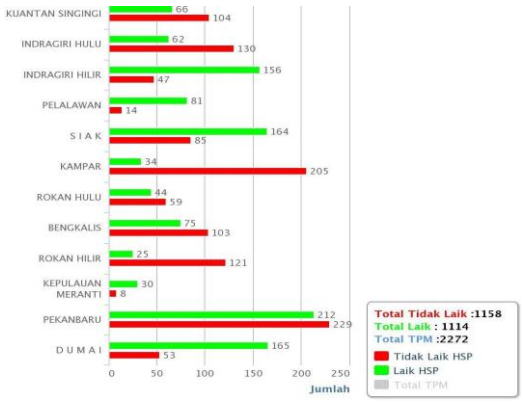

Figure 2. TPM Data for Regency/City RIAU Province – Types of TPM for Drinking Water Depots. *Source: food sanitation hygiene website, 2020*

METHODS

This research is quantitative analytical descriptive observational, namely with primary data analysis of Coliform bacteria content with the Double Tube Culture method, calculation of test results by: bacteriology contained in raw water / drinking water (Amount per 100 ml sample) in each water sample taken from the refill drinking water depot located in the Tampan District - Pekanbaru City in the West Sidomulyo Village.

To determine the presence of *Coliform* bacteria, a laboratory test is carried out. Presumtive test or TPC (Total Plate Count) for total *coliform* (Jlh/100ml) is to detect the presence of *Coliform* bacteria and compare it with the microbiological quality standard stipulated by the Regulation of the Minister of Health

of the Republic of Indonesia. Indonesia Number 32 of 2017 concerning environmental health quality standards and water health requirements for sanitary hygiene needs (raw water for refillable drinking water) and Regulation of the Minister of Health of the Republic of Indonesia Number 492/MENKES/PER /IV/2010 concerning Drinking Water Quality Requirements (Refill Drinking Water).

Variables of physical quality of water that can be observed directly without using a measuring instrument are: color, smell and taste. Good quality drinking water is: colorless, odorless and tasteless. The physical qualities that need to be measured with an instrument are: pH, turbidity and temperature. Meanwhile, the quality of microbiology that is directly related to consumer health needs to be tested in the laboratory.

The research location is in Tampan District in the West Sidomulyo Village for samples of refill drinking water and raw water. Samples were taken by random sampling, by placing in a cooling box so that the temperature was maintained; samples were sent to the laboratory in no more than 24 hours to comply with SOPs. Samples were examined at the Health and Environment Laboratory of the Riau Provincial Health Office. Sampling was carried out on Jalan Purwodadi, Sidomulyo Barat Village - Tampan District, Pekanbaru City on two samples of raw water at residential locations and two samples of refill drinking water at two depots and one comparison sample of raw water in Kec. Marpoyan Damai. The research and data processing process were carried out in July–September 2020. Water sampling was carried out on July 8, 2020, by providing sterile plastic bottles and taking water samples directly from raw water sources (water faucets) and from refill drinking water depots and delivering to the laboratory on the same day (requirements for samples to be analyzed in less than 24 hours), as shown in Table 1 below.

Table 1. Number of Samples and Sampling Locations.

Number of Samples	Sampling Locations
1	Raw Water for Purwodadi Housing Location 1
1	Raw Water for Purwodadi Housing Location 2
2	Raw Water and Water Refill Water Depot Location 1- Exo. West Sidomulyo
2	Raw Water and Water Refill Water Depot Location 2- Exo. West Sidomulyo
1	Distrik Paus Ujung (Marpoyan Damai District)

Note: Number of Samples 7 (5 Raw Water and 2 DAMIU Drinking Water)

The data in this study were analyzed descriptively by looking at the results of the water quality laboratory test whether positive or negative containing Coliform bacteria and observing the hygiene and sanitation of refill drinking water depots in Tampan District - Pekanbaru City, Table 2 shows the sample design matrix and the laboratory results for bacteriological test.

Table 2. Table of *Coliform* Bacteriological Test Data Analysis.

Sample Design and Coding (7 samples)	Microbiological Parameters – *Coliform* (CFU)
1 Sample = Residential Raw Water 1	x
1 Sample = Residential Raw Water 2	x
2 Samples = DAMIU 1 (Raw Water + Treated Water)	x
2 Sample = DAMIU 2 (Raw Water + Treated Water)	x

Sample Design and Coding (7 samples)	**Microbiological Parameters – *Coliform* (CFU)**
1 Sample = Residential Raw Water 3	x
Calculation of laboratory test results for bacteriology of raw/drinking water (Amount per 100 ml sample)/ CFU (Colony Forming Unit) X = Laboratory test results for *Coliform* bacteria.	

This research process was pandemic, so when surveying and sampling the researchers applied the 3M health protocol (wearing masks, washing hands with soap and also keeping a distance). Especially for washing hands with soap, providing simple socialization by giving souvenirs of cleaning tools (small towels + Hand Sanitizer) to homeowners and owners of refillable drinking water depots.

Strengths: This research uses a validated sampling technique, namely: using a sterile bottle and a refrigerated storage area so that the sample is in a cool condition so as to avoid possible damage to the sample before arriving at the testing laboratory. This research was carried out during the Covid-19 pandemic, so it is very necessary to evaluate the feasibility of drinking water quality standards from raw water and drinking water from DAMIU in order to avoid people from diseases caused by water that is not in accordance with quality standards

The limitation of this research is that the scope of the research area is only carried out in one Kelurahan in Kec. Marpoyan Damai and even then only two depots due to limited access when conducting research during the Covid-19 p□andemic. During the pandemic, interviews and observations could not be carried out optimally because DAMIU owners were reluctant to linger for interviews even though they had used health protocols and also were given souvenirs as a sign of gratitude for being willing to provide information about their DAMIU condition. Quality standards in this study only tested the bacteriological quality standards, so it is necessary to continue with the chemical and physical quality standards which may not be in accordance with the quality standards. This research has gone through the Health Research Ethics Committee of the Hang Tuah High School Pekanbaru with the number: 680/KEPK/STIKes-TP/XII/2020.

RESULTS

Bacteriological measurement results of seven water samples in the UPT Laboratory. Health and Environment of Riau Province stated that the Total Coliform Bacteria content was 0 (Zero),as shown in Table 3.

Table 3. Table of *Coliform* Bacteria Test Results on Raw Water and Drinking Water samples

Samples Identification	**Results Samples – *Coliform* Bacteria**
1, Purwodadi Housing Raw Water Location 1	0
2. Raw Water for Housing Purwodadi Location 2	0
3.Raw Water Location 1- Ex. West Sidomulyo	0
4.Water Refill Water Depot Location 1- Ex. West Sidomulyo	0
5.Raw Water Location 2- Ex. West Sidomulyo	0
6.Water Refill Water Depot Location 2- Ex. West Sidomulyo	0
7. Street Paus Ujung (Marpoyan Damai District)	0
Note: Meet Quality Standard for All Samples	

The results of observations of raw water samples in Purwodadi 1 housing from physical tests are: smell, taste and colorless, the well depth is six meters. The results of interviews with homeowners stated that, if the water just came out of the well using a sanio machine, it would smell very sulfuric (H_2S), meaning that the water contained sulfur or acid and could also contain high levels of iron in the form of FeS. So the well water is only used for daily household needs such as bathing and washing but it is not suitable for further processing into drinking water so that the homeowners are very dependent on drinking water from DAMIU around the housing. For Raw water samples in Purwodadi 2 Housing from physical test: odorless, tasteless and colorless, the well depth is 12 meters. The results of interviews with homeowners stated that their water was clean and suitable for further processing for drinking water, so they boiled their own drinking water and did not depend on DAMIU.

The results of observations of raw water and drinking water samples at DAMIU Purwodadi 1 and Purwodadi 2 from physical tests: odorless, tasteless and colorless, the well depth is more than 12 meters.

The results of interviews with depot owners stated that their water was clean and suitable for further processing for drinking water, so that they could operate DAMIU for the needs of the community around the housing. The depot is usually visited once in 3/6 months by the Delima Health Center which is the health center that supervises DAMIU in all districts. Tampan- Pekanbaru City. During this Covid-19 pandemic, there are no more visits from Puskesmas officers to supervise their places.

Laboratory test of raw water samples were in housing at jalan paus ujung Marpoyan Damai District which was carried out as a comparative test of raw water quality in the Kec. Tampan from the Physical Test, the results are: Odorless, Tasteless and Colorless, the well depth is 12 meters. The results of interviews with homeowners stated that their water was clean and suitable for further processing for drinking water, so they boiled their own drinking water and did not depend on DAMIU.

DISCUSSION

Research results of testing bacteriological quality standards in two drinking water depots and two raw water locations in Kec. Tampan and one in Kec. Marpoyan Damai as a comparison has obtained laboratory test results for bacteria total *Coliform* = 0 (empty/zero). This states that the quality standards for raw water and drinking water are met according to the Minister of Health of the Republic of Indonesia No. 32 of 2017 concerning environmental health quality standards and water health requirements for hygiene purposes regarding *Coliform* bacteriological parameter quality standards for raw water is 0. Regarding Regulation of the Minister of Health of the Republic of Indonesia No.492, 2010 for drinking water quality (refillable drinking water), the *Coliform* bacteriological parameter quality standard must be zero. The bacteriology in water depot the point the contamination for raw water in water depot as research Kab. Kampar, Riau 2019 (Herniwanti, Purnawati Rahayu and Purwawinata Mohan, 2021).

Actually the problem of unclean water in Depot because the employee didn't aware about cleaning of their hand before process the production and operational of water depot (Sarah Atyikah, Herniwanti, Novita Rany. Oktavia Dewi, 2021) (Yen Purwawinata Mohan, Herniwanti, 2021).

This is in line with research in the City of Surabaya in 2020 regarding water that comes directly from the PDAM, which can be consumed by the community after going through an advanced processing process ((Novitasari, 2020), Although the

test results show that the quality of raw water from drinking water depots and raw water from resident wells shows the same results (not contaminated with bacteria), it is different from resident wells on Buru Island, Maluku, which are not suitable for processing into drinking water (Muharam Heluth, 2013) but people prefer to subscribe to refill drinking water to the nearest DAMIU for reasons of practicality and also shuttle facilities by DAMIU owners and low prices. In Kampar, Pekanbaru research the higiene sanitation of depot 2019 still the problem of water depot (Endang Purnawati Rahayu, 2022)

Raw water in Purwodadi 1 and Purwodadi 2 Housing has different physical quality standards caused by the depth of the bore wells owned by each home owner. The deeper Drilling Wells in Purwodadi Housing 2 (12 meters) have better physical quality standards than the quality standards in Purwodadi 1 Housing (6 meters); this is because the deeper the borehole the water coming from the ground will be more filtered by the soil layer so that it will produce a water source of better quality: clear, tasteless and odorless.

This is in line with a similar study in Tampan District in 2010, where with the denser population and increasing housing, the construction of new housing does not pay attention to the distance between the wells for raw water sources that are close to the septic tank, causing the raw water to smell bad (Nazar, H., Kasri, A., Saam, 2010). Stinging can come from sulfur (H_2S or FeS) which means the water contains acid from dissolved iron/sulfur and can also come from organic substances dissolved in water because the Pekanbaru area is a peat area. which contains high organic matter so that it becomes acidic

The construction of dug wells are not deep so that the water taken is still surface water that has not been filtered and the distance from the septic tank that is <10 m can cause diarrheal disease in the community (Dangiran and Dharmawan, 2020).

From the results of in-depth interviews, information was obtained that the owner of the Purwodadi 2 house took an independent initiative when the developer of their house asked to deepen the well from 6-meters to 12 meters with an additional fee. Which means that the developer provides a source of drinking water in housing only if there is a water source but does not pay attention to its quality so that residents who do not have time to supervise the construction of their house from the beginning will get it when the house is finished,. The well water source is not suitable to be processed into drinking water and this will be difficult to repair because deepening the well is not an easy job (costs money, narrow land and makes it dirty during the construction period) (Nazar, H., Kasri, A., Saam, 2010).

The hope is that, if the drilled water provided in housing by the developer from the beginning of the construction of the house is feasible to be processed into drinking water, the community around the housing will not depend on the Drinking Water Depot, which is sometimes not guaranteed quality and can also save economic costs on household expenses by boiling. own drinking water. So that the source of raw water / decent well water affects the daily water consumption of DAMIU which is higher if the water source is not feasible as much as 7.6% compared to 1.8% suitable for drinking water (Elsi *et al.*, 2019).

Drinking Water Depot 1 and 2 in Jalan Purwodadi Kel. West Sidomulyo, Tampan District is usually supervised by the Health Service, in this case represented by the Delima Health Center. Microbiological Monitoring for Raw Water and DAMIU according to the Regulation of the Minister of Health is carried out once every 1-3 months. This is necessary to ensure that the drinking water sold to the community is of proper quality standard and to avoid diseases caused by contaminated/inappropriate drinking water. In Garuda Puskesmas, Pekanbaru of

evaluation water depot find the employee weren't healty check regulary (Herniwanti and Ray, 2022).

Factors that affect the quality of DAMIU's bacteriological quality standards are the sanitation hygiene of operators/handlers, most of whom have not carried out regular health checks and also do not have training certificates and socialization regarding PHBS (Weni et al., 2017). Most of the DAMIU use ultraviolet light and ozone technology as disinfection which is useful for killing germs in the DAMIU operational filtration process (Dewanti and Sulistyorini, 2017).

The root of the problem is where, during this pandemic period, health workers are busy serving Covid-19 patients, so the schedule for surveillance visits to DAMIU will no longer be carried out from January 2020. This is due to the busyness of health workers serving Covid-19 patients and limited human resources, limited funds, and inadequate drinking water quality monitoring equipment (Atyikah & Herniwanti, 2020; Purnawinata & Herniwanti, 2020).

The feasibility of drinking water quality standards is one of the efforts to prevent the transmission of the coronavirus. Drinking water that is proper will make the body healthy and immune to increase. Diseases caused by polluted water will cause the community's immunity to be low and vulnerable to infectious diseases such as Covid-19. Supervision of sanitation and hygiene is an absolute must to help maintain the quality of DAMIU consumed by the community on a daily basis, especially operators and depot owners must have their own awareness to check the quality of the depot water quality standards and pay attention to environmental cleanliness (Wulandari & Siwiendrayanti, 2015).

Poor supervision of DAMIU is actually also caused by the person in charge of health supervision at the Puskesmas not understanding their duties and also not receiving training; there is no supervision from superiors, there are no routine reports so that the monitoring data must always be up to date and also testing equipment for quality standards and limited drinking water. Actually, it would be easier if the DAMIU quality standard test equipment was owned by each puskesmas and operated by an operator who is capable of operation and maintenance because this tool is sensitive.

Another issue is that sometimes the equipment already exists, but the operator is incompetent and the equipment is damaged or the reagent is not available due to running out of funds or not being budgeted anymore (Mirza, 2014). The most dominant variables affecting microbiological contamination in DAMIU are knowledge, operator hygiene, depot sanitation, and drinking water (Pakpahan, Picauly and Mahayasa, 2015). Supervision by filling out the hygiene sanitation checklist from DAMIU regularly and coaching is the most effective thing in maintaining DAMIU's operational quality standards (Kasim et al., 2016; Rahayu & Setiani, 2013).

The implication of this research is the need for attention and responsibility from housing development developers when building housing to provide boreholes with optimal depth of wells so that the water source physically meets quality standards: clear, odorless, tasteless so that residents do not need to renovate the well, enabling them to get proper clean water.

Academic Study of Well Water/ Raw Water in Kec. Tampan needs to be done and a solution for the treatment is found so that it is feasible to be further processed into drinking water so that it does not depend on DAMIU. Although the responsibility for drinking water sanitation hygiene is not the responsibility of the developer directly, it is a social responsibility in helping to provide proper clean water facilities to the community.

Academic study of well water/raw water in Kec. Tampan needs to be done and

a solution for the treatment found so that it is feasible to be further processed into drinking water so that it does not depend on DAMIU. Although the responsibility for drinking water sanitation hygiene is not the responsibility of the developer directly, it is a social responsibility in helping to provide proper clean water facilities to the community.

Regular regular supervision by Health Officers/Puskesmas on DAMIU under their operational area according to the provisions of the Minister of Health for each quality standard, although the quality of sanitation and bacteriology is not directly related to the performance of health workers but supervision is the main task of health workers to DAMIU and also the community's raw water sources on a regular basis (Suriadi, Husaini and Marlinae, 2016). Third parties (NGOs, academics, communities) need to jointly supervise the feasibility of DAMIU in their area by participating in maintaining public health together, if it is not feasible to report and follow up (Pratiwi, 2007).

The Institute of Health Science/University as an independent institution can help monitor the DAMIU quality standards and also evaluate the performance of the DAMIU supervisory officers on a regular basis as part of the tri dharma of higher education toward public health by doing community service regarding sanitation hygiene (Herniwanti, Yunita et al., 2020) behavior for a clean and healthy life (PHBS) (Herniwanti, Dewi et al., 2020) and community-based total sanitation program (STBM) (Herniwanti *et al.*, 2021). If the health campus, especially the Kesling specialization, has a drinking water quality standard (Kesling Kit/Mobile Laboratorium Kesling) test equipment, it will be very helpful to assist DAMIU supervision on a regular basis, especially in areas that need to monitor the quality of their drinking water (Asfawi, Nurjazuli and Sulistiyani, 2015).

CONCLUSION

The results of the Laboratory Test for Coliform Bacteria in seven water samples in the West Sidomulyo Village were zero or in accordance with the Quality Standard of the Minister of Health. Sources of raw water from housing originating from drilled wells with a depth of six meters have poorer physical quality (smells and tastes) from a well which is 12 meters deep. There is no regular supervision from the Health Office/Puskesmas on DAMIU during this Covid-19 period. The community around the district Tampan whose well water is not suitable for processing into drinking water depends on DAMIU. There is no internal and external supervision of DAMIU's operations and quality standards

It is recommended that housing developers must provide clean water sources from proper bore wells from the beginning of housing development. It is necessary to have an academic study of the Raw Water Quality Standards in the Kec. Purwodadi and its processing solutions so that it is suitable to be processed into drinking water. Health workers/Puskesmas who are responsible for monitoring DAMIU's raw water and drinking water MUST conduct regular supervision, especially during the Covid-19 pandemic.

Third parties (NGOs, academics, communities) need to work together in supervising proper drinking water for the community. The Institute of Health Science/University, especially the Environmental Health Specialist, needs to have a Kesling Test Kit and a Mobile Kesling Laboratory to assist in monitoring the DAMIU Quality Standards in Pekanbaru City in collaboration with the Pekanbaru City Health Office.

REFERENCES

Asfawi, S., Nurjazuli, N. and Sulistiyani, S. (2015) ‘Analisis Faktor yang Berhubungan Dengan Kualitas

Bekteriologis Air Minum Isi Ulang Tingkat Produsen Di Kota Semarang Tahun 2004.', *Jurnal Kesehatan Lingkungan Indonesia; Vol 3, No 2 (2004): OKTOBER 2004*. doi: 10.14710/jkli.3.2.50 - 53.

Dangiran, H. L. and Dharmawan, Y. (2020) 'Analisis Spasial Kejadian Diare dengan Keberadaan Sumur Gali di Kelurahan Jabungan Kota Semarang', *Jurnal Kesehatan Lingkungan Indonesia*, 19(1), p. 68. doi: 10.14710/jkli.19.1.68-75.

Dewanti, R. A. and Sulistyorini, L. (2017) 'Analisis Kualitas Bakteriologis Air Minum Isi Ulang Di Kelurahan Sememi, Kecamatan Benowo', *The Indonesian Journal of Public Health*, 12(1), p. 39. doi: 10.20473/ijph.v12i1.2017.39-50.

Elsi, E. *et al.* (2019) 'Karakteristik Rumah Tangga Pengguna Air Minum Kemasan Dan Isi Ulang Di Indonesia', *Jurnal Ekologi Kesehatan*, 17(3 SE-Articles). doi: 10.22435/jek.17.3.319.155-164.

Endang Purnawati Rahayu, H. (2022) 'Perceptions of Sanitation Hygiene Refill Drinking Water Depot in the Region of Indonesia', *Gaceta Medica de Caracas*, 130. doi: 10.47307/GMC.2022.130.S1.37.

Herniwanti, H., Dewi, O., *et al.* (2020) 'Penyuluhan Perilaku Hidup Sehat Dan Bersih (PHBS) dan Gerakan Masyarakat Hidup Sehat (GERMAS) kepada Lanjut Usia (LANSIA) Menghadapi Masa Pandemi Covid 19 dan New Normal dengan Metode 3M', *Jurnal Abdidas*, 1(5 SE-), pp. 363–372. doi: 10.31004/abdidas.v1i5.82.

Herniwanti, H., Yunita, J., *et al.* (2020) 'Penyuluhan Personal Higyene pada Lanjut Usia di UPT Pelayanan Sosial Tresna Werdha Husnul Khotimah Kota Pekanbaru', *Jurnal Abdidas*, 1(4 SE-), pp. 254–260. doi: 10.31004/abdidas.v1i4.55.

Herniwanti, H. *et al.* (2021) 'Penyuluhan Sanitasi Total Berbasis Masyarakat (STBM) sebagai Support Program Kesehatan Lingkungan pada Masa Pandemi COVID-19', *Jurnal Abdidas*, 2(2), pp. 435–441. doi: https://doi.org/10.31004/abdidas.v2i2.295.

Herniwanti, H., Purnawati Rahayu, E. and Purwawinata Mohan, Y. (2021) 'Characteristics of Refill Drinking Water Depot and Bacteriology Evaluation in Covid-19 Period', in *Muhammadiyah International Public Health and Medicine Proceeding*. Jakarta: Universitas Muhammadyah Jakarta, pp. 579–594. doi: 10.53947/miphmp.v1i1.100.

Herniwanti, H. and Ray, D. K. (2022) 'Evaluation Drinking Water Depot Sanitation Hygiene In Pekanbaru City', *Jurnal Kesehatan Lingkungan Indonesia; 2022: Article In Press OctoberDO - 10.14710/jkli.0.0.%p*.

Muharam Heluth (2013) 'Dug Well Water Quality of the Tifu Village Community, Waeapo Sub-district, Buru Regency, Maluku Province', *Media Kesehatan Masyarakat Indonesia*, 9(2), pp. 67–73.

Nazar, H., Kasri, A., Saam, Z. (2010) 'Kebijakan Pengendalian Pencemaran Sumber Air Bersih Perumahan Sederhana di Kota Pekanbaru (Kasus di Kecamatan Tampan)', *Environmental Science*, 1(4), pp. 63–80.

Novitasari, D. (2020) 'Processing System and Evaluation Microbiological Quality of Drinking Water Fountain in Surabaya City', *Jurnal Kesehatan Lingkungan*, 12(3), p. 154. doi: 10.20473/jkl.v12i3.2020.154-162.

Nuria, M. C., Rosyid, A. and Sumantri (2009) 'Maulita Cut Nuria Uji Kandungan Bakteri Escherichia

Coli', *Jurnal -Pertanian*, 5(1), pp. 27–35.

Pakpahan, R. S., Picauly, I. and Mahayasa, I. N. W. (2015) 'Cemaran Mikroba Escherichia coli dan Total Bakteri Koliform pada Air Minum Isi Ulang', *Kesmas: National Public Health Journal*, 9(4), p. 300. doi: 10.21109/kesmas.v9i4.733.

Pratiwi, A. W. (2007) 'Kualitas Bakteriologis Air Minum Isi Ulang di Wilayah Kota Bogor', *Kesmas: Jurnal Kesehatan Masyarakat Nasional (National Public Health Journal); Vol. 2 No. 2 Oktober 2007*. doi: 10.21109/kesmas.v2i2.271.

Rahayu, C. S. and Setiani, O. (2013) 'Faktor Risiko Pencemaran Mikrobiologi pada Air Minum Isi Ulang di Kabupaten Tegal', *Jurnal Kesehatan Lingkungan Indonesia*, 12(1), pp. 1-9–9. doi: 10.14710/jkli.12.1.1-9.

Regulation of the Minister of Health of the Republic of Indonesia 32, N. 3. (2017) 'Environmental Health Quality Standards and Water Health Requirements for Sanitary Hygiene, Swimming Pools, Solus Per Aqua, and Public Baths'.

Regulation of the Minister of Health of the Republic of Indonesia No.492, 2010 (2010) 'Drinking Water Quality Requirements', *Kemenkes RI*.

Ronny, R. and Syam, D. M. (2016) 'Studi Kondisi Sanitasi Dengan Kualitas Bakteriologis Depot Air Minum Isi Ulang di Kecamatan Panakkukang Kota Makassar', *HIGIENE: Jurnal Kesehatan Lingkungan*, 2(2), pp. 81–90.

Sarah Atyikah, Herniwanti, Novita Rany. Oktavia Dewi, I. (2021) 'Evaluasi Operasional Depot Air Minum Isi Ulang (Damiu)', *Manarang*, 7(2), pp. 116–124. doi: https://doi.org/10.33490/jkm.v7i2.320.

Sarah Atyikah, Herniwanti, N. R. (2020) *Operasional evaluation of Refill Dringking Water Depots (DAMIU) in the working area of Puskesmas Rambah*.

Suci Wulandari, Arum Siwiendrayanti, A. S. W. (2015) 'Higiene Dan Sanitasi Serta Kualitas Bakteriologis Damiu Di Sekitar Universitas Negeri Semarang', *Unnes Journal of Public Health*, 4(3), pp. 8–15. doi: 10.15294/ujph.v4i3.6338.

Suriadi, S., Husaini, H. and Marlinae, L. (2016) 'Hubungan Hygiene Sanitasi dengan Kualitas Bakteriologis Depot Air Minum (DAM) di Kabupaten Balangan', *Jurnal Kesehatan Lingkungan Indonesia; Vol 15, No 1 (2016): April 2016*. doi: 10.14710/jkli.15.1.28-35.

Weni, E., Purba, M. S. and Erda, Z. (2017) 'Faktor Higiene Sanitasi yang Berhubungan dengan Kualitas Bakteriologi Air Minum Isi Ulang di Kota Tanjungpinang', *JKMA: (Jurnal Kesehatan Masyarakat Andalas) (Andalas Journal of Public Health)*, 11(1), pp. 33–38.

Yen Purnawinata, Herniwanti, E. P. R. (2020) 'Higiene Sanitasi Dan Pemeriksaan Bakteri Coliform Dan E.Coli Pada Air Minum Isi Ulang Di Kecamatan Koto Kampar Hulu Kabupaten Kampar', *Thesis Magister Kesehatan Masyarakat, Universitas Hang Tuah Pekanbaru*.

Yen Purwawinata Mohan, Herniwanti, E. P. R. (2021) 'Baku Mutu Mikrobiologi Bakteri Coliform Dan E. Coli Pada Air Minum Isi Ulang (Amiu) Di Kecamatan Koto Kampar Hulu, Riau', *Prosiding SainTeKes Semnas MipaKes Umri*. Pekanbaru: Universitas Muhammadyah Pekanbaru, p. 75.

THE RELATIONSHIP BETWEEN PHYSICAL CONDITIONS OF HOUSE AND SANITATION WITH LEPROSY CASE IN PATIENTS AT SUMBERGLAGAH MOJOKERTO HOSPITAL

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ABSTRACT

Introduction: The prevalence of leprosy in 2017 in Indonesia shows 6.08 / 100,000 new cases of leprosy and 86.12% of which are multi-bacillary types. Determinants of leprosy events include the condition of residence. The aim of the study is to analyze the relationship between physical condition of house and sanitary facilities with the occurrence of leprosy. **Methods:** This study uses analytical observational research with a case-control study to analyze the relationship between the physical condition of the house and sanitary facilities and the incidence of leprosy in patients of Sumberglagah Hospital, Mojokerto. The sample size was 38, including 19 cases and 19 controls with simple random sampling. Research variables include individual characteristics, the physical conditions of the home, and sanitary facilities were analyzed using chi-square tests. **Result :** The results showed there was a significant relationship between physical conditions of house such as the ceiling, the type of floor, humidity, and density of the bedroom ($p < \alpha$) with leprosy cases. Meanwhile, sanitary facilities do not show a significant relationship with leprosy cases. **Conclusion:** Efforts to prevent leprosy can be done through education to the public to maintain physical condition of the house according to prevailing requirements, especially the presence of ceilings, type of floor of the house made of materials that are easy to clean, comfortable humidity, and bedrooms not used by more than two people.

Keywords: physical house, leprosy, sanitation

INTRODUCTION

Leprosy is an infectious disease that attacks the peripheral nerves and skin. In 1873, G.H. Armauer Hansen discovered the cause of leprosy, namely *Mycobacterium leprae* (The Indonesian Ministry of Health, 2012). Leprosy is a disease that can be cured and early treatment will prevent disability. WHO classifies leprosy based on clinical manifestations and skin lesions into two, namely Basiler Pausi leprosy (PB) and Multi-Bacillary leprosy (MB) (WHO, 1997). Leprosy can occur from infancy to old age (The Indonesian Ministry of Health, 2012). Close contact with persons affected by leprosy can cause the infection of leprosy (Susanti and Azam, 2016). Manifestation of leprosy is determined by the immunity of each individual (Fischer, 2017).

Data from the World Health Organization in 2017 shows 210,671 new cases of leprosy around the world and the Southeast Asia region being ranked first with the most new cases (World Health Organization, 2018). The prevalence of leprosy in 2017 in Indonesia shows as many as 6.08 / 100,000 new cases of leprosy and 86.12% of which are multi-bacillary (MB) types. Meanwhile, according to gender, 61.99% of new leprosy sufferers are male and 38.01% are female (The Indonesian Ministry of Health, 2018a). East Java is the highest province with 3,373 new leprosy cases in 2017. However, East Java has experienced a decline from the previous year to a low leprosy burden category (The Indonesian Ministry of Health, 2018b). Mojokerto Regency is an area in East Java that is highly endemic to leprosy, where there were 35 new cases of leprosy recorded in 2017. This figure didn't decrease from

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the previous year, namely 35 new cases were recorded. During 2014 - 2016 the incidence of new leprosy in Mojokerto Regency decreased significantly, even though the incidence of leprosy has not yet reached the elimination rate proclaimed by the government (Mojokerto District Health Office, 2017).

Bacteria can reproduce through environmental media, one of which is in the physical environment, namely the house. The requirements for a healthy house include the physical condition of the house, sanitation facilities and behavior (The Indonesian Ministry of Health, 1999). Components of physical condition of the house include good and clean ceilings, strong walls, waterproof and easy to clean floors, natural lighting ≥ 60 lux and not dazzling, temperature 18^0C – 30^0C, humidity ranges from 40 - 60%, a minimum bedroom area of 8 m^2 occupied by a maximum of two people and one toddler, the bedroom is equipped with ventilation facilities, and a minimum ventilation area is 10% of the floor area.

Another component of the requirements for a healthy house is availability of sanitation facilities. House sanitation facilities include water facilities for drinking and hygiene sanitation, feces disposal facilities, waste water disposal facilities, and garbage disposal facilities. Facilities for drinking water and water for sanitation hygiene, at least, come from protected springs and wells, deep ground water, and PDAM that meets health requirements (Nurcahyati and Wibowo, 2016). The requirements for a healthy waste water disposal facility, among others are do not pollute the soil surface and do not cause odor. Meanwhile, feces and garbage disposal facilities must comply with the requirements for a healthy home according to regulations (The Indonesian Ministry of Health, 1999).

Several previous studies have proven that the physical condition of a house has a relationship with incidence of leprosy. The house as a residence must meet the requirements for a healthy home according to the regulations. Leprosy has a relationship with personal hygiene, socioeconomic factors, ventilation area and occupancy density (Wicaksono, Faisya and Budi, 2015). According to Ratnawati (2016), there is a significant relationship between housing sanitation and community characteristics with the incidence of leprosy. Meanwhile, research by Andita (2017) proves that there is a relationship between a house that has healthy environment and the incidence of leprosy in Sampang Regency (Andita, 2017). Based on this explanation, a study was conducted which aims to determine the relationship between physical condition of houses and sanitation facilities with the leprosy case among patients at Sumberglagah Hospital, Mojokerto.

METHODS

This research used an analytic observational study with a case control design to examine the relationship between the physical condition of the house and sanitation facilities with the incidence of leprosy in patients at Sumberglagah Hospital, Mojokerto. The study design was retrospective because researchers traced back the exposure, namely the physical conditions of houses and sanitation facilities related to the incidence of leprosy. The research was conducted at the hospital of Sumberglagah Hospital among patients who live in Mojokerto Regency. Cases are new leprosy sufferers, both PB and MB leprosy who were diagnosed and registered at the Sumberglagah Hospital during January - September 2018 who resided in Mojokerto. Controls were patients who were registered and diagnosed with skin disease at Sumberglagah Hospital during January - September 2018, but were not diagnosed with leprosy and tuberculosis who resided in Mojokerto. Sample size of the study was 38 which was taken by simple random sampling. The case sample was 19 people and the control sample was 19

people. The dependent variable is the incidence of leprosy in patients at Sumberglagah Hospital, Mojokerto. The independent variables include the physical condition of the house (ceiling, walls, floor, bedroom, bedroom window, living room window, ventilation, lighting, bedroom occupancy density) and sanitation facilities (water for hygiene and sanitation, feces disposal, disposal), waste water, and waste disposal). The tools used in observing the physical condition of the house are a metline roll to measure floor area and ventilation, a lux meter to measure lighting, and a thermohygrometer to measure temperature and humidity. The analysis results are shown by cross-tabulation and description. The statistical test used was the chi-square test ($\alpha = 0.05$) with the odds ratio (OR) as a measure of the association between the independent variable and the dependent variable. The p value <0.05 means that there is a significant or significant relationship between the independent and dependent variables. If the 95% confidence interval (CI) value exceeds 1 between the lower and upper limits, the OR value is significant. Research permit approval was obtained from the Health Research Ethics Committee of Sumberglagah Hospital with number 814 / 102.6 / 2018.

RESULTS

Characteristics of the individuals studied were age, gender, and income. The age variable is classified into two, namely age <25 years (young people) and age> 25 years (adult). The gender variable is classified into two, namely male and female. Income variables are categorized into two, namely smaller and greater than the District Minimum Wage (UMK) in Mojokerto. The district minimum wage (UMK) in Mojokerto in 2018 is Rp. 3.565 million. After all the individual characteristic variables were analyzed by using the chi-square test, it was found that the individual characteristic variables had no significant relationship with the incidence of leprosy (p value> 0.05). The table of the relationship between individual characteristics and the incidence of leprosy in patients at Sumberglagah Hospital is presented in Table 1.

The physical condition of house studied were the ceiling, type of wall, type of floor, natural lighting, temperature, humidity, density of bedroom, presence of bedroom and living room windows and ventilation area. The results of the analysis between the physical condition of the house and the incidence of leprosy are presented in Table 2.

The ceiling variable is categorized into two, namely non-existent and existing. After being analyzed by using chi-square test, it shows that the house ceiling variable has a significant relationship with the incidence of leprosy (p value = 0.00). The OR value is obtained at 10.5, meaning that respondents whose house has no ceiling have a chance of experiencing leprosy 10.5 times compared to respondents whose house has a ceiling. Variable types of house walls are categorized into two, namely semi-permanent and permanent. After the variables of the types of house walls were analyzed using chi-square test, it was found that the type of house walls was not significantly associated with the incidence of leprosy (p value = 1.00).

The variable types of house floors are categorized into two, namely not eligible (dirt floors, boards, plaits, damaged plaster) and eligible (good plaster, tiles, ceramics). After being analyzed using chi-square test, it shows that the variable type of house floor is significantly associated with the incidence of leprosy (p value = 0.00). The OR value was obtained at 153, which means that the floor of the house that is not eligible is 153 times more at risk of leprosy compared to the floor of the house that is eligible. The natural lighting variables in the bedroom are categorized into two, namely not eligible (<60 lux) eligible (> 60 lux). The temperature air quality variables are categorized into two,

namely temperatures> 30^0C and temperatures of 18^0C – 30^0C. After being analyzed using the chi-square test, it showed that the natural lighting in the bedroom and temperature had no significant relationship with the incidence of leprosy (p value> 0.05).

Humidity variables are categorized into two, namely humidity> 60% and humidity 40% - 60%. After being analyzed using the chi-square test, it shows that the humidity variable has a significant relationship with the incidence of leprosy (p value = 0.02). The OR value was obtained at 6.07, which means that the humidity> 60% has 6.07 times the opportunity for incidence of leprosy compared to the humidity of 40% - 60%.

Table 1. Relationship between Individual Characteristics and Incidence of Leprosy in Patients at Sumberglagah Hospital 2018

Individual Characteristics	Case		Control		*p-value*
	N	%	N	%	
Age					
≤ 25 years	3	15.80	3	15.80	1.00
> 25 years	16	84.20	16	84.20	
Gender					
Male	14	73.70	14	73.70	1.00
Female	5	26.30	5	26.30	
Income					
< UMK	12	63.20	10	52.60	0.74
≥ UMK	7	36.80	9	47.40	
Total	19	100,.00	19	100.00	

Table 2. Relationship between Physical Conditions of House and Incidence of Leprosy in Patient at Sumberglagah Hospital 2018

Physical Conditions of House	Case		Control		*p-value*	OR	95% CI
	N	%	N	%			
Ceiling of House	14	73.70	4	21.10	0.00	10.50	2.34 – 47.20
Non-existent	5	26.30	15	78.90			
Existing							
Type of Wall							
Semi-permanent	1	5.30	0	0.00		-	-
Permanent	18	94.70	19	100.00			
Type of Floor							
Not eligible	17	89.50	1	5.30	0.00	153	12.68 – 1845.92
Eligible	2	10.50	18	94.70			
Natural Lighting							
Not eligible	13	69.40	7	36.80	0.10	-	-
Eligible	6	31.60	12	63.20			
Temperature							

Physical Conditions of House	Case		Control		*p-value*	OR	95% CI
	N	%	N	%			
Temperature > 30^0C	15	78.90	9	47.40	0.09	-	-
Temperature 18^0C-30^0C	4	21.10	10	52.60			
Humidity							
Humidity >60%	14	73.70	6	31.60	0.02	6.07	1.49 – 24.76
Humidity 40%-60%	5	26.30	13	68.40			
Density of Bedroom							
Dense	10	52.60	2	10.50	0.02	9.44	1.69 – 52.73
Non-dense	9	47.40	17	89.50			
Bedroom Windows							
Non-existent	4	21.10	2	10.50	0.66	-	-
Existing	15	78.90	17	89.50			
Living Room Windows							
Non-existent	0	0.00	4	21.10	0.11	-	-
Existing	19	100.00	15	78.90			
Ventilation Area							
Not eligible	17	89.50	14	73.70	0.40	-	-
Eligible	2	10.50	5	26.30			
Total	19	100.00	19	100.00			

Bedroom density variables are categorized into two, namely dense and non-dense. After being analyzed using the chi-square test, it showed that the variable density of the bedroom had a significant relationship with the incidence of leprosy (p value = 0.02). The OR value was obtained at 9.44, which means a dense bedroom, used by more than two adults, the user will have a 9.44 times greater chance of leprosy compared to a bedroom that is not crowded (non-dense).

The variables for the existence of bedroom windows are categorized into two, namely non-existent and existing. The variable of the existence of the living room window is categorized into two, namely non-existent and existing. The variable of ventilation area is categorized into two, namely not eligible and eligible. After being analyzed using the chi-square test, it shows that the variables of the presence of bedroom windows, the presence of living room windows, and ventilation have no significant relationship with incidence of leprosy (p value> 0.05).

The results of the analysis between sanitation facilities and incidence of leprosy are presented in Table 3. The variables of clean water facilities are categorized into two, namely not eligible and eligible (good physical quality). There are two categories for the means of feces disposal facility, they not eligible (open, not goose neck and not septic tank) and eligible (closed, use goose neck and septic tank). The variables of the waste water disposal facility are categorized into two, namely not eligible (there is a pool around the house) and eligible (there is infiltration and does not pollute the water source). The variable of garbage disposal facilities is categorized into two, namely non-existent and existing. After being analyzed using the chi-square test, it shows that all components of the sanitation facilities studied have no significant relationship with the incidence of leprosy (p value> 0.05).

Table 3. Relationship between Sanitation Facilities and Incidence of Leprosy in Patients at Sumberglagah Hospital 2018

Sanitation Facilities	Case		Control		*p-value*
	N	%	n	%	
Clean Water Facility					
Not Eligible	2	10.50	0	0.00	0.13
Eligible	17	89.50	19	100.00	
Feces Disposal Facility					
Not Eligible	2	10.50	1	5.30	1.00
Eligible (septic tank)	17	89.50	18	94.70	
Waste Water Disposal Facility					
Not Eligible	5	26.30	7	36.80	0.73
Eligible	14	73.70	12	63.20	
Garbage Disposal Facility					
Non-existent	6	31.60	2	10.5	0.23
Existing	13	68.40	17	89.50	
Total	19	100.00	19	100.00	

DISCUSSION

In this study, the age of respondents has no significant relationship with the incidence of leprosy. This result is in line with research by Muntassir, Snow and Rulianti (2018) that there is no relationship between age and the incidence of leprosy. Young and productive age is the age that most experiences leprosy (The Indonesian Ministry of Health, 2018a). This study shows that gender does not have a significant relationship with the incidence of leprosy. This result is in line with research by Yunus, Kandou and Ratag (2015) that gender is not related to the incidence of leprosy. Leprosy attacks more men because they often do activities outside more than women (Putra, Fauzi and Agusni, 2009). Men usually experience leprosy when they are older than younger (Gaschignard et al., 2016). The results of this study indicate that the income variable has no significant relationship with the incidence of leprosy. Different results are shown by Ratnawati's (2016) research that income has a significant relationship with leprosy. It was found that the OR was 7.48 which means that income is at risk of causing leprosy (Ratnawati, 2016). Low immunity can be caused by insufficient nutritional needs due to insufficient income, thus increasing the risk of contracting the disease. Health status can also be caused by low public knowledge (Soemirat, 2009).

Most (73.7%) research respondents who experienced leprosy did not have a ceiling. The results of the analysis prove that there is a significant relationship between the ceiling of the house with the incidence of leprosy. A healthy house must have a ceiling because it functions to absorb the sun's heat that enters through the house tiles. The ceiling must meet physical and biological requirements, namely clean and in good condition (The Indonesian Ministry of Health, 1999).

The results of the analysis prove that the type of house wall has no significant relationship with the incidence of leprosy. Different results are shown by Siswanti and Wijayanti's (2018) research that the type of house wall is related to the incidence of leprosy. A house wall that is not waterproof has a 5.83 times risk of causing leprosy (Siswanti and Wijayanti, 2018). A house construction that is not good, such as walls that are not waterproof, causes high humidity so that it is bad for residents and becomes a supporting environmental factor for the microorganisms that cause leprosy

and other microorganisms (Patmawati and Setiani, 2015).

The results of the analysis prove that the type of house floor has a significant relationship with leprosy. Research conducted by Aprizal, Lazuardi and Soebono (2017) also shows that house floors are associated with leprosy. House floors that are not eligible, such as dirt or mud floors, can allow residents to contract leprosy (World Health Organization, 2010). *Mycobacterium leprae* can be found in soil samples in leprosy endemic areas of India. This happens because the soil is likely contaminated by patients (Turankar et al., 2016). In this study, 89.5% of respondents who suffer from leprosy have house floors that are not eligible.

The results of the analysis proved that natural lighting in the bedroom was not significantly associated with the incidence of leprosy. Research by Siswanti and Wijayanti (2018) also shows that there is no relationship between house lighting levels and the incidence of leprosy. Less natural lighting occurs due to the small ventilation area so that the sunlight entering the room is insufficient (Efrizal, Lazuardi and Seobono, 2016).

The results of the analysis prove that temperature has no significant relationship with the incidence of leprosy. Research by Amira and Sulistyorini (2016) also shows that temperature is not related to the incidence of leprosy. However, in other studies, temperature can be a risk factor for leprosy (Prasetyaningtyas, 2017). The existence of *Mycobacterium leprae* is influenced by the temperature in the environment (Elderson, Franciely and Eliane, 2015). In patients with type MB leprosy, the presence of leprosy bacteria is found in the nasal mucosa. Healthy people can get it through the spread of the bacteria Mycobacterium leprae when a person coughs or sneezes and accidentally inhales (The Indonesian Ministry of Health, 2012).

In this study, 73.7% of respondents with leprosy have air humidity above 60% and the analysis results prove that humidity has a significant relationship with the incidence of leprosy. Research by Patmawati and Setiani (2015) also shows that humidity is significantly associated with the incidence of leprosy. Humid places are media where leprosy bacteria can survive for several hours (Cendaki, 2018).

The results of the analysis prove that bedroom density has a significant relationship with the incidence of leprosy. Research by Silaban, Kaunang and Wariki (2017) also shows that bedroom density has a significant relationship with the incidence of leprosy. The density of bedrooms that are not suitable for healthy house has an effect on the transmission of infectious diseases. Dense bedroom conditions can increase contact between individuals, lack of oxygen and facilitate the transmission of leprosy to other family members (Siswanti and Wijayanti, 2018). The incidence of leprosy is related to the direct contact of a person with leprosy to a healthy person (Nurzila and Adriyani, 2019). In this study, 52.6% of the bedrooms of respondents' with leprosy were inhabited by more than two adults.

This study shows that the presence of a window in the bedroom is not significantly associated with the incidence of leprosy. Research also shows that the presence of windows with the incidence of leprosy is not significantly related (Ratnawati, 2016). However, the existence of a bedroom window is very important as it serves as an entryway for sunlight. A healthy house should have windows with an area of at least 15-20%. Therefore, the existence of windows is very important as a way to enter sunlight and exchange air in the room.

The results of the analysis prove that the existence of the living room window has no significant relationship with the incidence of leprosy. Different results are shown by Siswanti and Wijayanti's (2018) research that the habit of opening house windows is related to incidence of leprosy. The habit of not opening windows has risk of leprosy by 5.29 times more than the

ability to routinely open windows every day (Siswanti and Wijayanti, 2018).

The results of the analysis prove that the area of house ventilation is not significantly associated with incidence of leprosy. Different results are shown by Siswanti and Wijayanti's (2018) research that there is a relationship between the area of house ventilation and incidence of leprosy. House ventilation area <10% risk of leprosy incidence of 4.71 times compared to house ventilation area> 10% of floor area (Siswanti and Wijayanti, 2018). The presence of ventilation affects the survival of the leprosy bacteria (Al-Hunaiti et al., 2017). Ventilation that is eligible can inhibit the growth of leprosy bacteria because leprosy bacteria like to live in humid places and die when exposed to sunlight (Siswanti and Wijayanti, 2018). Ventilation is an important component of a healthy house which functions to keep the air in the house fresh and regulate the entry of sunlight into the house to kill leprosy bacteria.

The results of the analysis prove that clean water facilities have no significant relationship with incidence of leprosy. Different results are shown by research by Oktaviani and Nurmala (2016) which shows that there is a relationship between clean water facilities and incidence of leprosy. People who use water contaminated by Mycobacterium leprae bacilli for daily purposes will be exposed to leprosy. (Wahyuni, 2009). In the protozoa *Acanthamoeba sp* in water samples, leprosy bacilli can survive for three months and if the water is used continuously it will cause leprosy (Wahyuni et al., 2010).

The results of the analysis of this study prove that feces disposal facilities have no significant relationship with the incidence of leprosy. Different results are shown by Ratnawati's (2016) research that ownership of a healthy latrine is related to the incidence of leprosy. Ownership of unhealthy latrines has 5.18 times the risk of leprosy compared to ownership of healthy latrines. Every house must have sanitary facilities in the form of a healthy toilet. Healthy latrines have the characteristics, among others, that they do not cause contamination of hazardous materials due to feces disposal and do not cause disease transmission due to the presence of vectors (The Indonesian Ministry of Health, 2014).

The results of the research analysis prove that waste water disposal facilities are not significantly associated with the incidence of leprosy. Research by Ratnawati (2016) also shows that waste water disposal facilities are not related to the incidence of leprosy. The requirement for waste disposal is that it does not contaminate water sources and soil surfaces and does not cause odor (The Indonesian Ministry of Health, 1999).

Trash bins must be in sufficient quantity, easy to reach, and closed so that they do not become a place for various disease agents to develop (Purwanti, 2018).

CONCLUSION

The physical condition of a house, which includes the presence of the ceiling, type of floor, humidity and bedroom density, has a significant relationship with the incidence of leprosy. Meanwhile, other house condition variables such as the type of house walls, natural lighting in the bedroom, temperature, presence of bedroom windows, presence of living room windows, ventilation area and sanitation facilities (clean water, feces disposal, waste water disposal, and garbage disposal) have no significant relationship with the incidence of leprosy. Efforts to prevent leprosy can be made through education to the public. This education includes maintaining the physical condition of the house according to applicable requirements, especially presence of a ceiling, type of made from materials that are easy to clean, comfortable humidity, and the bedroom is not used by more than two people.

REFERENCES

Al-Hunaiti, A. *et al.* (2017) 'Floor dust bacteria and fungi and their coexistence with PAHs in Jordanian indoor environments', *Science of the Total Environment*. Elsevier B.V., 601–602, pp. 940–945. doi: 10.1016/j.scitotenv.2017.05.211.

Amira, N. and Sulistyorini, L. (2016) 'Pengaruh Faktor Lingkungan Fisik Rumah Terhadap Kejadian Kusta Anak di Kabupaten Pasuruan', *Jurnal Penelitian Kesehatan*, 14(3), pp. 136–143. doi: 10.1017/CBO9781107415324.004.

Andita, U. (2017) *Hubungan Rumah Sehat dan Karakteristik Individu Dengan Kasus Kusta di Wilayah Kerja Puskesmas Kedungdung Kecamatan Kedungdung Kabupaten Sampang*. Universitas Airlangga.

Aprizal, Lazuardi, L. and Soebono, H. (2017) 'Faktor risiko kejadian kusta di kabupaten Lamongan', *Berita Kedokteran Masyarakat (BKM Journal of Community Medicine and Public Health)*, 33(9), pp. 427–432. Available at: https://doi.org/10.22146/bkm.25569.

Cendaki, Q. A. (2018) 'Temuan Keberadaan DNA Mycobacterium Leprae di Udara Sebagai Indikasi Penularan Kusta Melalui Saluran Pernapasan', *Jurnal Kesehatan Lingkungan*, 10(2), pp. 181–190. doi: 10.20473/jkl.v10i2.2018.181-190.

Efrizal, E., Lazuardi, L. and Seobono, H. (2016) 'Faktor risiko dan pola distribusi kusta di Yogyakarta', *Berita Kedokteran Masyarakat (BKM Journal of Community Medicine and Public Health)*, 32(10), pp. 347–352. Available at: https://doi.org/10.22146/bkm.12345.

Elderson, M. de S. V., Franciely, M. C. C. and Eliane, I. (2015) 'Prevalence of Mycobacterium leprae in the environment: A review', *African Journal of Microbiology Research*, 9(40), pp. 2103–2110. doi: 10.5897/ajmr2015.7440.

Fischer, M. (2017) 'Leprosy – an overview of clinical features, diagnosis, and treatment', *JDDG - Journal of the German Society of Dermatology*, 15(8), pp. 801–827. doi: 10.1111/ddg.13301.

Gaschignard, J. *et al.* (2016) 'Pauci- and Multibacillary Leprosy: Two Distinct, Genetically Neglected Diseases', *PLoS Neglected Tropical Diseases*, 10(5), pp. 1–20. doi: 10.1371/journal.pntd.0004345.

Mojokerto District Health Office (2017) *Profil Kesehatan Kabupaten Mojokerto Tahun 2016*. Mojokerto.

Muntasir, M., Salju, E. V and Rulianti, L. P. (2018) 'Studi Faktor-Faktor Yang Berhubungan Dengan Kejadian Penyakit Kusta Pada Wilayah Kerja Puskesmas Bakunase Kota Kupang Tahun 2017', *Jurnal Info Kesehatan*, 16(2), pp. 197–213. doi: 10.31965/infokes.vol16.iss2.223.

Nurcahyati, S., N, H. B. and Wibowo, A. (2016) 'Sebaran Kasus Kusta Baru Berdasarkan Faktor Lingkungan dan Sosial Ekonomi Di Kecamatan Konang dan Geger Kabupaten Bangkalan', *Jurnal Wiyata*, 3(1), pp. 92–99.

Nurzila, U. and Adriyani, R. (2019) 'The Effect of Contact History and Immunization Status on the New Case of Leprosy', *Jurnal Berkala Epidemiologi*, 7(2), pp. 112–119. doi: 10.20473/jbe.v7i22019.112-119.

Oktaviani and Nurmala, E. E. (2016) 'Faktor Risiko yang Berhubungan dengan Kejadian Kusta Di Kabupaten Lampung Utara 2014-2016', *Jurnal Dunia Kesmas*, 5(3), pp. 115–120. Available at: https://doi.org/10.33024/jdk.v5i3.4

66.

Patmawati, P. and Setiani, N. O. (2015) 'Faktor Risiko Lingkungan dan Perilaku Penderita Kusta di Kabupaten Polewali Mandar', *Buletin Penelitian Kesehatan*, 43(3), pp. 207–212. doi: 10.22435/bpk.v43i3.4348.207-212.

Prasetyaningtyas, A. Y. (2017) 'Karakteristik Kondisi Fisik Rumah dan Personal Hygiene Penderita Kasus Kusta dan Sekitarnya', *Higeia Journal of Public Health Research and Development*, 1(2), pp. 21–28.

Purwanti, A. A. (2018) 'Pengelolaan Limbah Padat Bahan Berbahaya dan Beracun (B3) Rumah Sakit dI RSUD Dr.Soetomo Surabaya', *Jurnal Kesehatan Lingkungan*, 10(3), pp. 291–298.

Putra, I. G. N. D., Fauzi, N. and Agusni, I. (2009) 'Kecacatan pada Penderita Kusta Baru di Divisi Kusta URJ Penyakit Kulit dan Kelamin RSUD Dr . Soetomo Surabaya Periode 2004 – 2006', *Berkala Ilmu Kesehatan Kulit & Kelamin*, 21(1), pp. 9–17.

Ratnawati, R. (2016) 'Faktor-Faktor Yang Berhubungan Dengan Risiko Kejadian Morbus Hansen', *Tunas Riset Kesehatan*, VI(3), pp. 103–109.

Silaban, N., Kaunang, W. P. J. and Wariki, W. M. V (2017) 'Faktor Risiko Kejadian Kusta di Kota Manado', *Kesmas*, 6(4).

Siswanti and Wijayanti, Y. (2018) 'Faktor Risiko Lingkungan Kejadian Kusta', *Higeia(Journal of Public Health Research and Development)*, 2(3), pp. 352–362. doi: https://doi.org/10.15294/higeia.v2i3.23619.

Soemirat (2009) *Kesehatan Lingkungan*. Yogyakarta: Gajah Mada University Press.

Susanti, K. N. and Azam, M. (2016) 'Hubungan Status Vaksinasi Bcg, Riwayat Kontak Dan Personal Hygiene Dengan Kusta Di Kota Pekalongan', *Unnes Journal of Public Health*, 5(2), pp. 130–139. doi: 10.15294/ujph.v5i2.10121.

The Indonesian Ministry of Health (1999) 'Keputusan Menteri Kesehatan RI Nomor 829 tahun 1999 tentang Persyaratan Kesehatan Perumahan'. Jakarta.

The Indonesian Ministry of Health (2012) *Pedoman Nasional Program Pengendalian Penyakit Kusta*. Jakarta.

The Indonesian Ministry of Health (2014) 'Peraturan Menteri Kesehatan Republik Indonesia Nomor 3 Tahun 2014 tentang Sanitasi Total Berbasis Masyarakat'. Jakarta.

The Indonesian Ministry of Health (2018a) *Infodatin Kusta 2018*. Jakarta.

The Indonesian Ministry of Health (2018b) *Profil Kesehatan Indonesia 2018*. Jakarta.

Turankar, R. P. *et al.* (2016) 'Presence of viable Mycobacterium leprae in environmental specimens around houses of leprosy patients', *Indian Journal of Medical Microbiology*, 34(3), pp. 315–321. doi: 10.4103/0255-0857.188322.

Wahyuni, R. (2009) 'Eksistensi DNA Mycobacterium Leprae pada Air dan Tanah di Daerah Endemis Kusta Jawa Timur (Studi Kasus Kontrol di Kecamatan Brondong Kabupaten Lamongan)', *Universitas Airlangga*.

Wahyuni, R. *et al.* (2010) 'Mycobacterium leprae in Daily Water Resources of Inhabitants Who Live in Leprosy Endemic Area of East Java', *Indonesian Journal of Tropical and Infectious Disease*, 1(2), pp. 65–68. doi: 10.20473/ijtid.v1i2.2164.

WHO (1997) *A Guide to Eliminating Leprosy As A Public Health Problem*.

Wicaksono, M. A., Faisya, A. F. and Budi, I. S. (2015) 'Hubungan Lingkungan

Fisik Rumah dan Karakteristik Responden dengan Penyakit Kusta Klinis di Kota Bandar Lampung', *Jurnal Ilmu Kesehatan Masyarakat*, 6(November), pp. 167–177. Available at: https://doi.org/10.26553/jikm.2015.6.3.

World Health Organization (2010) 'Global leprosy situation, 2010', *Weekly epidemiological record*, (35), pp. 337–348.

World Health Organization (2018) 'Global leprosy update, 2017: reducing the disease burden due to leprosy', *Weekly Epidemiological Record*, 93(35), pp. 445–456.

Yunus, M., Kandou, G. D. and Ratag, B. (2015) 'Hubungan Antara Pengetahuan, Jenis Kelamin, Kepadatan Hunian, Riwayat Keluarga Dan Higiene Perorangan Dengan Kejadian Penyakit Kusta Di Wilayah Kerja Puskesmas Kalumata Kota Ternate Selatan', *Tumou Tou*, 1(3), pp. 1–8.

AN OVERVIEW OF KNOWLEDGE LEVEL REGARDING THE SYSTEMIC LUPUS ERYTHEMATOSUS (SLE) IN PEOPLE WITH LUPUS (ODAPUS)

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ABSTRACT

Introduction: Systemic Lupus Erythematosus (SLE) is lay disease in Indonesia. People with lupus must undergo lifelong treatment because the manifestations vary with high mortality rate. The aim of this study is to measure the level of knowledge of ODAPUS about SLE. **Methods:** This study was an observational descriptive with a cross-sectional approach. One hundred respondents were selected consecutively according to inclusion criteria from SLE patients who attended outpatients of Rheumatology Polyclinic in RSUD (Regional Public Hospital) Dr. Soetomo Surabaya from September 2019 to January 2020. The variable was knowledge level of ODAPUS about SLE and ODAPUS characteristics. Data analysis used descriptive statistical analysis. Data were obtained using LKQ-R questionnaires. **Result:** The result showed that majority of respondents are female (95%), aged 17-25 years (34%), had Senior High School (SHS) as their highest educational background (60%), do not work (53%), got the information about SLE only from health services (71%), and had lack knowledge about SLE (68%). There is no difference between knowledge about SLE in gender (p-value 0.123), a significant relationship between knowledge and educational background (p-value 0.005), and differences in the level of knowledge in group of information sources (p-value 0,000). **Conclusion:** In conclusion, most of the SLE patients have lack of knowledge about SLE, especially those who have SHS educational background and only depend on the health service as the source of information. Special interventions are needed as health promotion, especially in childbearing age women who likely suffer from the disease.

Keywords: Knowledge, Systemic Lupus Erythematosus (SLE), people with lupus, ODAPUS, LKQ-R questionnaires.

INTRODUCTION

Systemic Lupus Erythematosus (SLE) is a chronic autoimmune disease. This disease often occur the complex interaction disorder between the apoptosis clearance process, the increase of innate and adaptive immune responses, the immunity complex, and the inflammation process in the soft tissue, which is the climax of the autoimmune process (Fava and Petri, 2019). The clinical manifestations and severity of this disease vary according to the organ affected (Vaillant, McClellan and Varacallo, 2018). SLE can be stated as a still common disease, especially in Indonesia. Many people assume that SLE is a rare disease. The prevalence of SLE is different in every country. The difference in prevalence and incident varies related to gender, age, ethnicity, and time. It is stated that the highest prevalence occurs in America, which is 241 patients out of 100,000 people (Rees et al., 2017). In Indonesia, the prevalence of this disease is still low, which is 0.5% of the total population, but the number of new cases continues to increase (Infodatin Kemenkes, 2017). However, the increase of cases is not followed by an increase in information and knowledge about the disease. This is due to the lack of information, education, and socialization about lupus with easy language, which is easily understood by the people (Fatmawati, 2018). Based on the study conducted by Kalim et al., from 1,250,000 people in Indonesia who have lupus, just a few of them have realized that they have lupus (Infodatin Kemenkes, 2017).

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ODAPUS should be well-educated about disease pathology, some conditions when this disease attacks certain organs, and the importance of treatment and adherence monitoring. (Vaillant, McClellan and Varacallo, 2018). The knowledge level of lupus patients can influence the patients' adherence to have treatment. The low level of patients' knowledge about their disease will cause a lack of adherence to have treatment (Sheba *et al.*, 2018). There's a research that states SLE patients with severe disease status have a significant relationship with a decrease in quality of life and have an impact on their mental health. Patients also tend to experience depression and anxiety about their illness (Shen *et al.*, 2013). Those conditions will impact other health conditions, such as complications that could have been prevented. This condition can cause an increase the mortality rate of SLE if not handled properly.

Until this time, there is no research about this topic in Surabaya. This study aims to measure the knowledge level of people with lupus (ODAPUS) about SLE. The results of the study are expected to increase ODAPUS awareness about their disease. Moreover, the results of the study can be used as an attempt to increase community participation, especially ODAPUS in the prevention and control of SLE disease, also as the evaluation material for the health workers in giving health promotion and education for ODAPUS effectively and efficiently. Thus, in the future, it can help the government to determine what program can be applied as a health promotion attempt regarding the SLE disease in Indonesia.

METHODS

This study, according to the data collection technique, was observational research. The researcher conducted observation in outpatients of Rheumatology Polyclinic in RSUD (Regional Public Hospital) Dr. Soetomo Surabaya using the LKQ-R (Lupus Knowledge Questionnaire-Revised) as an instrument, which has been modified. This study was an observational descriptive with a cross-sectional approach. The researcher collected the data when patients came to the Rheumatology Polyclinic of RSUD Dr. Soetomo Surabaya from September 2019 to January 2020.

The population of the study was all outpatients or people with lupus (ODAPUS) in RSUD Dr. Soetomo. Meanwhile, the samples of the study were outpatients or people with lupus (ODAPUS) in Rheumatology Polyclinic of RSUD Dr. Soetomo Surabaya, which were selected according to the inclusion and exclusion criteria sequentially. The inclusion criteria of the samples were men or women more than 12 years old, can read and write, also willing to be a respondent by signing an informed consent sheet. Meanwhile, the exclusion criteria of the samples were a not cooperative respondent (have mental and physical disorders, limitation in speaking, unstable disease conditions) and work as health workers. The number of samples in this study was 100 respondents, which was obtained from the calculation using a consecutive sampling technique with the infinite population.

Variables in this study were the knowledge level of people with lupus (ODAPUS) about the SLE and ODAPUS characteristics. Variables of ODAPUS characteristics consisted of several sub-variables, which were age, gender, educational level, occupation, and source of information.

The questionnaire of knowledge about the Systemic Lupus Erythematosus (SLE) used as the data collection instrument was LKQ-R (Lupus Knowledge Questionnaire-Revised) modified, then a validity and reliability test was conducted. The validity and reliability test was conducted on people with lupus (ODAPUS), who were not a sample in this study. After conducting a validity and reliability test, it was obtained the results of

validity (r > 0.648) and reliability (Cronbach's alpha = 0.706).

The questionnaires consisted of 22 questions: definition, epidemiology, etiology, diagnosis, indication and symptoms, and myths about SLE. The questionnaires consisted of two questions about the definition, epidemiology and etiology, respectively. On the topics that discussed diagnosis and myth regarding SLE, there were five questions, respectively. Moreover, there were six questions for discussion topics regarding the indication and symptoms of SLE disease. Respondents were asked to answer every question with correct and wrong choices (Guttman scale). After that, it was given a score of 1 for the correct answer and 0 for the wrong answer. Then, calculation was conducted and then grouped into three categories of knowledge level; good, moderate, and lack. The researcher chose to use the theory by Arikunto, which stated that the knowledge level is divided into three levels based on the percentage value. It is stated in a good knowledge level if the score is ≥ 76-100%, in the moderate knowledge level if the score is 60–75%, and in the lack knowledge level if the score is < 60% (Arikunto, 2012).

The data collection was conducted in the Rheumatology Polyclinic of RSUD Dr. Soetomo, where the respondents got the explanation regarding this study and filling the agreement form first to participate in this study. After respondents signed the agreement form, the respondents were asked to complete the personal data as determined by the researcher, and then the respondents were asked to fulfill the prepared questionnaire. Respondents fulfilled the questionnaire completely, consciously, and without coercion. The data were processed using SPSS IBM 20 and then presented descriptively. Data of the study were processed by cross-tabulation. The researcher added Mann Whitney's test for the gender, Spearman rho test for the educational level, and the Kruskal-Wallis test continued the post hoc for the source of information to strengthen the research. This study has obtained a passing statement of ethics from the Ethics Commission of RSUD Dr. Soetomo No: 1350/KEPK/VII/2019, and monitoring and evaluation have been done during the research.

RESULTS

The Respondents' Demographic Characteristics

Table 1. The distribution of respondents' demographic characteristics in Rheumatology Polyclinic of RSUD Dr. Soetomo Surabaya from September 2019 - January 2020

The Respondents' Demographic Characteristics	n	%
Gender		
Women	95	95
Men	5	5
Age		
Early adolescence (12-16 y.o)	1	1
Late adolescence (17-25 y.o)	34	34
Early adulthood (26-35 y.o)	26	26
Early middle age (36-46 y.o)	26	26
Late middle age (46-55 y.o)	10	10
Late adulthood (56-65 y.o)	3	3
Educational Level		
Elementary School	7	7
Junior High School	13	13
Senior High School	60	60
College	20	20
Occupation		
Do not have a formal occupation/housewife	53	53
Private employees	18	18
PNS (Government Employee)/ABRI (Indonesian National Armed Forces)/POLRI (Indonesian National Police)	2	2
Students	19	19
Entrepreneur	8	8

The Respondents' Demographic Characteristics	n	%
Source of Information		
Only health services	71	71
Health services and mass media	28	28
Health services, mass media, and families	1	1

Based on the average age and deviation standard in this study, respondents were 32 ± 11 years old. Table 1 shows that ODAPUS, who are the respondents of this study, were mostly 17-25 years old, which were 34 respondents (34%). The majority of respondents were women,95 respondents (95%) with the last educational level of Senior High School of 60 respondents (60%), and have no formal occupation or a housewife,53 respondents (53%). As many as 71 respondents (71%) received information about SLE only from health services.

The Respondents' Knowledge

Table 2. The distribution of respondents' knowledge level about SLE

Knowledge Level	n	%
Good (≥ 76-100 %)	8	8
Moderate (60–75 %)	24	24
Lack (< 60%)	68	68

Table 2 presents the distribution of respondents' knowledge levels which are divided into three groups. From 100 respondents obtained, the majority (68%) of respondents' knowledge level was lack. Meanwhile, only a small number of respondents (8%) have a good knowledge level.

The evaluation results of systemic lupus erythematosus (SLE) knowledge regarding the red rashes as one of the lupus' symptoms, were 92 respondents (92%) answered correctly. These results show that questions about the rashes in the SLE patients were the most correctly answered by the respondents. However, in the aspect of knowledge about race/ethnicity and who are most susceptible to lupus, these were aspects that most respondents did not know. On that topic, 91 respondents (91%) answered incorrectly, and only nine respondents (9%) answered correctly. One respondent obtained the highest score of 95.45 or 21 points, and one person got the lowest one of 13.63 or 3 points.

Cross-tabulation statistical analysis was conducted on the respondents' demographic characteristics and the respondent's knowledge level, as presented in Table 3. The analysis results were used to determine the general overview of the respondents' knowledge level about SLE based on demographic characteristics. Respondents' demographic characteristics include gender, age, educational level, occupation, and source of information about SLE disease.

Based on Table 3 regarding gender characteristics, it was obtained that 63 women respondents (66.3%) have a lack knowledge level, 24 (25.3%) have a moderate knowledge level, and only eight respondents (8.4%) have a good knowledge level. Meanwhile, for the men respondents, there were five respondents (100%) who have a lack of knowledge level. The differences in knowledge level between women and men were tested using Mann Whitney. From the results of the statistic test it can be concluded that there were no differences in knowledge level abut SLE between women and men (p-value = 0.123).

In the characteristics of age, most respondents in this study were in late adolescence, which was 17-25 years old. Then, it was followed by early adulthood which was, 26-35 years old and early middle age, which was 36-46 years old. When viewed from the respondents' knowledge level about SLE, most respondents in the late adolescence have a lack of knowledge level. In which the group of lack knowledge level was dominated by the respondents of childbearing age. It was also obtained that four of eight respondents in the good knowledge level were in early adulthood.

Based on the educational level, most respondents in this study had Senior High School background education. Meanwhile, only seven respondents had Elementary School background education. When reviewed based on the knowledge level, most lack knowledge level was dominated by the respondents who had Senior High School background education. Meanwhile, four from eight respondents who had good knowledge level had college background education. The relationship between knowledge level about SLE and the respondents' educational level was examined using Spearman's rho. Based on the results of the statistic test, it can be concluded that there is a significant relationship between the knowledge level about SLE and the respondents' educational level (*p-value = 0.005*).

When viewed from the respondents' occupation characteristics, most respondents in this study did not have a formal occupation or as a housewife. In which the respondents included in that group mostly had a lack of knowledge level and became the biggest contributor in the group of lack knowledge level.

In the respondents' source of information characteristics, most respondents got the information about SLE only from the health services. Only few respondents looked for other additional sources of information, either from media or families. Respondents who chose the source of information only from health workers, the majority of them had a lack of knowledge level. Meanwhile, when viewed based on the good knowledge level, all respondents who had good knowledge levels were from the group who chose the source of information from the health personnel and media. The differences in knowledge level about SLE based on the group of respondents' source of information were examined using the Kruskal-Wallis test. The results of the statistical test concluded that there is a difference in knowledge level in the group of respondents' source of information. Then, the post hoc statistic test was conducted to see which group was different. The results of the test stated that there is a difference in knowledge level between health personnel's source of information and health service and media (*p-value* = 0.000).

Table 3. The survey results in the respondents' knowledge level about SLE according to the respondents' demographic characteristics.

The Respondents' Demographic Characteristics	Knowledge Level						Total		P Value
	Good		Moderate		Lack				
	n	%	n	%	n	%	n	%	
Gender									0.123
Women	63	66.3	24	25.3	8	8.4	95	100	
Men	5	100	0	0	0	0	5	100	
Age									
Early adolescence (12-16 y.o)	1	100	0	0	0	0	1	100	
Late adolescence (17-25 y.o)	27	79.4	5	14.7	2	5.9	34	100	
Early adulthood (26-35 y.o)	14	53.8	8	30.8	4	15.4	26	100	
Early middle age (36-46 y.o)	18	69.2	7	26.9	1	3.8	26	100	
Late middle age (46-55 y.o)	5	50	4	40	1	10	10	100	
Late adulthood (56-65 y.o)	3	100	0	0	0	0	3	100	
Educational Level									0.005
Elementary School	6	85.7	0	0	1	14.3	7	100	

The Respondents' Demographic Characteristics	Knowledge Level						Total		P Value
	Good		Moderate		Lack				
	n	%	n	%	n	%	n	%	
Junior High School	11	84.6	2	15.4	0	0	13	100	
Senior High School	42	70	15	25	3	5	60	100	
College	9	45	7	35	4	20	20	100	
Occupation									
Do not have a formal occupation/housewife	35	66.0	15	28. 3	3	5.7	53	100	
Private employees	11	61.1	4	22.2	3	16.7	18	100	
PNS (Government Employee)/ABRI (Indonesian National Armed Forces)/POLRI (Indonesian National Police)	0	0	1	50	1	50	2	100	
Students	15	78.9	3	15.8	1	5.3	19	100	
Entrepreneur	7	87.5	1	12.5	0	0	8	100	
Source of Information									0.000
Only health services	58	81.7	13	18.3	0	0	71	100	
Health services and mass media	9	32.1	11	39.3	8	28.6	28	100	
Health services. mass media, and families	1	100	0	0	0	0	1	100	

DISCUSSIONS

The term "thousand faces disease" given for SLE is not without reason. The symptoms can resemble allergic inflammation to the malfunctioning of various organs in the human body. SLE is an autoimmune disease that can affect many organs, including skin, joints, central nervous system, and kidney (Kaul *et al.*, 2016). In Indonesia, the increase of ODAPUS is not accompanied by the increase in information about SLE for ODAPUS or society. The lack of information using easier language contributes to increasing lupus patients (Azmi, 2017). Thus, ODAPUS often ignores the symptoms of this disease. This condition is a result of the ODAPUS' lack of awareness toward their disease, which eventually impacts the delays of treatment and diagnosis. If the patient is diagnosed late, there can be a deterioration in the patient's condition because early diagnosis is important to have the appropriate treatment to prevent more severe and widespread disease manifestations (Kaul *et al.*, 2016). This situation is very regrettable because the lack of education and socialization, either directly or through various media, can cause unfavorable conditions for ODAPUS.

The knowledge level of each ODAPUS varies; some have good knowledge, and some have moderate knowledge, but some have lack of knowledge. Based on the results of the study on 100 respondents, it was obtained that most of ODAPUS had a lack of knowledge level about SLE disease, which was 68 respondents (68%), and only eight respondents (8%) had good knowledge level. Those results are in line with research by Komalig *et al. (*2008) which stated that the knowledge of SLE patients about their disease is still low (41.1%). However, the results of the study are not in line with research by Sari (2016), which stated that all respondents in their study have a good knowledge level (100%). It can be

explained that there is a possibility in Sari's research that the respondents get better socialization from the health service than respondents of this study.

Someone's knowledge can be influenced by several factors, such as age, experiences, education, information/mass media, social, culture, economic, and environment. The differences in these factors can exactly also create different individual knowledge (Budiman, 2013). Society is expected, especially people with lupus (ODAPUS), to gain information from other reliable media sources to improve and expand knowledge about their disease. The government is also expected to provide facilities in delivering information regarding SLE that is easy to be accessed and understood.

Gender

Most respondents were women, which is in accordance with the theory by Pons-Estel et al. SLE disease often occurs in women than men with a ratio close to 9: 1 (Pons-Estel, Ugarte-Gil and Alarcón, 2017). SLE mostly affects women because of several roles of hormones: hormones on estrogen, androgens, prolactin, and gonadotropin-releasing hormone. The mechanism that works is associated with the differences in the metabolism of these hormones. There is a role for the activity of hormone estrogen effect on the hydroxylation process. Besides that, there is a condition where there is a decrease in the level of an androgen hormone, hyperprolactinemia, and differences in the expression of G protein signaling in GnRH (Tedeschi, Bermas and Costenbader, 2013). Although SLE disease attacks many women, the men patients tend to have the manifestation of more severe disease, consequently the level of disease activities is higher (Pons-Estel, Ugarte-Gil and Alarcón, 2017). The results of another study also show the same results, which are obtained from 34 female SLE patients (87.2%) and five male patients (12.8%) (Ghafirah, 2018).

Based on the results of the statistic test, it was obtained p-value (0.123) > α (α = 0.05), which shows that there is no difference of knowledge level about SLE between women and men of ODAPUS in RSUD Dr. Soetomo. According to the research, this is because the respondents are in the same hospitals. Moreover, there is no difference in the provision of special interventions that differentiate the patients' gender when having treatment until provision of education by the health workers, either doctors or nurses, to the patients. Thus, the information received about SLE disease is the same, and the services provided also do not differentiate between women or men patients. This in line with the theory by Lynn, Wilberg-Neidhardt and Margraf-Stiksrud (2005) who stated that there is no substantial and significant difference in gender in general knowledge. In knowledge management, it can be stated that gender relations are not explicitly possible to have a deeper understanding (Peter and Selvi, 2020).

Age

The majority of respondents in the 17-25 years old (late adolescence) were 34 respondents (34%). Followed by the next group in the 26-35 years old (early adulthood) were 26 respondents (26%), and in the 36-46 years old (early middle age) were 26 respondents (26%). SLE mostly affects women of childbearing age, which is women 15 to 44 years old, where this age range is the most significant risk of developing SLE (Carter, Barr and Clarke, 2016). Besides that, there is a previous study that is in line with this study, which obtained that the majority of the respondents are women SLE patients,44.4%, and among them are in the 35-45 years old (Sari, 2016).

In the group of 17-25 years old, most respondents had a lack of knowledge level about SLE disease. Besides that, the proportion of respondents with a lack of knowledge level was dominated by the childbearing age. Adolescence or adulthood

age have more comprehension and developed mindset. The individual tends to have active action in seeking knowledge. Thus, in that age range group, the knowledge obtained will be better and more increased (Notoatmodjo, 2012). However, the results of this study show that in childbearing age is obtained the lack of knowledge level about SLE, which should be used as the step to increase the awareness and knowledge in that age group. It is important for the individual (especially women), including the childbearing age, to realize those things and be motivated to improve their knowledge level. Thus, they can be more obedient in the treatment and management program of SLE by the doctor, and also can prevent the progression or deterioration of their disease control level.

Education

The results of this study show that most respondents' education was Senior High School of 60 respondents (60%). This is in line with the previous study conducted by Sari which also stated that from 36 respondents involved in their study, most of them or 30 respondents have Senior High School as the educational background (Sari, 2016).

It was also obtained that the most respondents who had good knowledge results were dominated by those who have college as the educational background, which was four respondents from eight others, followed by the respondents with Senior High School educational level (3 respondents) and Elementary School (1 respondent). The knowledge level about SLE was less, dominated by respondents with a Senior High School educational background, which was 42 respondents. Based on the results of the statistic was obtained p-value (0.005) < α (α = 0.05), which showed that there is a significant relationship between knowledge level about SLE and the respondents' educational level.

Waldron *et al*. (2011) stated that educational level can influence patients' needs of SLE information, how deep the information, and their ability to access and process information. The results of the analysis in this study show that 50% of respondents with a good knowledge level have a college educational background. This is something normal and should be like that because the individual formal education can give the basis for thinking and a better understanding regarding the knowledge obtained, including the knowledge about SLE. This flow of thinking will influence the individual in interpreting the information obtained in the future (Waldron *et al.*, 2011).

Education significantly affects someone's knowledge level. The higher someone's knowledge, the easier for someone to accept information from others. This also applies to the opposite, where individuals with a low educational background will be inhibited in receiving information. This study shows that most respondents have a Senior High School educational background (60%). However, formal education not always can be used as the measurement of knowledge. This is because the knowledge is not only from the formal education but also from the informal education, such as experience in society: socialization, and educative information of mass media. Both are one of the forms of primary health prevention (Notoatmodjo, 2010).

Occupation

Most of the respondents do not have a formal occupation or as a housewife. The number of respondents who did not have a formal occupation or housewives was 53 respondents (53%). In which among them, 35 respondents (66%) had a lack of knowledge level. Moreover, when viewed from the lack of knowledge level, the group that did not have a formal occupation or housewife became the largest contributor. In line with the research conducted by Komalig *et al.* (2008), which stated that, based on the type of occupation, most SLE patients do not have formal occupation (32.2%) while the least are workers/farmers

(1.9%). However, the results of this study are not in line with the research by Sari (2016), which stated that the majority of respondents that are SLE patients are entrepreneurs (33.3%) and private employees (33.3%).

The low economic conditions and educational level, also the lack of health insurance for SLE patients, are all related to unfavorable disease outcomes for patients. Moreover, the treatment of SLE disease is not cheap, either directly on indirectly. Besides that, the treatment cost is influenced by the severity of the disease and organ manifestations (Carter, Barr and Clarke, 2016). The obstacles can cause the patients' conditions to be worse. The research conducted by Feldman *et al.* (2013) stated that SLE is more commonly diagnosed in the individual from a lower socioeconomic population. This condition causes an increase in pressure stigmatization on SLE patients. This stigmatization of the patients occurs because of low education, which significantly affects the patients' self-perception. This stigma can raise concerns and become additional obstacles for SLE or ODAPUS patients to find appropriate medical care.

Source of Information

The results of this study show that the majority of respondents obtained the source of information about SLE disease only from the health service, which was 71 respondents (71%). It is mentioned in theory by Waldron *et al.* (2011) that,when viewed from the needs for early education, patients prefer to be informed about the potential problems that occurred than being naive or do not want to know about the problems. Patients feel helped from the verbal information delivered comprehensively by the doctor. This is what motivates or moves patients to immediately find more information about SLE to medical professionals (Waldron *et al.*, 2011).

In the groups of respondents who obtained sources of information only from the health service, 58 respondents (81.7%) had a lack knowledge level, and the other 13 respondents had a moderate knowledge level. Of all respondents in the good knowledge level, eight respondents obtained information about the SLE disease from the health service and media. Moreover, the results of the statistic test obtained p-value (0.000) < α (α = 0.05), which shows that there is a different knowledge level between health personnel's source of information and health service and media. Notoatmodjo (2012) stated that the individual's knowledge could be influenced by the source of information. The knowledge level is influenced by the individual's exposure to the information received. There are several sources of information that can influence the individual's knowledge, such as printed media: news, book, magazine, also other mass media: radio, television, and the internet.

The health service has many important roles related to the needs of information for patients about their disease. By obtaining appropriate and specific information, the patients will be more understanding and patient regarding their physical conditions, which also affect the risk of SLE disease. Based on Waldron *et al.* (2011), SLE patients who obtain detailed and accurate information from the health service will have a lower of worry level about the disease than the SLE patients who have limited knowledge. Patients who obtain detail and accurate information more can control and avoid several things that can cause remission or recurrence of the disease. Thus, patients need to be mentally better prepared in having treatment for their disease. Also mentioned in the research by Ferenkeh-Koroma (2012) is that currently, the health service must deliver the information needed by the patients to control the symptoms' fluctuation and the treatment for their disease. With adequate support and proper education provision,

patients can be more actively involved in maintaining their condition and quality of life. Thus, the active role of health service is needed, either doctor or nurses as the intermediary for delivering information to the patients. Certainly, education provided will be massive if it is followed by the active role of ODAPUS, such as giving questions related to the SLE disease or confirming information obtained about SLE to the health service, which allows more understand about those topics.

Based on the results of the study, action is needed to give massive education to increase the knowledge of SLE patients. One way is by utilizing several media to distribute information and health socialization for the SLE patients and their family or companions. The utilization of printed media can be done by providing brochures, leaflets, and x-banners regarding SLE in the health service. Moreover, the utilization of social media as the educational step is also very important to be done. One way is by providing information in the educational videos, pictures or animations, articles, and news related to SLE using language that is easy to understand to improve the SLE patients' insight. Providing education can also be done by health socialization methods involving the patients' families. By involving the patients' families, they will be more understanding of and responsible for the treatment given to the patients. From the health socialization, the patients can be actively asked and discuss the SLE disease and their conditions with competent doctors.

CONCLUSIONS

Most of the SLE patients have a lack of knowledge about SLE, especially those who have Senior High School educational background and only depend on the health service provider as the source of information. There is a significant relationship between the knowledge level about SLE and respondents' educational level. The health service has an important role in educating patients about their disease. Thus, the particular intervention is needed as the attempt for health promotion, especially for the patient with low educational background and the patients of childbearing age who are most likely having the disease. Many ways can be done to increase the knowledge about SLE disease, such as socialization, regularly seeking information about SLE, having a consultation with an expert that is a doctor, and other health services if problems are found.

It is expected that this study can be used as a guide and inspire further study to determine deeply about the overview of knowledge level in ODAPUS about the SLE disease. Moreover, future researchers can expand the respondents' characteristics that will be studied, expand the research area with a larger number of respondents, and have more varieties of respondents' characteristics.

REFERENCE

AA, J. V., McClellan, N. and Varacallo, M. (2018) 'Lupus Erythematosus'.

Arikunto, S. (2012) *Prosedur Penelitian : Suatu Pendekatan Praktik (Edisi Revisi), Rineka Cipta*.

Azmi, A. (2017) 'Perilaku Penemuan Informasi Kesehatan Dikalangan Penderita "Lupus"'. Universitas Airlangga.

Budiman, R. A. (2013) 'Kapita selekta kuesioner: pengetahuan dan sikap dalam penelitian kesehatan', *Jakarta: Salemba Medika*, pp. P4-8.

Carter, E. E., Barr, S. G. and Clarke, A. E. (2016) 'The global burden of SLE: Prevalence, health disparities and socioeconomic impact', *Nature Reviews Rheumatology*, pp. 605–620. doi: 10.1038/nrrheum.2016.137.

Fatmawati, A. (2018) 'Regulasi Diri pada Penyakit Kronis-Systemic Lupus Erythematosus: Kajian Literatur',

Jurnal Keperawatan Indonesia, 21(1), pp. 43–50.

Fava, A. and Petri, M. (2019) 'Systemic lupus erythematosus: diagnosis and clinical management', *Journal of autoimmunity*. Elsevier, 96, pp. 1–13.

Feldman, C. H. *et al*. (2013) 'Epidemiology and sociodemographics of systemic lupus erythematosus and lupus nephritis among US adults with Medicaid coverage, 2000–2004', *Arthritis & Rheumatism*. Wiley Online Library, 65(3), pp. 753–763.

Ferenkeh-Koroma, A. (2012) 'Systemic lupus erythematosus: nurse and patient education.', *Nursing standard (Royal College of Nursing (Great Britain) : 1987)*. England, 26(39), pp. 49–57; quiz 58. doi: 10.7748/ns2012.05.26.39.49.c9134.

Ghafirah, B. (2018) 'Insiden Mortalitas Systemic Lupus Erythematosus (Sle) Aktif Di Rsud Dr. Soetomo Surabaya Periode Mei 2016–Mei 2017'. Universitas Airlangga.

Infodatin Kemenkes, R. I. (2017) 'Pusat Data dan Informasi Kementrian Kesehatan Republik Indonesia: Situasi dan Analisis Lupus', *Jakarta: Media Publis Kemenkes RI dikutip dari www. depkes. go. id*.

Kaul, A. *et al.* (2016) 'Systemic lupus erythematosus', *Nature Reviews Disease Primers*. doi: 10.1038/nrdp.2016.39.

Komalig, F. M. *et al.* (2008) 'Faktor Lingkungan Yang Dapat Meningkatkan Risiko Penyakit Lupus Eritematosus Sistemik', *Indonesian Journal of Health Ecology*, 7(2). doi: 10.22435/jek.v7i2 Agt.1651.

Lynn, R., Wilberg-Neidhardt, S. and Margraf-Stiksrud, J. (2005) 'Sex differences in general knowledge in German and Northern Irish university students', *Sexualities, Evolution & Gender*. Taylor & Francis, 7(3), pp. 277–285.

Notoatmodjo, S. (2010) 'Konsep perilaku kesehatan', *Dalam: Promosi Kesehatan Teori dan Aplikasi. Jakarta: Rineka Cipta*.

Notoatmodjo, S. (2012) 'Promosi kesehatan dan perilaku kesehatan', *Jakarta: rineka cipta*, pp. 45–62.

Peter, H. and Selvi, K. (2020) 'Knowledge management: does gender matter? A systematic review of literature', *Journal of Knowledge Management*. Emerald Publishing Limited, 24(6), pp. 1315–1342. doi: 10.1108/JKM-08-2018-0472.

Pons-Estel, G. J., Ugarte-Gil, M. F. and Alarcón, G. S. (2017) 'Epidemiology of systemic lupus erythematosus', *Expert Review of Clinical Immunology*. doi: 10.1080/1744666X.2017.1327352.

Rees, F. *et al.* (2017) 'The worldwide incidence and prevalence of systemic lupus erythematosus: A systematic review of epidemiological studies', *Rheumatology (United Kingdom)*, 56(11), pp. 1945–1961. doi: 10.1093/rheumatology/kex260.

Sari, N. P. W. P. (2016) 'Faktor Pencetus Gejala dan Perilaku Pencegahan Systemic Lupus Erythematosus (Precipitating Factors and Preventive Behavior towards the Exposures of Systemic Lupus Erythematosus)', *Jurnal Ners*. Fakultas Keperawatan Universitas Airlangga, 11(2), pp. 213–219.

Sheba, S. H. *et al.* (2018) 'Kepatuhan Minum Obat Pada Pasien Lupus Eritematosus Sistemik Di RSUP Dr. Hasan Sadikin Bandung', *Majalah Kedokteran Bandung*, 50(1), pp. 21–28. doi: 10.15395/mkb.v50n1.1229.

Shen, B. *et al.* (2013) 'The correlations of disease activity, socioeconomic status, quality of life, and depression/anxiety in Chinese patients with systemic lupus erythematosus', *Clinical and*

Developmental Immunology. Hindawi Publishing Corporation, 2013.

Tedeschi, S. K., Bermas, B. and Costenbader, K. H. (2013) 'Sexual disparities in the incidence and course of SLE and RA', *Clinical Immunology*, 149(2), pp. 211–218. doi: https://doi.org/10.1016/j.clim.2013.03.003.

Waldron, N. *et al.* (2011) '"It's more scary not to know": a qualitative study exploring the information needs of patients with systemic lupus erythematosus at the time of diagnosis', *Musculoskeletal care*. Wiley Online Library, 9(4), pp. 228–238.

DESCRIPTION OF PHYSICAL ENVIRONMENTAL FACTORS, CHARACTERISTICS OF INDIVIDUALS, USE OF PPE AND IRRITANT CONTACT DERMATITIS IN BRATANG COMPOST HOUSES

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ABSTRACT

Introduction: Compost house is one of the government's efforts to overcome the adverse effects of increasing the volume of waste; one of the large compost houses is the Bratang Compost House. One of the health risks faced by workers is irritant contact dermatitis. The purpose of this study was to individual characteristics and use of PPE with the incidence of irritant contact dermatitis in workers at the Bratang Compost House. **Methods:** The study was descriptive observational with a cross-sectional model. Calculation of RR values was used to see the characteristics of the relationship between the use of PPE and the incidence of irritant contact dermatitis in workers at the Bratang Compost House. **Result:** The results showed that there were 9 workers affected by irritant contact dermatitis and 6 workers who were not affected by irritant contact dermatitis. Most workers affected by irritant contact dermatitis were dominated by workers age less than 30 years old and have a service life of more than 5 years. The results of the calculation of RR values indicated that poor usage of PPE can increase the risk of developing irritant contact dermatitis. **Conclusion:** What needs to be done by workers is to increase awareness of the importance of occupational health and safety especially the usage of PPE. The thing that needs to be done by the manager of the compost house is to fix the physical environmental factors, conduct socialization of health risks in the workplace and provide PPE to improve the safety of workers.

Keywords: Physical Environmental, Characteristics of Individual, Use of PPE, Irritant Contact Dermatitis in Bratang

INTRODUTION

Every day, humans consume the resources on earth to carry out their activities so as to produce waste. Population increase, industrial development, urban population increase and economic growth can have a maximum impact on the amount of waste generated. Surabaya is a city that has a significant population growth due to industrialization and urbanization because it is the center of the economy in East Java. The increasing volume of waste causes problems for the environment. Therefore, it is necessary to carry out waste management activities in order to reduce the negative impact of waste on the human environment.

Recycling of waste is one solution to reduce the accumulation of waste in the landfill and reduce the unwanted impact of environmental pollution due to waste. Recycling of solid waste is an activity to manage waste that is considered useless into goods that can be reused. Examples of waste recycling include turning kitchen waste or waste from the market into compost, turning plastic waste into household items by reprinting them. Based on the example of the form of recycling , composting is an alternative solution implemented by the Surabaya City Government to reduce the volume of waste that will go to the landfill through the compost house program. Based on data from the Surabaya City Parks and Hygiene Service, in 2014 there was 68.5% organic waste originating from households, city parks and markets that could be processed into compost (Dhera, 2017). Currently, there are 26 compost houses operating in the city of Surabaya with different capacities and number of workers. The eastern part of Surabaya has seven compost houses with the Bratang Compost House having a large production capacity and a

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large number of workers, namely 15 people, in contrast to other compost houses in the eastern area of Surabaya, which have a number of workers ranging from two to eight people.

Working in a compost houseare not without risk, it is not much different from scavengers because they also have the same activity, namely contact with garbage. Activities in the compost house are sorting and stockpiling waste from households, markets and city parks to collect organic waste that can be produced into compost. Garbage has an influence on the health of the human body. The effects can be from toxic waste, waste containing pathogens, waste containing carcinogens and waste that is corrosive to the body (Slamet, 2014). This can trigger the occurrence of health problems at work.

Contact dermatitis is an inflammation of the skin due to substances or particles that touch the skin; there are two types of contact dermatitis, namely irritant contact dermatitis, which is dermatitis that is not caused by the body's immune system response, while the other is allergic contact dermatitis, caused by a specific immune system response, For example, workers are exposed to certain allergens that cause an inflammatory response in the skin. Based on the period of occurrence of the disease, it is divided into two, namely acute and chronic. Irritant contact dermatitis is caused by substances that are irritating to the skin such as sawdust, household cleaners, engine lubricants, and materials that are too acidic or alkaline. In addition, individual factors can influence such as length of contact, age of the worker, gender and previous history of skin disease (Djuanda et al., 2010). Occupational contact dermatitis is also caused by environmental physical conditions such as environmental temperature and humidity in addition to materials derived from plants such as plant sap, tree branches and leaves (Suma'mur, 1994). So, from the description above, it can be concluded that the composting process at the Bratang Compost House has a risk of irritant contact dermatitis in its workers.

Data on the incidence of contact dermatitis are indeed rather difficult to obtain, this is probably because not all incidents are reported and recorded by the competent agency and affected workers sometimes do not report it. In a study conducted on garbage collectors in Yogyakarta in 2016, it was stated that 28.9% of 45 respondents admitted that they had complaints of irritant contact dermatitis. In a study conducted at the Jambangan compost house in 2016, data showed that there were 76.2% of 21 composting house workers affected by contact dermatitis (Dhera, 2017). The same results were also shown in a study conducted on waste processing workers at the Cipayung landfill in 2010 where there were more workers affected by irritant contact dermatitis (Annisa, 2010).

Based on the description above, it can be concluded that working in a compost house can cause expoure to risk factors such as air temperature in the compost house, humidity in the compost house environment, gender, age, years of service and knowledge of workers. Factors that do not directly affect the incidence of contact dermatitis in workers include the behavior of using PPE and personal hygiene or personal hygiene (Lestari & Utomo, 2007). The behavior of using PPE can prevent workers from getting contact dermatitis because PPE protects workers from contact with garbage. In addition, personal hygiene is also important in the prevention of contact dermatitis because personal hygiene can eliminate the substance that causes contact dermatitis attached to the body. Personal hygiene activities aim to rid oneself of dirt or chemical substances attached to the skin and maintain physical and psychological health (Wartonah, 2003).

The results of initial observations made by researchers in November 2018 at the Bratang Compost House have obtained

an overview of the activities and skin health complaints experienced by workers. The waste in the Bratang Compost House comes from households, markets and city parks where it contains a lot of organic and inorganic materials that can trigger irritant contact dermatitis in workers. The workers who carry out sampang sorting activities also do not all wear PPE completely and correctly. Symptoms of irritant contact dermatitis are quite varied, this also affects the type of irritant contact dermatitis, namely acute or chronic. Acute irritant contact dermatitis is characterized by peri-pitched skin, burning heat, erythema and bullae. In patients with chronic irritant contact dermatitis, it is characterized by dry, thickened, and scaly skin (Djuanda et al., 2010). If the disease is not controlled, it can cause pathogenic infection and disability, which can reduce work productivity.

Based on the results of the initial observations above, this study aims to describe the risk factors for the incidence of irritant contact dermatitis among workers at the Bratang Compost House.

METHODS

This study used a cross-sectional research design. The cross-sectional method is a research conducted at one time, both in data collection, observation and studying the relationship between risk factor variables and the effects that will occur (Notoatmodjo, 2005). This research was conducted with a descriptive observational method so that it does not give treatment to the subject under study and the data that have been collected will be processed to obtain a picture that can be presented in the form of a narrative to explain the phenomena that occur.

The research population is 15 people who work at Bratang Compost House. In this study, the sample was taken using a total sampling technique, namely the number of research samples was the same as the total population, this step was taken because the number of research populations was less than 100 people (Sugiyono, 2007). The research location is in the Bratang Compost House which is located in the Bratang Flora Park complex, Baratajaya Village, Gubeng District, Surabaya City. Data collection was carried out in January 2019.

The independent variables in this study were temperature, humidity, environmental sanitation, years of service, age, gender and use of PPE. The dependent variable in this study was the incidence of irritant contact dermatitis in Bratang Compost House workers. To observe the temperature and humidity of the compost house a thermohygrometer eas used and . environmental sanitation observed using the assessment sheet. To obtain data on years of service, age, gender, bathing behavior, cleanliness of clothes, knowledge and use of PPE a questionnaire sheet was used. To diagnose workers for contact dermatitis a doctor's examination was used.

Data processing is carried out descriptively, namely by conducting a frequency distribution and then providing a narration that describes the phenomenon. In addition, the researcher also calculated the Relative Risk (RR) value to determine the type of relationship between the independent variable and the dependent variable through the resulting value. This research has also passed the ethical test conducted by the Health Research Ethics Commission, Faculty of Public Health, Airlangga University with certificate number 581/EA/KEPK/2018.

RESULT

Contact dermatitis examination on respondents was carried out by general practitioners. The results of the examination of respondents who are BratangCompost House workers are nine (60%) workers with contact dermatitis and six (40%) workers without contact dermatitis. In this study, the location of

contact dermatitis included the toes and fingers, soles of the feet and palms, arms, legs, thighs and necks of workers.

The results of the observation of contact dermatitis symptoms in most workers experienced dry and scaly skin as many as five people, then redness of the skin as many as three people, while the rest experienced small bumps filled with fluid and itchy and sore skin. The workers admitted that they often experience itching, redness and soreness after working in the compost house, usually after they sort the garbage or stir the compost pile.

The results of measuring the temperature of the work environment at the Bratang Compost House using a thermohygrometer measuring instrument for five minutes near the point where workers carry out their activities, show a figure of . These results are compared with the standards regulated by the Minister of Public Works Regulation No. 03 of 2033 concerning the Implementation of Waste Infrastructure and Facilities in the Handling of Household Waste and Types of Household Waste which states that the temperature in the waste processing site should be less than 550C (Ministry of Public Works, 2013). So that the temperature in the Bratang Compost House is in accordance with the regulations.

The results of the measurement of air humidity in the Bratang Compost House using a thermohygrometer for five minutes near the point where workers carry out their activities is 61%. The measurement results are then compared with the standards regulated in the Ministry of Health of the Republic of Indonesia No. 48 of 2016 concerning Office Safety and Health Standards where the humidity is between 40% to 60% (Ministry of Health, 2016). So that the air humidity in the Bratang Compost House does not meet the standards. The building design of the compost house may affect the temperature and humidity conditions of the air.

Environmental sanitation in the Bratang Compost House refers to the standards applied in the Minister of Health Regulation No. 70 of 2016 concerning Industrial Work Environment Health Standards. In this standard, three main aspects are assessed, namely the toilet sink, and the availability of clean water. The toilet aspect criteria are the suitability of the number of toilets with latrines appropriate with the number of workers, available water for toilets, and available soap. The sink aspect has criteria such as there is a hand dryer, there is running water and soap for washing hands. Aspects of the availability of clean water criteria include the availability of sufficient water, which is 20 liters per person, coming from protected sources, odorless water and tasteless water (Ministry of Health, 2016).

The results of the toilet aspect assessment show that there are two criteria which are met, namely the availability of a number of latrines that are in accordance with the number of workers, and the availability of water for toilet facilities. The criteria that have not been met for the toilet aspect is the availability of soap. The number of compost house workers is 15 with the number of toilets already meeting the standards. There is no soap in the toilet because it is possible for workers to bring their own soap from home. The water in the toilet is also always sufficient because it comes from a water source that always drains smoothly.

The results of the assessment of the sink aspect stated that there was only one criterion that met the availability of running water. The sink still does not meet two criteria, namely the presence of a hand dryer and hand soap. Usually workers only wash their hands with running water because it is not a hassle. Only when their hands are really dirty do they use the soap they brought from home. Good and correct hand washing habits can prevent irritant contact dermatitis.

The results of the assessment of the availability of clean water stated that it had met all the criteria. Clean water comes from drilled wells connected to pipes. The

water also looks clear and odorless. For the amount of clean water so far there has never been a shortage because the wells used as water sources have never dried up and, in the event of a blackout from the State Electricity Company (PLN), a generator can be used.

Based on the results of environmental sanitation observations above not all environmental sanitation facilities are met. Facilities that are not yet available include bath soap in the toilet, hand dryer in the sink and hand soap in the toilet. The lack of sanitation facilities is probably due to the lack of attention from compost house managers and workers who are already satisfied with the existing facilities.

Table 1. Distribution of Contact Dermatitis by Period of Work in Bratang Compost Home Workers in 2019

Working Period	Irritant Contact Dermatitis		No Irritant Contact Dermatitis		Total	
	n	%	n	%	n	%
<5	5	55.6	4	44.4	9	100
≥5	4	66.7	2	33.3	6	100
Total	9	60	6	40	15	100

Table 2. Distribution of Contact Dermatitis by Age in Bratang Compost Home Workers in 2019

Age	Irritant Contact Dermatitis		No Irritant Contact Dermatitis		Total	
	n	%	n	%	n	%
<30	4	66.7	2	33.3	6	100
≥30	5	55.6	4	44.4	9	100
Total	9	60	6	40	15	100

Table 3. Distribution of Contact Dermatitis by Gender in Bratang Compost Home Workers in 2019

Gender	Irritant Contact Dermatitis		No Irritant Contact Dermatitis		Total	
	n	%	n	%	n	%
Male	9	60	6	40	15	100
Female	0	0	0	0	0	100
Total	9	60	6	40	15	100

The variable length of service for the respondents was measured from the time the worker first worked at the Bratang Compost House to the time the worker was examined for his skin by a general practitioner to diagnose box dermatitis. Based on Table 1, workers affected by contact dermatitis are dominated by workers with a working period of five years (66.7%), while workers without contact dermatitis are dominated by workers with a working period of <5 years (44.4%). In Table 1 it can also be seen that workers with <5 years of service were more likely to have irritant contact dermatitis (55.6%).

The age variable was measured through the worker's date of birth to the time the worker was examined by a doctor to

diagnose contact dermatitis. Based on Table 2, the incidence of irritant contact dermatitis was more experienced by workers who were <30 years old (66.7%), compared to those without irritant contact dermatitis (33.3%). Workers who are 30 years old are also more affected by irritant contact dermatitis (55.6%) than those who do not have irritant contact dermatitis (44.4%).

In Table 3, it can be seen that all workers are male (100%) with 60% of them having irritant contact dermatitis. According to the compost house supervisor, the workers there are dominated by men because the compost processing activity is quite heavy.

Table 4. Distribution of PPE Use for Bratang Compost Home Workers in 2019

PPE Type		Irritant Contact Dermatitis		No Irritant Contact Dermatitis		n	%
		n	%	n	%		
Work uniform							
	Use	8	61.5	5	38.5	13	100
	Do not use	1	50	1	50	2	100
Gloves							
	Use	4	44.4	5	55.6	9	100
	Do not use	5	83.3	1	16.7	6	100
Boots							
	Use	6	50	6	50	12	100
	Do not use	3	100	0	0	3	100

Table 5. Cross-tabulation between the results of the assessment of the use of PPE and the incidence of irritant contact dermatitis in Bratang composting house workers in 2019

Use of PPE	Irritant Contact Dermatitis		No Irritant Contact Dermatitis		Total		RR
	n	%	n	%	n	%	
Buruk	6	75	2	25	8	100	1.75
Baik	3	42.9	4	57.1	7	100	

In Table 4, the use of PPE in the form of work clothes is more widely used by workers affected by irritant contact dermatitis, namely 61.5%, while those without contact dermatitis and wearing work clothes are 38.5%. Workers who do not wear work clothes between workers with irritant contact dermatitis and those who do not have the same number (50%).

In Table 4, the use of PPE in the form of gloves is more widely used in workers who do not have irritant contact dermatitis (55.6%), while those who have irritant contact dermatitis are 44.4%. Workers who do not wear gloves are more affected by irritant contact dermatitis (83.3%), while workers who do not have irritant contact dermatitis are 16.7%. In addition, Table 4 also shows the possibility that the use of certain PPE also affects the number of sufferers of irritant contact dermatitis. This may be due to their activities, such as sorting waste by hand, but there are still many workers who do not use gloves.

In Table 4, the use of PPE in the form of boots has the same number between workers who have contact dermatitis or not and wear boots, namely 50%. There are still workers who do not wear boots, all of whom are also affected by contact dermatitis.

In Table 5, it can be seen that the poor use of PPE is found in workers with irritant contact dermatitis, which is 75%, while the use of good PPE is mostly found in workers who are not exposed to irritant contact dermatitis, which is 57.1%. The results of the Relative Risk (RR) assessment yield 1.75, which means that poor use of PPE can be a risk factor for the occurrence of irritant contact dermatitis in Bratang Compost House workers.

DISCUSSION

Incidence of Contact Dermatitis in Workers at Bratang Compost House

Irritant contact dermatitis or commonly abbreviated as DKI is an inflammation of the skin due to direct exposure of cells to toxic chemicals, it can also be due to physical, biological agents on the epidermis of cells without the production of certain antibodies (Kezic et al., 2009).). Irritant contact dermatitis can occur due to factors from outside the body (exogenous) or factors from inside the body (endogenous). Factors originating from within the body itself or commonly referred to as endogenous can be in the form of gender, heredity, ethnicity or race, the location of the disease, and a history of atopy. While factors originating from outside the human body or commonly referred to as exogenous include chemicals that have irritant properties, exposure characteristics, environmental factors, mechanical factors and UV radiation. Chemical properties of irritants can be in the form of pH level, concentration of chemical exposed, carrier material and solubility level of the substance. Exposure characteristic factors are usually in the form of amount, concentration, length of time, type of exposure, exposure that triggers other irritants and the time span after previous exposure. Environmental factors usually consist of temperature and humidity (Sularsito & Djuanda, 2009).

The results of the research on irritant contact dermatitis among workers at Bratang Compost House were 60% of workers with irritant contact dermatitis and 40% of workers without irritant contact dermatitis. Most workers experience symptoms such as burning skin, reddened skin, dry and scaly skin, and small fluid-filled bumps known as vesicles. Common symptoms in patients with irritant contact dermatitis are usually the appearance of a shiny epidermal layer, the presence of fissures, well-defined erythematous macules and dry or blistered skin (Sularsito & Djuanda, 2009).

Based on the description above, it can be concluded that the incidence of irritant contact dermatitis in workers is the result of exposure to irritant chemicals and biological agents, where many chemicals and biological agents are found in the waste to be sorted and stacked to become compost. Garbage which is the main raw material for composting comes from households, markets, offices and city parks. The waste consists of several elements such as tree branches, dry leaves, vegetable scraps, meat scraps, plastic bags, household cleaners and so on. The workers choose the waste to be separated between organic and inorganic waste and pile the organic waste into compost. It is very possible for contact with disease agents on the skin of workers. If workers do not use adequate PPE, poor personal hygiene and unfavorable physical environmental factors can trigger irritant contact dermatitis in Bratang Compost House workers.

Temperature, Humidity and Environmental Sanitation

The results of temperature and humidity measurements in the Bratang Compost House are the environmental temperature which is 35.50C and the humidity 61%. The environmental temperature of the Bratang Compost House

has complied with the regulations stipulated by the Minister of Public Works No. 03 of 2033 concerning the Implementation of Waste Infrastructure and Facilities in the Handling of Household Waste and Waste Similar to Household Waste, which is not more than 550C. Meanwhile, the humidity in the Bratang Compost House is 61% so it does not meet the standards set by the Minister of Health Regulation No. 48 of 2016 concerning Office Occupational Safety and Health Standards, which is 40%-60%.

The temperature and humidity of the air in the compost house must be in accordance with regulations. If the low temperature and humidity result in a decrease in the level of wetting or hydration of the stratum corneum, it makes the skin dry easily; under these conditions irritant chemicals will easily enter the skin tissue (Cohen, 1999). Damage to the skin's defense function can also occur if the temperature and humidity are too high, causing excessive hydration of the stratum corneum and also at too low a temperature and humidity (Safeguards, 2010). In addition, other opinions also state that when humidity drops and air temperature increases, it will cause severe contact between strong acids and strong bases besides making the skin condition more dry, making it easier for chemicals to irritate the skin, making it easier to get irritant contact dermatitis (1981).

The results of environmental sanitation research at the Bratang Compost House show that there are still sanitation criteria that are not available including the absence of soap in the toilet, the absence of hand dryer media in the sink and the unavailability of hand soap in the sink. Lack of environmental sanitation facilities can affect the healthy behavior of workers. One of the most prominent is the inhibition of workers to carry out personal hygiene behavior to the fullest. One of the personal hygiene factors is hand washing. Washing hands properly can remove dirt that sticks to the skin; it is very beneficial for skin health because it can reduce the duration of exposure, reduce the concentration of substances and prevent disease agents from entering through the skin. Another example is the availability of hand dryers, which can be a preventive measure to maintain a stable level of skin hydration through reducing moisture in wet skin after washing hands (WHO, 2009). Based on the description, it can be concluded that environmental sanitation is not directly related to the incidence of contact dermatitis, but poor personal hygiene factors due to poor environmental sanitation facilities can trigger the incidence of contact dermatitis in workers.

The Relationship of Working Period with the Incidence of Contact Dermatitis

Most of the workers at Bratang Compost House who suffer from contact dermatitis have a working period of less than five years, but the workers who have a working period of more than five years are also dominated by contact dermatitis sufferers. If workers have a long working period, it will result in a longer period of exposure to contact dermatitis triggers (Suma'mur, 1996). In addition, continuous skin contact with irritant chemicals will increase the severity of irritant box dermatitis, which can be acute or chronic.

Relationship of Worker Age with the Incidence of Contact Dermatitis

Based on the results of interviews with workers' age, it shows that workers who are affected by irritant contact dermatitis are mostly over 30 years old, but workers who are under 30 years old are also dominated by workers who are affected by irritant contact dermatitis. The increasing age of workers causes a decrease in the lipid layer on the skin which manifests in the drying of the skin and making the skin more permeable to irritating chemicals (Cohen, 1999).

On the other hand, many workers who are under 30 years old or who are still

young are also affected by irritant contact dermatitis. This phenomenon is also explained by Cohen (1999), according to whom the experience of young workers is still less when compared to older workers so that contact with cilia is more common. Because older workers know more about how to avoid boxes and older workers value their safety more, so they are more disciplined in using PPE.

Relationship between Worker Sex and the Incidence of Contact Dermatitis

The results of the research on the sex of workers at Bratang Compost House showed that all workers were male. Contact dermatitis is actually not gender-based, it affects men and women the same. However, there is a lot of literature which states that more female workers are affected by irritant contact dermatitis than male workers. This is because women's skin is thinner and they rarely have fine hair, making it easy for irritating chemicals to enter the skin. The skin layer in women secretes fewer lipids so the skin becomes drier. The high rate of contact dermatitis in women may also be possible due to more frequent use of jewelry, use of cosmetics, and interactions with the surrounding environment. However, although it is more dominated by women, men are also susceptible to contact dermatitis if they are not disciplined in using PPE, are not diligent in maintaining personal hygiene, and individual characteristics are susceptible to irritant contact dermatitis. In addition, the level of awareness and knowledge of workers which are still low may be a risk factor for the occurrence of irritant contact dermatitis.

The Relationship between the use of PPE with the Incidence of Contact Dermatitis

In this study, there were three types of PPE that must be worn by compost house workers, including work clothes, gloves and boots. The use of work clothes for Bratang Compost House workers shows that there are many workers who use work clothes and there are only two workers who do not wear work clothes where one of them has contact dermatitis. Workers who do not wear gloves are more affected by contact dermatitis, as well as boots where there are three workers who do not wear them and are exposed to irritant contact dermatitis. The results of the calculation of the RR value also show that poor use of PPE is a risk factor for the incidence of irritant contact dermatitis in workers at the Bratang Compost House.

The use of work clothes aims to protect the body from dirt or chemical irritants present in the waste for contact with the worker's body. Although many workers have worn work clothes, many still have contact dermatitis. This is possible, because workers do not pay attention to the cleanliness of the work clothes used and there are still workers who change clothes with other people. This behavior is very likely to transmit skin diseases on the skin of someone who wore the clothes before. Lack of cleanliness of clothes can also cause irritating chemicals and biological agents to accumulate in the clothes, making workers who wear them more often exposed.

The lack of workers wearing PPE in the form of gloves is also a contributing factor to the occurrence of irritant contact dermatitis. Activities in the compost house that allow workers to touch the waste with their hands need to be protected by gloves so that the skin of their hands does not touch the waste directly. This is because in the waste there are many chemicals that are irritants and biological agents that can cause workers to get contact dermatitis. The same thing happens with the use of PPE boots, which are also to protect the skin of the feet from contact with garbage and protect the skin from friction against sharp objects in the garbage.

In a study conducted on workers making paving blockby Erliana (2008), it was found that the use of PPE has a strong relationship with the incidence of contact dermatitis through the chi-square test.s. The use of PPE is actually not to eliminate or

minimize existing hazards, but to reduce contact with workers by providing a place that prevents workers' contact with hazards (Suma'mur, 1992).

CONCLUSION

The incidence of contact dermatitis in workers at Bratang Compost House occurs due to physical environmental factors, individual characteristics, and waste as the main agent of the disease. The incidence of contact dermatitis can reduce worker productivity and increase the budget burden for workers or managers.

The temperature of the compost house has met the standard but the humidity is still below the standard. This needs to be controlled so that the temperature and humidity of the air can be optimal to support the health of the workers' skin.

To prevent the incidence of contact dermatitis effort needs to be carried out by all parties and requires high awareness. Workers must have high motivation to maintain work safety by using PPE properly and correctly. Managers must also provide PPE, socialize the correct use of PPE and provide sanctions if workers do not use PPE properly and correctly. Managers must also pay attention to a good environmental sanitation system so that workers are able to carry out personal hygiene optimally. There should also be socialization to workers about contact dermatitis.

REFERENCES

Annisa, M. (2010). *Faktor-Faktor yang Berhubungan dengan Dermatitis Kontak Iritan Pada Pekerja Pengelolah Sampah di TPA Cipayung Kota Depok Tahun 2010*. Universitas Islam Negeri Syarif Hidayahtullah Jakarta.

Cohen, D. (1999). *Occupational Dermatoses In : DiBerardinis LJ, editors.Handbook of Occupational Safety and Health Second Edition.* Canada: John Wiley & Sons Inc.

Dhera, S. F. A. (2017). HUBUNGAN KARAKTERISTIK PEKERJA, KELENGKAPAN DAN HIGIENITAS APD DENGAN KEJADIAN DERMATITIS KONTAK (Studi Kasus Di Rumah Kompos Jambangan Surabaya). *The Indonesian Journal of Occupational Safety and Health*, *6*(1), 16. http://dx.doi.org/10.20473/ijosh.v6i1.2017.16-26

Djuanda, A., Hamzah, M., & Aisah, S. (2010). *Ilmu Penyakit Kulit dan Kelamin*. Jakarta: Fakultas Kedokteran Universitas Indonesia.

Erliana. (2008). *Hubungan Karakteristik Individu Dan Penggunaan Alat Pelindung Diri Dengan Kejadian Dermatitis Kontak Pada Pekerja Paving Block CV. F. Lhoksemawe*. Universitas Sumatera Utara.

Fregert, S. (1981). *Manual of Contact Dermatitis*. Chicago: Yayasan Essentia Medica.

Ministry of Health (2016). Permenkes Nomor 48 Tahun 2016 tentang Persyarkatan Keselamatan dan Kesehatan Kerja Perkantoran Jakarta: Ministry of Health RI.

Ministry of Health. (2016). *Peraturan Menteri Kesehatan Republik Indonesia Nomor 70 Tahun 2016 tentang Standar dan Persyaratan Kesehatan Lingkungan Kerja Industri*. Jakarta: Ministry of Health RI.

Ministry of Public Works. (2013). *Peraturan Menter Pekerjaan Umum Republik Indonesia Nomor 03 Tahun 2013 tentang Penyelenggaraan Prasarana dan Sarana Persampahan Dalam Penanganan Sampah Rumah Tangga dan Sampah Sejenis Sampah Rumah Tangga*. Jakarta: Kementrian Pekerjaan Umum republik Indonesia.

Kezic, S., Visser, M. J., & Verberk, M. M. (2009). Individual Susceptibility to Occupational Contact Dermatitis.

Industrial Health, *47*(5), 469–478. https://doi.org/10.2486/indhealth.47.469

Lestari, F., & Utomo, H. suryo. (2007). FAKTOR-FAKTOR YANG BERHUBUNGAN DENGAN DERMATITIS KONTAK PADA PEKERJA DI PT INTI PANTJA PRESS INDUSTRI. *Makara Journal of Health Research*, *11*(2), 61–68. Notoatmodjo, S. (2005). *Metodologi Penelitian Kesehatan*. Jakarta: Rineka Cipta. https://doi.org/10.7454/msk.v11i2.257

Safeguards. (2010). *Contact Dermatitis. Government of South Australia, Departemen for Administrative and Information Services.*

Slamet, J. S. (2014). *Kesehatan Lingkungan*. Yogyakarta: Gajah Mada University Press.

Sugiyono. (2007). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Bandung: Alfabeta.

Sularsito, S. ., & Djuanda, S. (2009). *Dermatitis. Djuanda A. In: Djuanda A, Mochtar H, Aisah S, editors. Ilmu Penyakit Kulit Dan Kelamin.* Jakarta: Fakultas Kedokteran Universitas Indonesia.

Suma'mur. (1992). *Higiene Perusahaan dan Kesehatan Kerja*. Jakarta: Haji Masagung.

Suma'mur, P. K. (1994). *Higiene Perusahaan dan Kesehatan Kerja*. Jakarta: Penerbit PT. Toko Gunung Agung.

Suma'mur, P. K. (1996). *Keselamatan kerja dan pencegahan kecelakaan*. Jakarta: Gunung Agung.

Wartonah, T. dan. (2003). *Kebutuhan Dasar Manusia dan Proses Keperawatan*. Jakarta: Salemba Medika.

WHO. (2009). *WHO Guidelines on Hand Hygiene in Health Care (Advance Draft): A Summary*. Switzerland: WHO Press.

CHARACTERISTICS RELATIONSHIP OF WORKERS AND INTENSITY OF WORK ENVIRONMENT NOISE WITH TINNITUS COMPLAINTS IN GAS INDUSTRIAL WORKERS IN SIDOARJO

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ABSTRACT

Introduction: Industrial progress is characterized by the increasing use of machinery in factory which has a negative impact on workers' health, one of which is tinnitus symptoms. Tinnitus is a hearing loss due to exposure to noise. The purpose of this study was to determine the relationship of worker characteristics and intensity of work environment noise with tinnitus symptoms in gas industry workers in Sidoarjo. **Methods:** Based on the study design, this study used analytic research, in terms of time including cross-sectional research. Research variables include age, years of service, noise intensity and tinnitus symptoms. Data are from observation, measurement, questionnaire filling and interview. **Result**: The results showed that there was a relationship between noise intensity and tinnitus symptoms (p = 0.033). There was no relationship between the age of workers and tinnitus symptoms (p = 1.000). There was no significant relationship between years of work (p = 0.505) with tinnitus symptoms suffered by workers at PT. X Sidoarjo Gas Industry. There was no association between exposure pattern and complaints of tinnitus (p=0.165). **Conclusion**: So as to reduce the risk of tinnitus complaints the company can apply the use of ear protector for workers and install silencers that can absorb sound with high noise intensity such as glasswool, rockwool, foam, cellulose fiber and acourete fiber carpets to reduce noise.

Keywords: Worker characteristics, intensity of work environment noise, tinnitus

INTRODUCTION

Exposure to noise at work increases with technological advancements, especially in the industrial sector that cannot be separated from the use of machinery. The noise source is generated from engine noise in the work environment with dBA values exceeding the specified threshold value or NAV, especially in the factory environment. The NAV of noise based on the specified time is 1 to 8 hours per day for noise intensities between 85 dBA and 94 dBA. The regulation stipulates that NAVs from 94 dBA to 112 dBA can only be heard for 30 minutes per day (PER.13/MEN/X/2011).

A person's hearing in the work environment will correlate with the time and severity received by the worker. When the assessment time exceeds a predetermined limit, then it will aggravate hearing changes in someone. If there is noise that persists over a long time, it results in damage to the inner ear, so that the ability to hear sounds with high or low frequencies disappears (Septiana & Widowati, 2016).

Noise caused by sound is caused by the sound source that produces vibrations and makes molecules in the air become trembling. According to the longitudinal wave pattern, the vibration of this source also causes mechanical energy propagation waves in the air. Wave propagation or commonly known as voices or sound scan disrupt comfort and health if it is too loud. Hearing loss is one of the effects that can be caused by excess noise, and progressive deafness is also caused by noise that exceeds specified limits (Dewanty & Sudarmadji, 2015).

According to research in India, of 50 workers exposed to noise, 80% had hearing loss at a frequency of 4000 Hz (Tekriwal,

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Parmar, & Saxena, 2011). One impact due to noise exposure in the workplace is a decrease in hearing function (Primadona, 2012). Tinnitus is a hearing loss caused by exposure to high-intensity noise continuously. Symptoms experienced by sufferers are ringing ears (Occupational Safety and Health Administration, 2011). Risk factors for tinnitus include individual factors, namely age, sex, and the use of ear protection equipment (EPE); activity pattern factors namely length of work, years of service, exposure patterns; and noise intensity factors (Kurniawati, 2016).

According to a study conducted in 2011, there was an impact on the level of noise intensity with someone's hearing threshold, in which 65% of the respondents were found to have mild disturbance in the left and right ears (Listyaningrum, 2011). In research conducted at PT. Japfa Comfeed Indonesia Tbk. the Makassar Unit in 2014 showed a relationship between the length of service of the worker, the age of the worker, and the use of ear protection equipment by workers with hearing loss complaints (Hamzah, 2014). this is in line with research that worker's age is significantly related to the incidence of hearing loss (Primadona, 2012).

As many as 35 million people experience the incidence of hearing loss at the age of 18 years and becomes worse as you get older; this happens in many American countries (Choi, 2011). Noise is felt to interfere with work concentration, accelerate fatigue, and reduce work efficiency and also affect one's behavior. Noise also causes interrupted speech communication. Such incidence, of course, greatly affects the work, it can even cause mistakes in doing work. A form or model in which an organism is exposed to exposure can be in a matter of hours, days, months or years is called a pattern of exposure. The nature of the pattern of exposure includes continuous, intermittent and impulsive (repetitive) (Djafri, 2014).

Sidoarjo City has an industry that produces a variety of gases. One of the units in the PT X industrial area has a work process and the presence of machinery used can cause a high risk of noise. The work environment in PT X Industri Gas Sidoarjo has a noise level above 85 dBA or arguably exceeds the threshold value. Measurements made during the field survey showed the noise level of 90-110 dBA in the ASP Unit Engine Room so that the room has a noise threshold value that exceeds the limit. A noise that occurs in the ASP Engine Unit is continuous because the engine in this unit is working continuously or never turned off.

Workers in the ASP engine unit at PT X have an average working time of eight hours per day. There are three shifts in the division of working time in the room, namely the morning shift to evening, evening to night and night to the morning with several shifts of 2-3 workers each on duty. ASP machine maintenance activities are carried out once every hour in the ASP Engine Unit Room with noise between 90-110 dBA, so that, when maintaining, workers are face to face with machines that are a source of noise, so that workers get greater exposure from these machines. This is done alternately for workers who work on this shift once every hour.

The results of the review in the Ministry of Manpower and Transmigration Regulation NO.PER.13 / MEN / X / 2011 stated that if the noise level exceeds values above 85 dBA (90-110 dBA) it is only allowed to work for less than eight hours. This still requires further research to examine the relationship between the intensity of the noise exposure of the engine room of the ASP unit and the complaints of tinnitus in the gas industry workers in Sidoarjo.

METHODS

This study examines the risks associated with noise intensity in the work environment due to complaints of tinnitus in gas industry workers in Sidoarjo. This study uses analytic research with a quantitative approach. This research is a cross-sectional

study by way of data collection at the same time (point time approach).

The measurement in this study uses two variables, the dependent variable, and the independent variable. The independent variables in this study are age, years of service, noise exposure patterns, and noise intensity, while the dependent variable studied is complaints of tinnitus. Researchers conducted interviews and observations without intervening or giving treatment to respondents. Data were collected by observation, measurement, filling questionnaires and interviews to determine risk factors in the form of worker characteristics that influence complaints felt by workers due to noise in the work environment. When the measurement was completed, a bivariate analysis was carried out on each variable.

The research location is the engine room of the ASP unit because it has a fairly high noise level between 90-110 dBA compared to other rooms such as the liquid nitrogen filling room and water filtration where workers at PT X do their daily work. This research was conducted in October 2018 to retrieve secondary data and continued until April 2019 to collect primary data by distributing questionnaires to workers, measuring noise with sound level meters and documentation during the study. When researching, work was carried out simultaneously on the same day.

The study population was all PT X gas industry workers in Sidoarjo, totaling 14 people consisting of ASP Unit Engineers and Outdoor Environment workers. The sampling technique in this study was total sampling so that the samples taken from this study were 14 people. Research data were processed using Chi-square test to see the relationship between the independent variable and the dependent variable. The basis of hypothesis decision-making is based on a significance level (α value) of 95%.

This research has passed the ethical test by Universitas Airlangga, Faculty of Dental Medicine - Health Research Ethical Clearance Commission with number 237 / HRECC.FODM / V / 2019.

RESULTS

Table 1 shows the results that most respondents had age less than 40 years with a percentage of 78.6%. In this table, it is known that the majority of respondents have a tenure less than equal to 10 years with a percentage of 64.3% and the majority of respondents have a continuous exposure pattern with a percentage of 57.2%.

Table 1. Characteristics of Respondents PT. X Sidoarjo Industri Gas in March 2019

Characteristics of Respondents	The number of workers	
	N	%
Age :		
>40 years	3	21,4
≤40 years	11	78,6
Works Period :		
≤10 years	9	64,3
>10 years	5	35,7
Exposure Pattern :		
Continuous	8	57,2
Intermittent	3	21,4
Impulsive	3	21,4

Table 2. Noise Intensity Measurement Results at PT X Industri Gas Sidoarjo in March 2019

Measurement Location	Average of Noise Leq 8 hours (dBA)
Point 1	109.74
Point 2	81.76
Point 3	92.21
Average of Noise	94.57

Table 2 shows the results that the measurement of the greatest noise intensity is at point 1 of the measurement that is equal to 109.74 dBA. Then, the results of the calculation of the average noise at PT X Industri Gas Sidoarjo show a figure of 94.57 dBA. When compared with the NAV

determined by Permenaker Number 13 of 2011, the average results of noise measurements at PT X have exceeded the specified quality standards.

Table 3. The Relationship between Age and Tinnitus Complaints PT. X Sidoarjo Industri Gas in March 2019

Tinnitus Complaint	Age of Respondents (years)				*p* Value
	> 40 years		≤ 40 years		
	N	%	N	%	
Yes	3	100	9	81,8	1,000
No	0	0	2	18,2	
Total	3	100	11	100	

Table 3 shows the results that the majority of respondents who experienced Tinnitus complaints were aged less than 40 years with a total of nine respondents from a total of 14 respondents. Meanwhile, those who have more than 40 years of age and suffer from complaints of tinnitus are three respondents out of a total of 14 respondents. Fisher Exact Test results showed a value of p = 1,000 which means that there is no relationship between the age characteristics of respondents with complaints of tinnitus. This clearly shows that tinnitus complaints that occur in workers in the Sidoarjo gas industry are not caused by age.

Table 4 shows the results that the majority of respondents who suffered from tinnitus complaints were with a work period of less than 10 years, as many as seven respondents from a total of 14 respondents. Then, the Fisher Exact test results showed a value of p = 0.005, which means that there is no relationship between tenure and tinnitus complaints.

Table 5 shows that the majority of respondents suffering from tinnitus complaints were respondents who had a continuous noise exposure pattern with a total of eight respondents out of a total of 14 respondents. Fisher Exact test results showed a value of p = 0.165, which concluded that there was no relationship between exposure patterns with tinnitus complaints.

Table 4. The Relationship between Work Period and Tinnitus Complaints PT. X Sidoarjo Industri Gas in March 2019

Tinnitus Complainment	Works Period (Years)				*p* Value
	< 10 years		>10 years		
	N	%	N	%	
Yes	7	77,8	5	100	0,505
No	2	22,2	0	0	
Total	9	100	5	100	

Table 5. The Relationship between Pattern of Exposure and Complaints of Tinnitus of PT. X Sidoarjo Industri Gas in March 2019

Tinnitus Complaint	Pattern of Exposure				*p* Value
	Continuous		Intermittent & Impulsive		
	N	%	N	%	
Yes	8	100	4	66.7	0.165
No	0	0	2	33.3	
Total	8	100	6	100	

Table 6. The Relationship between Environmental Noise Intensity with Tinnitus Complaints PT. X Sidoarjo Industri Gas in March 2019

Tinnitus Complainment	Noise Intensity (dBA)				*P* Value
	High (>85 dBA)		Normal (≤85 dBA)		
	N	%	N	%	
Yes	11	100	1	66.7	0.033
No	0	0	2	33.3	
Total	11	100	3	100	

Table 6 shows that the majority of respondents suffering from tinnitus complaints were those with high noise intensity (> 85dBA), as many as 11

respondents out of a total of 14 respondents. Then, the Fisher Exact test results showed a value of p = 0.003, which means that there is a relationship between noise intensity with tinnitus complaints.

DISCUSSION

Characteristics of Respondents

This research was conducted at PT X Industri Gas Surabaya with a total of 14 respondents. Workers taken as respondents of this study came from workers who were at three different noise measurement points, namely eight workers from point 1 measurement, three workers from point 2 measurement, and three workers from point 3 measurement. Point 1 noise is an ASP engine unit where workers carry out machine production activities, point 2 noise is water filtration near ASP where workers carry out filtration activities and water pumps near ASP units, and point 3 noise is liquid filling where workers carry out liquid filling production activities, then passing tanker trucks, and channeling gas to the tank.

The majority age of respondents in this study were workers who were less than 40 years old. This proves that there are still many respondents who are young and still have good health conditions. Then, in terms of tenure, there are many less than 10 years. This proves that many new people become workers in this company, so there is a possibility of employee turnover. Furthermore, many respondents have a pattern of continuous exposure and cause most of the respondents to get exposure to noise that occurs for a long time and continuously. As a result, this can be a causative agent and risk factor for the occurrence of complaints of tinnitus in workers' hearing. Not only that, other factors such as the amount of noise intensity can also be a major determinant in the occurrence of complaints of tinnitus. Another study conducted by Al-Swiahb (2016) in several age groups who experienced complaints of tinnitus and treatment at Mary Hospital, Korea, also found it has nothing to do with age. A similar study conducted by Steinmetz (2009) in Brazil on workers who experienced exposure to noise in the workplace also showed no relationship between age and complaints of tinnitus suffered by someone.

Noise Intensity Measurement Results

According to Prabu (cited in Dewanty & Sudarmadji, 2015), the intensity of noise in a workplace gives impacts such as physiological, psychological, communication and effects on internal organs. Research conducted by Dewanty (2015) on laundry unit officers states that there is a relationship between noise intensity with hearing loss in the unit officer. Besides, if a person is exposed continuously for a long period and the intensity of noise exceeds the threshold value that has been determined, the risk of a worker being affected by hearing loss is higher. The risk of the hearing will be higher in old age than at a young age (Stranks, 2003).

In the measurement of noise, intensity carried out at three measurement points in the PT X work environment, namely in the ASP engine unit, water filtration section, and liquid filling section. Based on the results of measurements at these three points, it is found that there are two measurement points with noise intensity that exceeds the threshold value of 85 dBA for eight hours. The two measurement points are located in the ASP engine unit and liquid filling work section. Noise in the work environment at PT X Industri Gas is measured using a noise level meter, the SLM, to determine the intensity of noise at the site.

Workers who work on the ASP engine unit certainly have a high noise intensity, because, in this section, there are several production activities of machines such as RNC Sergas, refrigeration units, coller engines, nitrogen compressors, and

turbine expander. The machine at the measurement point 1 operates 24 hours a day, so workers who work at this point are divided into three shifts or three times, 7 am to 3 pm or morning shift, 3 pm to 11 pm or afternoon shift, and 11 am night until 7 am or night shift. Furthermore, workers who are at the third point of filling liquid oxygen and nitrogen also have the risk of getting noise exposure that exceeds the threshold value or high intensity because there is the liquid filling production activity itself, as well as the number of tank trucks passing on duty to channel gas into the tank.

After measuring and calculating the average related to noise intensity at PT X Industri Gas, the results obtained that the average noise is 94.57 dBA in eight hours/day. These results prove that the noise intensity at this company has exceeded the quality standard set by Permenaker No. 13 of 2011, namely noise exposure that exceeds 85 dBA may not be exposed to workers for more than eight hours. This study shows that 11 out of 14 respondents or around 78.57% of respondents experienced noise exposure with noise intensity reaching more than 85 dB in the work environment. One-way research conducted by Septi (2016) on the meat grinder business in Jember Market with noise intensity of 108.58 - 109.38 dBA and Putri (2016) on the machine shop workers of PT. Surabaya Dock and Shipping obtained significant results regarding the relationship of noise intensity with complaints of tinnitus experienced by workers.

The Relationship between Worker Characteristics and Tinnitus Complaints

Tinnitus is a form of sound perception perceived by a person without any sound stimulus coming from outside the ear. Tinnitus itself can be objective or subjective for the listener. Subjective tinnitus is tinnitus that is heard only by the patient himself without being able to be heard by others (Nugroho & Naftali, 2015). Complaints of tinnitus experienced are humming, hissing, roaring, or various other variations of sounds (Dewi Purwita Agustini, 2016).

The characteristics of respondents who have been investigated during this study are age, years of service, and exposure patterns. Research conducted on workers in the gas industry in Sidoarjo found that there is no significant relationship between age factors with complaints of tinnitus. This means that complaints of tinnitus that have been experienced by workers are not caused by age, but can be caused by other factors such as noise intensity. Table 1 shows many workers with complaints of tinnitus at the age of less than 40 years. If age can affect tinnitus complaints, then the older a person should be, the more he suffers from tinnitus complaints.

Tinnitus complaints can indeed be experienced by all age groups. But complaints of tinnitus generally appear with age, whereas in children it is usually caused by the use of earphones with a loud volume for hours. Generally, this complaint is experienced by someone who is in the age group of 40 years or more because every year the hearing threshold will increase by 0.5 dB.

Supporting research is that conducted by Al-Swiahb. J., & Park, SN., (2016) that some age groups experience complaints of tinnitus and treatment at Mary Hospital, South Korea, there is no significant relationship between age and complaints of tinnitus. Then, other supportive research is that conducted by Steinmetz (2009) in Brazil which shows that there is no relationship between age and complaints of tinnitus. A study conducted by Purintyas (2006) mentioned the lack of significance in the relationship between age and tinnitus complaints.

Putri (2016) states that one of the factors that determine the magnitude of the decrease in hearing and hearing loss and can produce a large influence on the condition of Temporary Threshold Shift (TTS) experienced by workers is the work period. Complaints of tinnitus due to noise

exposure can arise directly or chronically until it can cause disruption of daily activities and sleep quality. This study shows that there is no significant relationship between tenure and complaints of tinnitus. That is because there are workers with tenure less than 10 years who experience tinnitus complaints.

Previous research conducted by Putri (2016) on PT Dok and Shipping Surabaya workers also showed that there was no significant effect between tenure and complaints of tinnitus. However, it is different from Purintyas' research (2006) which shows that complaints of tinnitus are related to the length of service received by workers. Other research that is in line with this research is a study conducted by Putri (2016) on a meat-grinding worker in Jember District which shows that there is also a significant relationship regarding tinnitus complaints with the length of service of workers.

Work period can affect hearing complaints such as tinnitus because the hearing organ is only able to receive noise at certain limits. If the noise level received by the worker exceeds the appropriate limit with long-term exposure and continuous or recurring events, this can have an impact on workers' hearing complaints. Decreased hearing ability can occur in a person due to the noise that has occurred over a long time, about five years or more.

However, in this study, workers who had a working period of fewer than 10 years experienced greater tinnitus complaints, while workers who were more than 10 years experienced lower tinnitus complaints. What causes this to happen is the frequency of noise exposure to the workers themselves. For example, it is possible for workers who have more than 10 years of service to have less frequency of noise exposure compared to workers who have less than 10 years of service. As a result, workers with more than 10 years of service experience no complaints from tinnitus. Another possibility that causes work period to not not affect tinnitus complaints is the worker's employment history. For example, workers with tenure less than 10 years have had jobs with higher noise levels compared to the current workplace, so that this can also affect workers' complaints of tinnitus.

This study found that there was no relationship between exposure patterns with significant tinnitus complaints. This shows that the noise that is heard by workers continuously does not have a big influence on the occurrence of complaints of tinnitus. Similar study was previously conducted by Kurniawati (2016) and showed that there was no significant relationship between exposure time and hearing loss. Other studies that are in line with this study are those conducted by Steinmetz (2009) in Brazil on workers who experience noise exposure in the workplace. It found that there is no significant relationship between exposure patterns with complaints of tinnitus suffered by someone.

Exposure can occur due to risk agents from the work environment inhaled into the air, absorbed through human skin or in direct contact with body parts for physical hazards such as radiation, swallowed together with water and hot food, noise, or vibration (Djafri, 2014). This pattern of exposure is a form or model in which an organism is exposed to exposure, it can be in a matter of hours, days, months, or years. The pattern of exposure, in this case, can be continuous (continuous), intermittent (intermittent), and impulsive (repetitive) (Djafri, 2014).

The pattern of exposure may not have a relationship with tinnitus complaints because it is caused by several other major factors that can affect tinnitus complaints, such as noise intensity. A very high noise intensity that exceeds> 85 dBA can cause some hearing loss, one of which is a complaint of tinnitus.

A person with a continuous exposure pattern may not be affected by tinnitus complaints because the worker is in a position of workers exposed to low noise intensity. Meanwhile, workers who have

interrupted or repeated exposure patterns are in a position of workers exposed to high noise intensity. As a result, although the worker has a pattern of exposure that is not frequent or rarely experiences noise exposure, workers can experience tinnitus complaints due to exposure to noise intensity that is too high and exceeds a predetermined threshold value, which affects the organ function of the workers' hearing.

The Relationship between the Noise Intensity of the Work Environment and the Complaints of Tinnitus

Hearing loss due to noise such as complaints of tinnitus can be caused by several factors including the duration of noise exposure, ototoxic treatment, and the high frequency (Soetirto & Hendarmin, 2009). Noise with an intensity of 85 dBA or more can cause damage to Corti's auditory receptors for frequencies of 3000 Hz to 6000 Hz at sound receptors, and heavy damage to the Corti device for sound resets at frequencies of 4000 Hz (Soetirto & Hendarmin, 2009).

In this study, tinnitus complaints were experienced by 12 respondents from a total of 14 respondents, which is about 85.7% of respondents experienced tinnitus complaints. In line with the research conducted by Silitonga et al. (n.d.) is the relationship between noise and workers' hearing who stated that some workers experienced the most complaints of tinnitus with a percentage of 70.9%.

Other measurement results about the intensity of work environment noise at PT X Industri Gas Sidoarjo showed that there were only three workers who were not exposed to noise more than 85 dBA, namely workers who were at point 2 namely the water filtration section. Based on the results of research and calculations, it was found that there is a significant relationship between noise intensity with the occurrence of complaints of tinnitus. This means that if there is a change in noise intensity, it will also affect the occurrence of complaints of tinnitus. The higher the intensity of noise received by a person, the higher the risk that a person will experience complaints of tinnitus.

Complaints of tinnitus can be grouped into five scoring severity, i.e. very mild, mild, medium and heavy. very heavy. Based on the results of the study it was also found that of the 12 respondents experiencing complaints of tinnitus, five respondents were found to have a very mild degree of tinnitus, five respondents had a mild degree of tinnitus, and the remaining two respondents had a moderate degree of tinnitus.

Research conducted by Silitonga et al. (2015) found similar results, namely the relationship between noise intensity and hearing loss by workers. This is in line with findings in the Purintyas (2006) study which showed a relationship between noise exposure and tinnitus complaints in respondents who were exposed to noise had a risk of 28.3 times greater. This means that respondents who are exposed to noise exposure have a 28.3 times greater risk of developing tinnitus complaints compared to respondents who are not exposed. Thus, the greater the value of the noise intensity we receive, the greater the risk of tinnitus complaints that will be suffered.

Other research is Putri's (2016) finding that there is a relationship between noise exposure and tinnitus complaints in PT Dok and Shipping Surabaya workers. Other studies conducted in the US on workers exposed to noise show the results of the prevalence of Tinnitus by 15% (Masterson, E A., Themann, C L., Luckhaupt, S E., Li, J & Calvert, G M, 2016) Besides, research conducted by Gananca (2011) also showed a prevalence of 37.8% experienced the occurrence of complaints of tinnitus due to noise exposure . Then, other studies conducted in the flour industry also showed a large prevalence of tinnitus complaints of 38.1% (Ibrahim, Aremu, Ajao, & Ojelabi, 2015).

The noise occurred at work has to be handled properly by the appropriate

authorities. This is because, in addition to the workers themselves, the leader of the workplace also has the authority to maintain occupational health and safety. The results of observations and interviews with PT X Industri Gas Sidoarjo showed that so far there have been several activities carried out related to noise control. Some noise controls that have been carried out include PT X Industri Gas Sidoarjo conducting supervision, cleaning, and repairing the production machines periodically, providing a separate area for machines that make high noise, providing ear protection equipment (APT) such as earplugs and earmuffs, and a medical check-up to all workers once a year.

PT X Industri Gas Sidoarjo also explained that the use of APT has been stipulated, namely for workers to always use PPE and APT while doing work. However, the use of APT depends on the awareness of the workers themselves. So, in this case, there are still workers who do not use APT while doing work that is exposed to noise. Because of that, many PT X Industri Gas Sidoarjo workers experienced complaints of tinnitus after doing the work.

CONCLUSION

Based on the results of this research, it can be concluded that there is a relationship between the age characteristics of the respondents with complaints of tinnitus. Fisher Exact test results also showed that there was no relationship between the characteristics of the respondent's tenure and tinnitus complaints and there was no relationship between exposure patterns with tinnitus complaints. Furthermore, the test results also indicate that there is a relationship between the intensity of work environment noise with complaints.

The advice given by the author to PT X Industri Gas Sidoarjo is that the company can enforce the use of ear protection equipment (APT) for workers and install a silencer that can absorb sound with high-intensity noise such as glasswool, rockwool, foam, cellulose fiber, and acourete fiber carpet type to reduce noise. Thus, noise at work can be minimized and the intensity of work environment noise received by workers' hearing can also be smaller.

REFERENCES

Al-Swiahb, J. and S. N. P. (2016). Characterization of Tinnitus in Different Age Groups: A Retrospective Review. *Noise Health*, 214–219.

Choi, Yoon-Hyeoung. 2011. *Metals, Noise, Diet and Hearing Loss" A dissertation submitted ini partial fulfillment of the requirments for the degree of Doctor of Philosophy (Enviromental Health Sciences) in The University of Michigan*, 2011.

Dewanty, R. A., & Sudarmadji. (2015). Analisis dampak intensitas kebisingan terhadap gangguan pendengaran petugas. *Jurnal Kesehatan Lingkungan*, *8*(2004), 229–237.

Dewi Purwita Agustini. (2016). Mengenali Gejala Tinitus dan Penatalaksanaannya. *Fakultas Kedokteran Universitas Udayana*, *6*(1), 34–40.

Djafri, D. (2014). Prinsip dan Metode Analisis Kesehatan Lingkungan. *Jurnal Kesehatan Masyarakat Andalas*, *8*(2), 100–104.

Masterson, E A., Themann, C L., Luckhaupt, S E., Li, J & Calvert, G M. (2016). Hearing difficulty and tinnitus among U.S. workers and non-workers in 2007. *Am J Ind Med.*, *Vol 59 (4)*, 290–300. https://doi.org/10.1002/ajim.22565

Gananca, M M., Caovilla, H H., Gazzola, J M., Gananca, C F., and Gananca, F F. 2011. Betahistine in The Treatment of Tinnitus in Patients with Vestibular Disorder. *Journal of Otorhinolaryngol*,77(4), pp. 499-503.

Hamzah, Z. 2014. Faktor-faktor yang

Berhubungan dengan Keluhan Gangguan Pendengaran pada Tenaga Kerja Bagian Produksi PT. Japfa Comfeed Indonesia Tbk. Unit Makasar Tahun 2014. *Skripsi*. Universitas Islam Negeri (UIN) Alauddin Makasar.

Ibrahim, I., Aremu, A., Ajao, K., & Ojelabi, A. (2015). Evaluation of Noise Pollution and Effects on Workers during Wheat Processing. *Journal of Applied Sciences and Environmental Management*, *18*(4), 599. https://doi.org/10.4314/jasem.v18i4.6

Kurniawati, S. P. (2016). . Intensitas Kebisingan Terhadap Gangguan Pendengaran dan Keluhan Tinnitus pada Pekerja Penggilingan Daging di Kabupaten Jember. *Kesehatan Masyarakat*, p. 100. Doi: 10.1242/jcs.150862

Listyaningrum, A. W. 2011. Pengaruh Intensitas Kebisingan terhadap Ambang Dengar pada Tenaga Kerja di PT. Sekar Bengawan Kabupaten Karanganyar. *Skripsi*. Universitas Sebelas Maret.

Nugroho, D. A. and Naftali, Z. 2015. Hubungan frekuensi dan intensitas tinitus subjektif dengan kualitas hidup pasien. 45(1), pp. 19–26. doi : 10.32637/orli.v45i1.102

Occupational *Safety and Health Administration*. 2011. *Worker Safety Series – Protecting Yourself from Noise in Construction*. OSHA 3498-12N 2011.

PER.13/MEN/X/2011, P. R. (2011). *Permenaker No. 13 Tahun 2011 Tentang NAB Fisik dan Kimia*.

Primadona, A. 2012. Analisis Faktor Risiko yang Berhubungan dengan Penurunan Pendengaran pada Pekerja di PT. Pertamina Geothermal Energy Area Kamojang Tahun 2012. *Skripsi*. Universitas Indonesia.

Purintyas, Ipop Sakti. 2006. Hubungan antara Paparan Kebisingan dengan Keluhan Trinnitus pada Tenaga Kerja (Studi di Unit Power Plant Pusdiklat Migas Cepu). *Skripsi*. Universitas Airlangga.

Septiana, N. R., & Widowati, E. 2016. GANGGUAN PENDENGARAN AKIBAT BISING. *HIGEIA (Journal of Public Health Research and Development)*, *1*(1), 73–82.

Silitonga, N., Adnan, A., Isranuri, I., Haryuna, T. S. H., Ilmu, D., Telinga, K., … Malik, A. (n.d.). The Relationship Between Noise Exposure and Hearing Loss (Case Study at discotheque A , B , C in Medan), *51*.

Soetirto I, Hendarmin H, B. J. (2009). Gangguan Pendengaran. Dalam: Soepardi EA, Iskandar N, Bashiruddin J, Restuti RD. Buku Ajar Ilmu Kesehatan Telinga, Hidung, Tenggorok, Kepala & Leher. Edisi ke 6 (p. Pp : 10-22). Jakarta: Fakultas Kedokteran Universitas Indonesia Press.

Steinmetz, L. G. 2009. The characteristics of tinnitus in workers exposed to noise. *Brazilian Journal of Otorhinolaryngology*, 7–14.

Stranks, J. (2003). *The Handbook of Health and Safety Practice. Sixt Edition.* (Great Britain : Pearson Prentice-Hall, Ed.).

Tekriwal, R., Parmar, D. M., & Saxena, R. 2011. Noise induced hearing loss - A comparison between speech frequency and 4000Hz frequency. *National Journal of Physiology, Pharmacy and Pharmacology*, *1*(2), 79–85. https://doi.org/10.1093/bioinformatics/btn484

EVALUATION OF POSYANDU INFORMATION SYSTEMS USING THE HEALTH METRIC NETWORK MODEL

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ABSTRACT

Introduction: Posyandu has an important role in disseminating health information and monitoring the growth and development of infants and toddlers. The information generated serves as a material for consideration of decision-making. In order for the decision-making to be right on target, it is necessary to evaluate the Posyandu recording and reporting system. The purpose of this study is to assess the implementation of the Putra Bangsa Posyandu recording and reporting system in Bojonegoro which is more commonly referred as Posyandu Information System (PIS). **Methods:** used in this study is a qualitative approach that is presented descriptively using in-depth interviews and observation methods without making any intervention on the target. The Posyandu Information System Assessment uses Health Metrics Network components which are grouped into 3 parts, namely input, process, and output. **Result:** of the evaluation of the implementation of the Posyandu Information System at Putra Posyandu show that in terms of input the implementation of the Posyandu Information System is not in accordance with the guidelines for implementing the Posyandu Information System. From the aspect of the process it was found that data collection had been carried out routinely, but there was one format that was not yet routine. In terms of output it shows that the data generated are quite complete but not timely. **Conclusion:** Human Resources (HR) is one of the most dominant factors causing Posyandu Information Systems not to run optimally. The results of this study can help Health Information Management in improving the Posyandu Information System.

Keywords: Posyandu, Health Metric Network, Record, Report

INTRODUCTION

Posyandu as a form of Community-Based Health Efforts (UKBM) makes Posyandu as the main frontline for maternal, infant and toddler health services in the community. In addition, Posyandu also has an important role in disseminating health information and monitoring the growth and development of infants and toddlers. Optimizing the role of Posyandu is not only the responsibility of the government and health workers, but elements in society including cadres also play an important role. One of the roles of cadres after the opening of Posyandu is to learn Posyandu Information System (PIS) (Kementerian Kesehatan RI, 2017).

Posyandu Information System (PIS) is a set of data preparation tools to produce health information about Posyandu activities, conditions, and developments that occur in each Posyandu. The benefits of this PIS are as a reference for cadres to understand existing problems and facilitate the operation of Posyandu activities such as posyandu basic data, Posyandu service activities, posyandu user data and posyandu officers (Mubarak et al., 2017). Through this PIS, it is expected that Posyandu can develop the right type of activity and in accordance with the target's needs. The ability of cadres in understanding PIS becomes very important because it will affect the quality of information produced. This is in accordance with the theory of Garbage In, Garbage Out which states that if the data obtained are of poor quality then processing as well as anything else will produce bad information (Kim, Huang, & Emery, 2016).

Posyandu Information System has three main components of the system, namely, input, process, and output. Input

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here is defined as a collection of raw data obtained from internal and external organizations to be processed in a system. The process is a series of activities that include moving, manipulating, and analyzing data into useful information, while output is the distribution of information that has been processed up to the utilization of information generated (Wiratna Sujarweni, 2015).

The Posyandu Information System is still far from the standards set by the Government. Some challenges that are still faced in the implementation of the Posyandu Information System such as the process of managing data into information that has not been effective and efficient in an integrated and coordinated mechanism, there is overlap in the collection and processing of health data, and there is still data collection that is repeated by the units different units so that there is a risk of data and activities being recorded more than once.

Health information is a collection of data relating to health that have been processed into information that has value and meaning that is useful for increasing knowledge in supporting development and development in the health sector. These data and information then become a reference in the management, decision-making, planning, and accountability processes. But until now the available health information system has not been sufficient to present data and information that is valid and timely.

The need for quality data and information can be obtained through the implementation of the Health Information System (SIK) by collecting data, processing data, analyzing data, and presenting information. At present the data quality assessment methods are still fragmented and have not been able to provide quality information. In connection with this, it is necessary to develop data quality assessment methods that are able to produce accurate, complete, timely, actual, and consistent information (Indonesian Ministry of Health Center for Data and Information, 2015).

Oleh karena itu, pencatatan dan PIS reporting is very important to be done by Posyandu cadres because it will determine the information produced as a material for decision-making. In order for the decision-making to be on target, an evaluation of the Posyandu Information System (PIS) is needed. An assessment of the quality of data produced by the Posyandu Information System can be carried out using a Health Metrics Network (H MN) framework developed by the World Health Organization (WHO) in 2008 (Tristantia, 2018). The HMN framework aims to make improvements and developments in a health information system and assist in the implementation of sustainable monitoring and evaluation.

The Health Metrics Network (HMN) framework is useful in providing information about all health data and information systematically. This framework is universally standardized as a guide in the collection, reporting and use of health information. In addition to the benefits above, the Health Metrics Network (HMN) Framework also helps identify important gaps and issues that can be seen from the perspective of stakeholders involved in health information systems (Mbondji et al., 2014).

According to Permenkes No. 97 of 2015 concerning the Health Information System Road Map states that the results of the Health Information System (SIK) evaluation using the Health Metric Network (HMN) model conducted in 2012 showed that the six components of the health information system implementation did not yet adequately meet data quality standards, especially for the data management component. However, when compared to 2007 as a whole, there was an increase, especially in the resource component.

The Health Metrics Network has six main components namely health information system resources, health indicators, data sources, data management,

information products, and dissemination and use of health information. The six components are further divided into input, process, and output (Jakti et al., 2016).

Inputs in this case include policy, human resources, and communication technology support as a prerequisite needed to ensure health information is functioning optimally. Process in this case is the basis of health information planning and strategy which includes data collection and data processing activities. While the output in this case is the quality of information produced based on the timeliness and completeness of the data criteria (Listyorini et al., 2017).

The Posyandu that is the location of this research is one of the Posyandus in Ngujo Village, Bojonegoro, which has been Purnama standardized. According to interviews with health workers who work at the Polindes, one of the problems is the Posyandu Information System (PIS) which has not been running optimally.

This study aims to assess the implementation of the Posyandu Information System (PIS) in Posyandu Putra Bangsa, Bojonegoro. The results of this study can be used as input in improving the management of the Posyandu Information System (PIS) better.

METHOD

The research method used in this study is a qualitative approach that is presented descriptively using in-depth interviews and observation methods without making any intervention on the target. Informants in this study included the Ngujo Village midwife, and two Posyandu cadres who filled out the Posyandu Information System (PIS) book. The Posyandu that is the place of research is the Putra Bangsa Posyandu based on the recommendation of Ngujo Village health workers because this research is useful if conducted at the Posyandu Putra Bangsa that will prepare for an increase in the Posyandu strata from Purnama level to Mandiri.

Variables in this study use components of the Health Metrics Network (HMN) evaluation model that have been grouped into inputs, processes, and outputs. Variables in the input group consist of policies, human resources, and technology which are the main prerequisites for the formation of information systems. Process variables consist of data collection and data processing which are two important activities in processing data into quality information. While in the output group there are two variables analyzed to see the resulting picture of information, namely, timeliness and completeness of the data.

Primary data collection is done through two techniques, namely direct observation and in-depth interviews. Observation was carried out to directly observe the Posyandu recording and reporting process carried out by the cadres. In-depth interviews were conducted with semi-structured questions to find out the obstacles experienced by cadres and important information that supports the results of observation. Meanwhile, secondary data were obtained from a review of the Posyandu Information System (PIS) report document.

The assessment conducted in this study uses two categories, namely appropriate and not appropriate. Recording and reporting are said to be appropriate if they are carried out in accordance with the standards established by the implementation manual of the Posyandu Information System (PIS). In addition to the PIS handbook, the assessment is also seen from the Health Metrics Network theory.

After the data collection has been completed, the data are analyzed using content analysis methods based on Health Metrics Network components that have been grouped into inputs, processes, and outputs. The recording and reporting documents that are in PIS will be analyzed for their suitability by comparing the recording and reporting of PIS that has been

carried out by Posyandu cadres with the guidelines for implementing the Posyandu Information System (PIS). Presentation of the data used in the study is descriptive narrative that is equipped with tables. This research has received ethical approval by Komisi Etik Penelitian Kesehatan – Fakultas Keperawatan Universitas Airlangga (1769-KEPK/2019).

RESULT

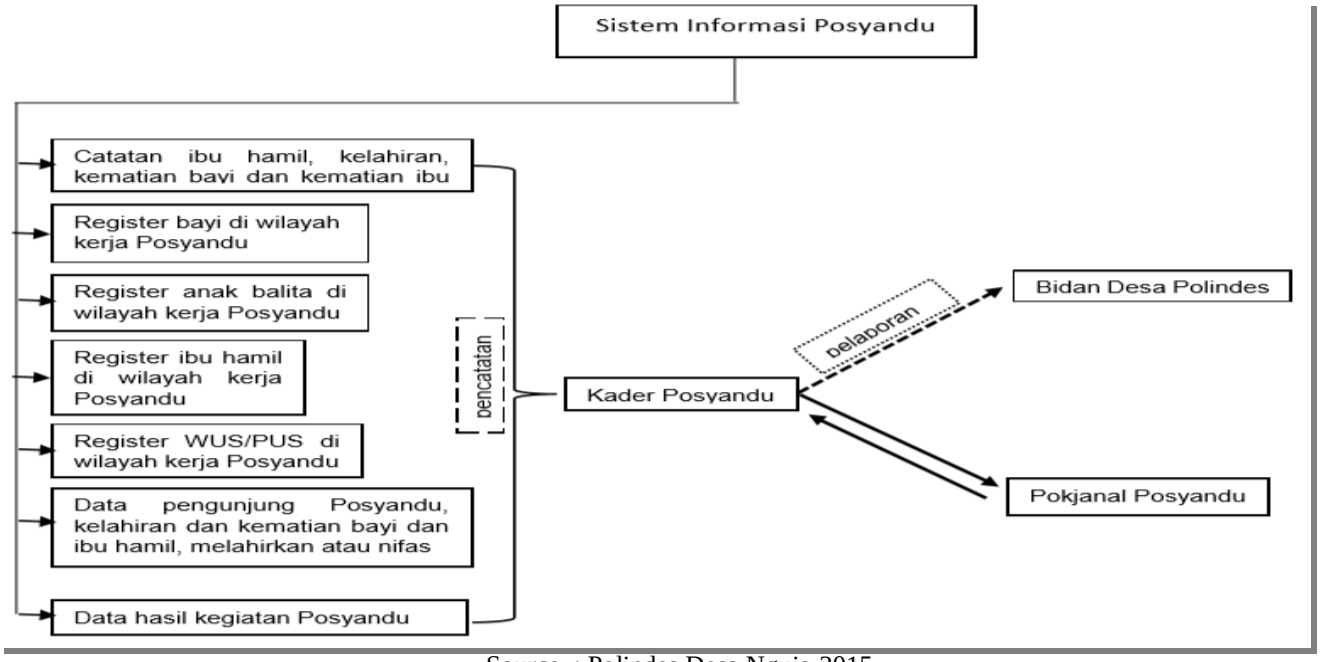
Overview of Posyandu Information System Format

Posyandu Information System has seven formats consisting of (1) records of pregnant women, births, infant deaths and maternal deaths, (2) registers of babies in Posyandu working areas (3) registers of under-fives in Posyandu working areas (4) registers of pregnant women in the Posyandu working area.

In addition to the four formats, there are still three other supporting formats consisting of (5) WUS / PUS registers in Posyandu working areas, (6) Posyandu visitors data, births and deaths of babies and pregnant women, childbirth or childbirth, and (7) Data results of Posyandu activities.

The seven formats must be filled in regularly by Posyandu cadres in accordance with the Posyandu Information System guidebook. The handbook is held by the midwife, then the midwife will convey the recording mechanism to the Posyandu cadres.

The process of recording to reporting not only involves Posyandu cadre leaders but all cadre members and Posyandu coordinating midwives are also involved. Pokjanal Posyandu is also involved in cross-checking data.



Source : Polindes Desa Ngujo 2015

Figure 1. Flow Chart of Posyandu Information System

The Posyandu Information System chart in Ngujo village is actually not available in the form of pictures. The chart in Figure 1 is obtained from the conversion results of the interview with the midwife in Polindes. Midwives confirmed that the Posyandu Information System that is already running has seven formats which must be filled out by Posyandu cadres after every Posyandu activity is completed.

The results of the recording are then kept by Posyandu cadres. If there is a request for data by the midwife, the cadre will submit them to the village midwife. In

addition, cadres also distribute data with Pokjanal Posyandu in the context of cross-checking data with the aim of ensuring that the data recorded are complete and correct.

Input Assessment of Poyandu Information System

The evaluation of the Posyandu Information System (PIS) in terms of input in this study includes three variables, namely policy, human resources, and technology support as a prerequisite needed to ensure the Posyandu Putra Bangsa Information System functions optimally. The recapitulation of the results of the Posyandu Information System (PIS) assessment in terms of input is explained in Table 1.

Based on observations and document review by comparing the Posyandu Information System format sheet and the Posyandu Information System Guidelines issued by the Ministry of Health in 2017 it was found that the Posyandu Information System (PIS) format sheet given to cadres was not in accordance with the latest Posyandu Information System Guidelines (PIS). The discrepancy is due to there being one sheet of PIS format which is different from the 2017 PIS Guide.

The discrepancy lies in format 5, namely the WUS / PUS register in the Posyandu working area. The format used is still using independent recording through cadre notebooks. This was considered more practical by the cadres and the format was rarely checked by the Posyandu Putra Bangsa supervisor midwives.

Table 1. Recapitulation of Input Assessment of Posyandu Information System

Evaluation Aspect Based on Health Metrics Network	Implementation	Conformity To Theory	Obstacles
Policy	The existence of a Posyandu Information System guidebook published by the Indonesian Ministry of Health, 2017.	Not in accordance with the guidelines. The discrepancy lies in format 5, that is, the WUS / PUS register which is recorded only in the notebook does not match the format.	Cadres feel that data about WUS / PUS are rarely requested so that the recording is not done according to format.
Human Resource	The cadre leader was given training by the Village midwife on recording and reporting on the Posyandu Information System (PIS) format.	In accordance with the guidelines that the cadre leader or the representative is entitled to receive training on Posyandu Information Systems.	The difficulty of determining the meeting time between midwives and cadres.
Technology	Already available	Not in accordance with	The availability

Evaluation Aspect Based on Health Metrics Network	Implementation	Conformity To Theory	Obstacles
	software in the form of Ms. Excel but there is no hardware in the form of computers or laptops that can be used by cadres. Therefore, recording and reporting is still done conventionally in the book.	the Health Metrics Network theory that there should be a need for a complete technology component so that information technology can function optimally.	of hardware (hardware) is inadequate.

Process Assessment of Poyandu Information System

The Posyandu Information System (PIS) assessment is carried out based on two process variables consisting of data processing and data collection. The recapitulation of the Posyandu Information System (PIS) assessment results in terms of process is shown in Table 2.

Posyandu Information System data collection is done through recording all PIS format sheets that are carried out by Posyandu cadres. Data collection time varies for each format. For formats 1 to 5, recording is done every month in one year openly. While for formats 6 and 7, every Posyandu is completed.

However, there is one format that is not in accordance with procedures, namely the format of 5 WUS and PUS registers in the Posyandu working area. The discrepancy lies in the time of data collection which should be done once a month but in reality it is only done once a year or tentatively in accordance with the request of the Posyandu supervisor midwife.

> *"... if the data register of WUS and PUS is not done every month, if asked by the midwife alone."* (main informant, 35 years).

The availability of timely health data and information is very much needed. This will affect the speed and accuracy in decision-making.

Table 2. Recapitulation of Output Assessment of Posyandu Information System

Evaluation Aspect Based on Health Metrics Network	Implementation	Conformity To Theory	Obstacles
Data Collecting	The Posyandu Information System data collection is done through the recording	Of the seven formats, only one format is not in accordance with the PIS guidelines, namely	WUS and PUS register data collection is still adjusted by

Evaluation Aspect Based on Health Metrics Network	Implementation	Conformity To Theory	Obstacles
	of seven sheets of PIS format conducted by Posyandu cadres.	the fifth format of WUS and PUS registers.	midwife requests.
Data Processing	Data processing is carried out by the midwife using the Ms. program. Excel provided by the Bojonegoro Health Office.	It is in accordance with HMN theory that the use of technology used can support data processing.	Not fully computerized.

Output Assessment of Poyandu Information System

The Posyandu Information System (PIS) assessment is based on two output variables consisting of data completeness and timeliness. The recapitulation of the Posyandu Information System (PIS) assessment results in terms of output is shown in Table 3.

Based on observations and analysis of PIS documents, it can be concluded that the available data are quite complete. The cadre has filled out the format given in accordance with the instructions submitted by the midwife.

There are still some data that are not yet available. Incomplete data include data on Fe tablets, data on the number of PUS / WUS, attendance list of cadres and health workers.

The completeness of the data will affect the quality of information that will be generated. So that incomplete data cannot be used as a reference for making decisions.

Table 3. Recapitulation of Output Assessment of Posyandu Information System

Evaluation Aspect Based on Health Metrics Network	Implementation	Conformity To Theory	Obstacles
Data Completeness	The completeness of data on Posyandu Information System (PIS) can be seen from aspects that must be completed in 7 PIS formats.	The recording and reporting of Posyandu activities are quite complete but the attendance list of cadres and data regarding the number of PUS / WUS and Fe tablet data are not recorded.	Lack of awareness of the importance of completeness of data.
Punctuality	The recording is done in accordance with the	Not in accordance with the PIS Handbook	Cadres have responsibilities on

Evaluation Aspect Based on Health Metrics Network	Implementation	Conformity To Theory	Obstacles
	free time that the cadres have after carrying out Posyandu activities.	which states that the recording should be done once a month or after every Posyandu activity is completed.	other work and must adjust Posyandu schedules to take notes.

"If the official registration data is never recorded, only visitor registration is recorded. So far, I have never checked with Puskesmas or midwives and Pokjanal for visitor registration data." (Main informant, 32 years).

The results of observations and study of recording documents in the PIS format found double data so it was inefficient. This is in the fifth and sixth formats. Cadres must record the number of WUS and PUS in the Posyandu working area in both formats. The recording should be in the WUS and PUS registers or in the fifth format so that it is more efficient and does not overlap data.

In terms of timeliness, cadres have filled in routinely in one year. However, if viewed from the guidelines, it should be done every month and after every Posyandu activity has been carried out. Based on interviews with cadres it can be concluded that some of the obstacles experienced were cadres having to adjust Posyandu schedules that could change at any time.

Timeliness is one important component in data collection. Especially in the health sector, the data needed must be updated immediately and available when needed. This can have an effect on making decisions that are fast and right. Therefore certainty in the data collection schedule must be ensured and more clearly regulated.

DISCUSSION

Format of Posyandu Information System Evaluation

Based on the Posyandu Information System handbook available at the Ngujo Village Polindes, it can be concluded that the recording should be done every month. Each format has a different note. Therefore, cadres must pay close attention to the guidelines so that each format can be filled correctly.

In an information system and database, the format can be in the form of a screen that contains a lot of space or fields that have been categorized to enter data in accordance with the categories that have been made. Good format and neatly arranged will facilitate the recording in entering data. The Posyandu Information System used in the Putra Bangsa Posyandu has seven formats. The seven formats are fairly neat but have a concise and small layout. So that the manual recording process is quite difficult for Posyandu cadres to adjust handwriting to the available layouts.

Provisions and ways to fill in are available in the Posyandu Information System (PIS) manual. Format 1 contains basic notes on Posyandu targets. Format 2 contains the results of weighing the baby, administering iron pills, vitamin A, ORS, date of immunization and infant meningeal. Format 3 is used to record the results of weighing children under five, giving iron pills, vitamin A and OR in

children under five. Format 4 is data about pregnant women, gestational age, administration of blood-added pills and iodine capsules, immunization, pregnancy examination, risk of pregnancy, date and birth attendants, data on live and dead infants, and data on maternal deaths. Format 5 is a list of women and husband and wife who are likely to have children (pregnant). Format 6 is a record of the number of Posyandu visitors and the number of attendees. Format 7 contains reports on the results of Posyandu activities that have been held. Explanation of the Posyandu Information System flowchart is simply illustrated through Figure 1 regarding the Ngujo Village Posyandu Information System flowchart.

The many formats that must be filled in by Posyandu cadres will add to the workload of Posyandu cadres. Based on interviews with Posyandu cadres, information was obtained that some of the Posyandu cadres also doubled as Posbindu cadres so that the workload increased. The absence of specific regulations governing Posyandu Information Systems is also a factor in the weak development and improvement of existing systems.

> "*Many of them are concurrently being managers of Posyandu toddlers as well as Posbindu or Posyandu elderly. Work becomes more and more, must take care of the household with other work.*" (Informant Utaman, 35 years old)

Analysis of Posyandu Information System (PIS) in Input

The register format for Fertile Age Women (WUS) and Fertile Age Pairs (PUS) is still made manually by Posyandu cadres. So the recording done by cadres is not based on the Posyandu Information System guidelines. The format of the register of Fertile Age Women (WUS) and Fertile Age Pairs (PUS) is very important because it can estimate basic immunization needs by looking at the list of women and husband and wife who are likely to have children (pregnant).

> "*Data collection on women of fertile age (WUS) and couples of fertile age (PUS) is carried out in cross-program with Family Data Collection (PK) so that the format used is slightly different to facilitate data collection.*" (Supporting Informant, 49 years old)

The Posyandu Putra Bangsa has achieved full stratification (green), which means that this Posyandu already has an innovative program with Posyandu activities often carried out annually. Posyandu cadres in charge of 5 people but in addition to the leader of the cadres, there are still four other cadres who do not understand the recording and reporting system for each sheet format in accordance with the Posyandu Information System (PIS). This shows that only cadre leaders can complete all the formats in the Posyandu Information System. While other cadres only assist in copying from manuals to formats with the guidance of the cadre leader. That is because the training on recording and reporting of Information Systems is indeed not comprehensive and only cadre representatives get the information

The results of the Posyandu Information System (PIS) assessment on the technology aspect are in line with research (Rohman & Try Nur Aminna, 2018) that the Posyandu Information System will be implemented effectively and efficiently through the assistance of the latest technology. However, not everyone is capable and ready to take advantage of the existence of such technology so the results are not necessarily as expected. As is the case in the Putra Bangsa Posyandu, there is no device that can and is ready to be used by cadres to do computerized recording. So

that all data are still input manually using handwriting.

The Posyandu Putra Bangsa work area already has internet access but the internet network is not yet stable and strong enough. In addition, the change in the recording model from manual to computerized with the help of technology certainly requires readiness from several sectors. Therefore the Health Office needs to review the matter to support the operation of a more effective and efficient Posyandu Information System.

Analysis of Posyandu Information System (PIS) in Process

The Posyandu Information System (PIS) assessment is carried out based on two process variables consisting of processing and collecting data. If seen based on observations in the data collection process, there is still one format that is not yet suitable, namely the fifth format regarding the register of Fertile Age Women and Fertile Age Pairs.

The format of the register of Fertile Women (WUS) and Fertile Age Pairs (PUS) is very important because it can estimate basic immunization needs by looking at the list of women who have the potential to have children (pregnant). Therefore, it is better from the midwife and the health department to inform further about the recording of WUS and PUS. Data on WUS and PUS have actually been recorded by the village and also the PKK. Data collected by several parties and not yet integrated results in data duplication. There are no specific provisions regarding which parties should be obliged to collect data about Fertile Age Women and Fertile Age Pairs.

Data processing was carried out by the midwife at Polindes using the assistance of Ms. program. Excel provided by the Bojonegoro Health Office. The program has been developed in 2019 with a more comprehensive and systematic formula. When compared with the previous year, the program made now is very helpful in making decisions quickly. That is because there is a hyperlink feature that is used.

In its application, midwives do not experience significant difficulties. The existence of training of health workers organized by the Health Office is very helpful for health workers to operate the program. Training is conducted at least once a year.

> "*For data processing, it is already using the program in Ms. Excel is the latest one in 2019. It installs people from the DHO section of the health information system. There used to be but not as complex as this formula. Before being implemented, each health worker representing the village was given training by the Health Office. At that time I was also assisted by other health workers.*" (Main Informant, 49 years old)

Although data processing has used a computer but this is not enough to say computerized. Research conducted by Arges Cilla Mondev and Asparizal (2018) states that to be described as a computerized system is not just doing data deception using a computer but includes the process of recording data, distributing data to printing reports involving computers. Based on these findings, it can be concluded that the application of PIS in Posyandu Putra Bangsa has not been fully computerized because at the stage of recording and distributing data it is still done manually without involving programs on the computer.

This condition is caused by cadres not being able to operate computers so that recording at Posyandu is still done manually. Processes that use computers are only carried out by midwives at the data processing and decision-making stages. Another drawback is the condition of regions that have internet networks that are less stable and less robust so that the data distribution stage is still done manually.

Analysis of Posyandu Information System (PIS) in Output

The assessed component of output consists of data completeness and timeliness. This is consistent with the results of research conducted by Tristantia (2018) who revealed that the indicators that determine the quality of a data can be seen through completeness and timeliness.

The completeness of the data means that the information generated from the data processing can represent any amount needed and the actual conditions. The data in the Posyandu Information System are complete, but there are some data that are not recorded. One of them occurred when the cadres did not fill out data regarding the administration of Fe tablets. The recording should be done in the 7th PIS format.

The recording of the number of officers present was also not routinely filled out by the cadres assuming that the data were not used to make decisions. The data should still be filled in regularly to see the activeness of the cadres who attend the Posyandu.

Lack of information about the use of cadre and health staff attendance registration data is one of the contributing factors. Until now, cadres feel that the attendance list of cadres and health workers is not very important because it has never been checked and is rarely asked by the midwife for Posyandu supervisors. Cadres should have been informed that the activity of the officers present was very influential on the success of the Posyandu. One of them is monitoring active and inactive cadres. Without the presence of cadres, Posyandu will find it difficult to run optimally.

During checking the PIS format held by cadres, double data were found to be inefficient. This can be found in format 5 regarding the Register of Fertile Age Women (WUS) & Fertile Age Couples (PUS) and the 6th format regarding Posyandu visitors. In both formats it must record the number of WUS and PUS in the Posyandu working area. The recording should be in the WUS and PUS registers so that it is more efficient and does not overlap data. In terms of timeliness, cadres have filled in routinely in one year. However, if viewed from the guidelines, it should be routinely done every month and after every Posyandu activity has been completed. Based on interviews with cadres it can be concluded that some of the obstacles experienced were cadres having to adjust Posyandu schedules that could change at any time. Therefore recording is often not exactly one month and can be more than the time it should be.

Timeliness is an important component in data collection. Especially in the health sector, the data needed must be updated immediately. Therefore the certainty of the data collection schedule must be ensured. Because this will affect the decision-making. If the resulting data are available on time and in full, then decision-making can be done more quickly as well.

CONCLUSION

Posyandu Putra Bangsa has implemented Poyandu Information System. However, in practice there are still several formats that are not filled in accordance with the PIS Guidelines. Through this research, it is expected to help Health Information Management in improving some components that are not yet suitable.

Human resource capabilities also need to be planned because, based on an assessment of all aspects, it shows that Human Resources (HR) plays a very important role as implementing Posyandu Information Systems. In addition to improving the quality of human resources, the prerequisites for the formation of other information systems such as supporting policies and technology need to be considered so that the Posyandu Information System (PIS) can run optimally.

REFERENCES

Arges Cilla Mondev, Asparizal, S. A. (2018). Komputerisasi Barang Inventaris Pada Kantor Lingkungan Hidup Kota Dumai. *I N F O R M a T I K A*.

Indonesian Ministry of Health Center for Data and Information. (2015). Infodatin-Statistics Self-Assessment of Routine Data Quality Towards Quality Data. InfoDatin Data and Information Center of the Indonesian Ministry of Health.

Jakti, U. B., Jati, S. P., & Purnami, C. T. (2016). *Evaluasi Sistem Informasi Jejaring Rujukan Maternal-Neonatal (SIJARIEMAS) di Kabupaten Tegal dengan Pendekatan Model Health Metrics Network (HMN)*.

Kim, Y., Huang, J., & Emery, S. (2016). Garbage in, garbage out: Data collection, quality assessment and reporting standards for social media data use in health research, infodemiology and digital disease detection. *Journal of Medical Internet Research*. https://doi.org/10.2196/jmir.4738

Listyorini, P. I., Raharjo, M., & Agushybana, F. (2017). Pengembangan metode penilaian mandiri kualitas data rutin di dinas kesehatan kota Surakarta. *Jurnal Manajemen Kesehatan Indonesia*.

Ministry of Health. (2017). Ayo ke POSYANDU. In *Ayo ke POSYANDU*.

Mbondji, P. E., Kebede, D., Soumbey-Alley, E. W., Zielinski, C., Kouvividila, W., & Lusamba-Dikassa, P. S. (2014). Resources, indicators, data management, dissemination and use in health information systems in sub-Saharan Africa: Results of a questionnaire-based survey. *Journal of the Royal Society of Medicine*. https://doi.org/10.1177/0141076814528690

Mubarak, Z. Y., Noor, E., Destyanto, F., Nugroho, K. T., Mustofa, M. I., & Arif, A. M. (2017). Perancangan Sistem Informasi Kesehatan Di Tingkat Posyandu Cilacap Selatan Kabupaten Cilacap. *Semnasteknomedia Online*.

Regulation of the Minister of Health of the Republic of Indonesia Number 97 of 2015 concerning the Roadmap of the 2015-2019 Health Information System.

Respati, Dian Laela. (2010). Pengembangan Sistem Informasi Manajemen Kesehatan Ibu dan Anak di Puskesmas. Tesis . S2 Magister Teknologi Informasi, Universitas Gadjah Mada.

Riga M, Vozikis A, Pollalis Y, Souliotis K. MERIS (Medical Error Reporting Information System) as an innovative patient safety intervention : A health policy perspective. Health Policy (New York) [Internet]. Elsevier Ireland Ltd; 2015;119(4):539–48. Available from: http://dx.doi.org/10.1016/j.healthpol.2014.12.006.

Rohman, H., & Try Nur Aminna. (2018). Perancangan Sistem Informasi Pelaporan Posyandu Lansia. *Jurnal Manajemen Informasi Dan Administrasi Kesehatan (J-MIAK)*.

Sholihah, N., & Kusumadewi, S. (2015). Sistem Informasi Posyandu Kesehatan Ibu dan Anak. *Prosiding SNATIF*.

Soekidjo N. (2010) Metodologi Penelitian Kesehatan. Jakarta: PT. Rineka Cipta.

Tristantia, A. D. (2018). EVALUASI SISTEM PELAPORAN INSIDEN KESELAMATAN PASIEN DI RUMAH SAKIT. *Jurnal Administrasi Kesehatan Indonesia*. https://doi.org/10.20473/jaki.v6i2.2018.83-94

Wiratna Sujarweni, V. (2015). Komponen utama sistem informasi. In *Sistem Akuntansi*.

EMO DEMO EDUCATION ON IMPROVING MATERNAL KNOWLEDGE

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ABSTRACT

Introduction: Breast milk is food that is first given to babies after birth, given naturally by the mother through the process of breastfeeding. Breast milk has many nutritional contents such as minerals and vitamins that will be needed by newborns. The WHO says that, every year, 800,000 children's lives can be saved with breast milk. In East Java Province the exclusive breastfeeding in 2018 was 77.51%, whereas in the city of Surabaya, the achievement of exclusive breastfeeding in 2018 only reached 71.62%. At the location of the study of 85 mothers with the baby, only 3 people provided exclusive breastfeeding. Supplementary breastfeeding before six months of age is one of the reasons for the low coverage of exclusive breastfeeding in Indonesia. The emo demo is a health education that uses an interactive demonstration to add insight and knowledge. The purpose of this paper is to determine the differences in maternal knowledge in the pre-test and post-test about exclusive breastfeeding and the provision of MP-ASI. **Methods:** This study uses quantitative research with the One Group Experiment Pre-Test Post-Test approach. This research was conducted in the working area of the Sawah Pulo Puskesmas, precisely at Baduta mothers in the RW IX area of Kelurahan Ujung with a population of 85 people and a total sample of 20 people. **Conclusion:** The sampling technique in this study is random sampling. The average knowledge of mothers about Exclusive ASI and MP-ASI has increased after being given education according to the Wilcoxon test results

Keywords: Knowledge, ASI, MP-ASI, Emo Demo

INTRODUCTION

Breast milk is the first food given to a baby after birth, given naturally by the mother by breastfeeding the baby. Breast milk has much nutritional content such as minerals, vitamins, and other substances needed by newborns. Given that the baby's digestive devices are still not working, breast milk is the best choice for newborn food. Breast milk is given exclusively to infants ranging from newborns to even infants aged six months without being given any other additional food, then continued from the age of six months until the age of two years by providing additional food as various breast milk complements according to the age of the infant and toddler. According to WHO, providing breast milk is the best way to provide nutrition for babies (Oktora, 2013; Safitri, 2014; Ulfah, 2014; Iswati et al., 2019).

Exclusive Breastfeeding arrangements are contained in Government Regulation no. 33 of 2012 on Exculcitation of Mother's Milk Regulation Article 2 which aims to "ensure the fulfillment of the right of the baby to obtain exclusive breast milk from birth up to the age of six months taking into account growth and development, providing protecting the mother in providing exclusive breast milk to the baby and increasing the role and support of the family, communities, local governments, and governments against exclusive breastfeeding" (PP No.33/2009, 2012).

In addition to exclusive breastfeeding, breastfeeding assistance also needs to be considered. Breast milk complementary food or commonly called MP-ASI is food given to

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infants ranging in age from more than six months to the age of two. The purpose of MP-ASI is to provide additional nutrients other than breast milk to children in fulfilling the nutrition for growth. This is related to the baby's digestive process and the size of the baby's stomach which begins to increase as it grows and develops (Lestari, Lubis and Pertiwi, 2014).

In Regulation of the Minister of Health of the Republic of Indonesia No. 25 of 2014 concerning children's health efforts Article 21 concerning the health services of infants, toddlers, and preschoolers that "to improve the survival and quality of life of infants, toddlers and preschool one of them through the provision of breastfeeding companion food from the age of six months to the age of two" (Menteri Kesehatan, 2014).

The WHO says that every year, some 800,000 children's lives can be saved by breast milk. In the results of the 2017 survey, exclusive breastfeeding decreased but breastfeeding and food fluctuated. The achievement of exclusive breastfeeding alone only reached 68.74% in Indonesia in 2018. In East Java Province exclusive breast milk in 2018 amounted to 77.51%. Meanwhile, in Surabaya, the achievement of exclusive breastfeeding in 2018 only reached 71.62%. For breast milk complementary food, East Java Province only reached 46.6% for the proportion of food variety for infants aged 6-23 months. At the location of Ujung Village, Semampir Sub-District, Surabaya of 85 Baduta mothers who have children, there are three people giving exclusive breast milk and the rest provide breast milk plus formula milk and other foods such as bananas and rice team (Riskesdas, 2018; East Java Province Health Office, 2019).

Breast milk has many benefits for babies as well as mothers, including immunity for babies, protecting babies from gastrointestinal infections, providing complete nutrition, protecting against indigestion, and can lower infant mortality rates. The benefits for the mother herself are as a natural contraceptive to delay pregnancy, reduce the risk of developing cancer, and help the process of smoothing the milk.

The effect that of not giving breast milk exclusively to the baby can cause growth and developmental disorders for the baby due to unmet nutritional needs, susceptible to infectious diseases due to immune system without breast milk, the possibility of stunting, or malnutrition in the child. Most mothers provide additional food to meet the needs of babies less than six months old or replace it with formula milk, in fact providing complementary food or formula milk to infants less than six months old also adversely impacts the baby. Indonesia has a practice of administering MP-ASI before the age of six months, which can have an impact on the health of babies such as diarrhea, airway infections, and allergies (Fitriana et al., 2016).

Child (cited in Iswati, 2019), explains the additional feeding before the age of even six months is one of the causes of low exclusive breast milk coverage in Indonesia. These causes are also supported by other causes, namely low maternal knowledge, the influence of the family environment as well as the social environment, the promotion in the mass media about formula milk, as well as the demands of work for working mothers (Iswati et al., 2019).

The problem that occurs at the research site is there are still mothers who provide additional food to the child before the right age even some who gives formula milk to a child who is not even one year old. Most of the mothers who provide extra food too early because many mothers work, tradition and culture in the residential and family environment, and the influence of the environment that makes the mother prestige to breast milk her child.

An emo demo is one of the interactive educations usually used to add insight and

knowledge of emo demo participants. The emo demo uses a kind of game between individuals, groups, or communities by developing communication to achieve the ultimate goal of positive behavior change that participants are expected to be able to change behavior in exclusive breastfeeding and breast milk complementary food according to the age of the child.

The methods used are intended to achieve changes in public behavior, especially in the field of health. Emotional Demonstasi (Emo Demo) was first developed by the Global Alliance for Improved Nutrition (GAIN) with Behavior Centered Design (BCD) theory. BCD was founded by the London School of Hygiene and Tropical Medicine. BCD was developed on the principle that behavior can be transformed into a new behavior as a form of positive response resulting from challenging, surprising or interesting things. As well as a form of change as a way to ensure an intervention in changing behavior (Amareta and Ardianto, 2017).

Mothers who have babies in the area of RW IX Ujung Village have never received an education like this emo demo, and the problem found in the area is that there are still mothers who do not breast milk exclusively to their children and many mothers who give MP-ASI prematurely. To solve the problem faced by the mother, providing education through this emo demo model is one of the ways that can be used to improve the mother's insight and knowledge about exclusive breast milk and MP-ASI properly.

Based on the above description, breastfeeding is not exclusive and the provision of MP-ASI at a not appropriate age is still a problem in RW IX Kelurahan Ujung. This is the basis for the author to conduct an emo demo program to mothers to improve their knowledge. The purpose of this writing is to find out the difference in maternal knowledge in the pre-test and post-test about exclusive breast milk and MP-ASI administration.

METHODS

This research uses quantitative research with the One Group Experiment Pre-Test Post-Test approach. This research was used to determine the difference in the treatment of experimental activities in a homogeneous group. This research was conducted in the working area of Puskesmas Sawah Pulo, precisely Ibu Baduta, in the area of RW IX Ujung Village with the number of maternal population that has clowns as many as 85 people and a sample number of 20 people.

The sampling technique is purposive sampling by taking random awareness in the group. Members of the group are mothers who have toddlers accounting for five people from four Posyandus. The study was conducted in January 2020. The mother was given emo demo intervention on Exclusive Breast Milk and MP-ASI using a questionnaire instrument. Before the emo demo, participants were given pre-tests on Exclusive Breast Milk and MP-ASI.

The method used uses props and cards regarding breast milk and MP-ASI. The game is divided into four groups according to each Posyandu mother. The time given by each group is 10 minutes, each mother fills in the age column adjusted to the image of the shape of the food by hanging a card on the props and this will be assessed. After the emo demo, an explanation of the results of the game is given, then done again post-test after emo demo and explanation.

Analysis data using the Wilcoxon Test compared two observations derived from one sample presented in table and narrative form with α=0.05. (The data have passed the ethics test with certificate number1796-KEPK).

RESULT

Table 1. Respondents' Characteristics

Characteristics	N	%
Age		
19-25	8	40%
26 – 35	8	40%
>35	4	20%
Education Level		
No School	1	5%
SD	10	50%
SMP	6	30%
SMA	3	15%
Job		
IRT	20	100%

As many as 20 participants, most participants were in a productive age range of 80%. The average participant has an elementary school education of 50%, the rest are middle school, high school, and some are not in school. All participants were housewives.

Table 2. Pre-Test and Post-test Results of Breast Milk

	Pre Test		Post Test	
	n	%	n	%
Less	15	75%	0	0%
Enough	5	5%	4	20%
Good	0	0%	16	80%
Total	20	100%	20	100%

The results showed that among Baduta mothers who knew exclusive breast milk by category before being educated, 75% had less knowledge and 25% enough knowledge. Meanwhile, the results of the study of mother's knowledge about breast milk exclusively after being given education were 80% good knowledge and 20% enough knowledge.

Table 3. MP-ASI Pre-Test and Post-Test Results

	Pre Test		Post Test	
	n	%	n	%
Less	16	80%	0	0%
Enough	4	20%	8	40%
Good	0	0%	12	60%
Total	20	100%	20	100%

The results of the study targeted Baduta mothers who knew MP-ASI just before being educated with 80% less knowledge and 20% enough knowledge. And the results of research in Ibu Baduta showed MP-ASI right after being given education as 60% good knowledge and 40% know enough.

Table 4. Average Knowledge

Average	Pre-Test	Post-Test
ASI	1.25	2.80
MP-ASI	1.20	2.60

The results showed that the average value of the mother's knowledge of exclusive breast milk before getting an education was 1.25 and after getting an education2.80 with an average difference of 1.55, which means there is a change in mother's level of knowledge about exclusive breast milk after the emo demo. The average maternal knowledge score about MP-ASI before getting was 1.20 and after getting an education of 2.60 with an average difference of 1.40, which means there is a change in the level of maternal knowledge about MP-ASI in age.

Table 6. Test Statistics

	Score Post-Test MP-ASI - Score Pre-Test MP-ASI	Score Post-Test MP-ASI- Score Pre-Test MP-ASI
Z	-3.963[b]	-4.053[b]
Sig. (2-Tailed)	.000	.000

Statistical test results for Exclusive Breast Milk have significance values (p=0.000) and MP-ASI has a significance value (p=0.000) smaller than α=0.05. The results of the test showed the initial Hypothesis or H0 was rejected, which means there is a difference in the level of maternal knowledge before the emo demo with the knowledge of the mother after the emo demo.

DISCUSSION

Respondents' Characteristics

Of the 20 participants who participated in the emo demo, 10 participants had a level of elementary school education, six junior high school students, three high school students, and one person did not go to school. Ariningsih (cited in Ana and Fitria, 2019) mentions the supporting factors of exclusive breastfeeding and breastfeeding assistance, one of which is the low level of maternal education that makes the level of maternal knowledge to be limited as well as a culture that has traditionally become a habit that assumes breastfeeding alone is not enough for the child. So the call to provide breast milk exclusively for six months became difficult to implement as expected (Ana and Fitria, 2019).

Nababan and Widyaningsih (2018) explained that the education of respondents is one of the many factors that support in providing breast milk complementary food. They think that, if the mother has a low level of education, then they will have a low level of understanding and absorption of information as well. This is also mentioned in a study conducted by Atik (2010 cited in Nababan and Widyaningsih, 2018), also explaining that the higher the level of education of respondents, the less likely it is to provide breast milk complementary food early. Education is one way in which a person receives knowledge and understands, especially about the growth and development of babies (Nababan and Widyaningsih, 2018). In the study conducted by researchers many of the respondents had a level of elementary school education, which can be assumed that the mother's knowledge and insights about exclusive breastfeeding and breastfeeding are still low, but it could be that the knowledge and insight of the mother is high but the awareness is low.

Based on previous research on the relationship of working mothers with exclusive breastfeeding the biggest reason mothers do not breastfeed exclusively to their child is because of the limited time to breastfeed directly to their child, thus triggering the provision of additional food other than breast milk to the child before the age of six months. But, based on the above research data, all mothers who take emo demo activities of their work are housewives, so it cannot be relevant to the mother's work with exclusive breastfeeding because the mother who should be at home alone has more time and can directly feed breast milk her child at any time.

Based on the information provided by Posyandu cadres at the research site, the mothers have a hereditary habit of providing food other than breast milk and MP-ASI early, such as giving water or bananas and perceptions of mothers who feel the child is not full (Oktora, 2013).

Exclusive ASI

According to the WHO (2006), breast milk is exclusively food that is only accepted

by the baby from its mother by breastfeeding without being given additional food in both liquid and solid form. The WHO also argues that the administration of syrups containing vitamins, minerals, or medicines should still be given to children. While, according to the Ministry of Health (2003), babies only get breast milk without being given food and other drinks from birth until the age of six months except for medicine and vitamins.

UNICEF also mentioned that giving breast milk exclusively to children provides a survival chance of the first six months from birth 14 times greater than that of children who are not given exclusive breast milk. Some studies have proven that breastfeeding has a link to higher brain intelligence in children who get exclusive breast milk. What's more when the child gets physical closeness, skin to skin touch, and eye contact with the mother, it helps the bond between the mother and the baby (WHO, no date; Dwi sunar prasetyono, 2017; Dian, 2018).

Fikawati said the thing that affects the unsuccessful breastfeeding exclusively is the mother's inability to initialize early breastfeeding (IMD). The success of this IMD is in the helper of childbirth; if the mother is facilitated by the maternity helper to do IMD, then the mother will feel able and believe they can give breast milk to her child so that there is no need to provide additional food to her child because with breast milk alone the child already feels enough for the first six months.

Roesli (cited in Anggorowati, 2013) stated that the reason mothers do not give exclusive breast milk is working mothers. Prabasiwi (2015) said the reason the mother does not give exclusive breast milk to her child is the perception from the mother that giving breast milk alone is not enough for her child so that the mother gives additional food to the child at the age of six months.

Studies conducted in Karawang Regency, Tanjung Priok sub-district, and Cilandak sub-district show that the failure of exclusive breastfeeding comes from breastfeeding mothers who fail to gain weight while pregnant so as not to have fat reserves and cause the mother to stop breastfeeding for six months (Thermometer, 2010; Anggorowati, 2013; Prabasiwi, Fikawati and Syafiq, 2015).

Notoatmodjo (2003) revealed that other factors that cause the mother not to give exclusive breast milk to her child are less information about the overall information ranging from the nutritional content, benefits, and advantages of breast milk, as well as the mother's ignorance of how to survive in giving breast milk for six months without being given additional food. Research conducted by Prabasiwi, Fikawati and Syafiq (2015) mentions variable knowledge is one of many factors that are very important to determine advanced attitudes in exclusive breastfeeding

As found in the known field problems, of mothers who do not breast milk exclusively most mothers do not work, only work side by side, i.e. trading in front of the house, have less maternal knowledge, the influence of the family environment and neighboring environment, community service advertisements about formula milk, and the culture that exists in the residence by giving bananas or sugar water to the child.

The emo demo method is one way to educate participants about knowledge by using interactive and interesting educational methods for participants. To add to the mother's knowledge, as already explained, about the cause of not being given exclusive breast milk, an emo demo can be done to add insight and knowledge of mothers in Ujung village.

Notoatmodjo (2012 cited in Iswati, 2019) used methods with imaginative emo demo education aimed at achieving behavioral change in society, especially in the field of health. This success is determined by the selection of methods that correspond to the characteristics of the community as well

as factors that will be influenced for the results of the education provided. The emo demo method is not only to improve the mother's knowledge of exclusive breast milk but also change the mother's attitude in giving breast milk to her child even though the mother works.

But for behavioral changes, it requires individual awareness itself. Research on exclusive breastfeeding by working mothers conducted by Sihombing states that the work done by mothers outside the home triggers not to feed breast milk exclusively to their child. Research conducted by Wulansari et al. with the same method proved effective in improving the knowledge of respondents before and after education. Research also conducted by Waroh et al. also succeeded in improving knowledge and improving exclusive breast milk coverage (Sihombing, 2018; Buana, 2020; Wulansari, 2020).

Wilcoxon test results showing post-test scores on Exclusive Breast Milk are greater than pre-test scores on Exclusive Breast Milk with a significance score ($p=0.000$) smaller than $\alpha=0.05$ which means that there are differences in maternal knowledge levels before and after education about exclusive breast milk. This research shows that the average increase in mothers' knowledge of exclusive breast milk is significant because most mothers have been counseled about exclusive breast milk by cadres and health workers during Posyandu activities.

The successful implementation of the emo demo method on Exclusive Breast Milk was also successfully conducted in research by Iswati (2019), showing there was an increase in knowledge before and after being given education on lactation management with this emo demo method. In research by Astuti (2017), statistical test results show there is a difference in cadre knowledge between before and after being given emo demo training on lactation management (Astuti, 2017; Dewi Mamonto, Syam and Indriasari, 2019; Iswati et al., 2019).

Similar research conducted by Amareta, compared respondents' knowledge before and after the activity using the emo demo method on the effectiveness of improving CTPS practice, which showed the difference after being given intervention on handwashing using soap means successfully improving the respondent's knowledge.

MP-ASI

Age six months is the time when the baby needs more energy and nutrition than breast milk. Breast milk complementary food is needed by children in the age of growth starting from six months old. At this age, the baby is developmentally also preparing to receive other foods. Good food is a food that meets the needs of calories and energy such as protein, iron, zinc, calcium, vitamin A, vitamin C, and folate while keeping in account the cleanliness and safety of the food, quality, and quantity for the child's stomach (Nunik, 2017).

The problem with breastfeeding is that the mother feels that the child is hungry when the child starts to fuss and this makes the mother anxious, the thing that causes problems feeding the complementary food in addition to the anxious mother is to feed before breast milk comes out, colostrum is not given to the baby, MP-breastfeeding too fast in the child at the age of less than six months or late (more than 24 months), breast milk complementary foods do not meet nutritional needs, inappropriate MP-ASI frequency, and incorrect nutritional fulfillment in families (Buku, 2013).

The influential factors in giving MP-ASI too quickly can be caused by the mother's ignorance of breast milk or MP-ASI, the condition of the mother's breasts that are not good, such as blistered nipples, swollen breasts, or flat nipples, can also be caused by less family support to the mother to give

exclusive breast milk to the child, the influence of rampant formula milk advertising everywhere, and health workers who are less keen in providing education on the importance of exclusive breastmilk (Juliatin, 2015).

Nutrisiani (cited in Ana and Fitria, 2019) also explained that administering MP-ASI too quickly can interfere with the digestive mechanism process in infants, resulting in such as diarrhea. Riskesdas data in 2008 also explained that premature breast milk complementary feeding meant babies were more affected by diarrhea, constipation, cough, colds, and heat than babies who received exclusive breast milk without being given other additional foods (Ana and Fitria, 2019).

Notoatmodjo (cited in Artini et al., 2018) found further knowledge after conducting activities against an object or news. The knowledge can be from the eyes and ears through the media or hearing and seeing in person. Research conducted by Artini et al. (2018) found high or low knowledge does not guarantee that a mother will provide early complementary food or not, and explained that among mothers who have a history of high school education level, most of them still provide breast milk complementary food prematurely to the child. Artini et al. (2018) also mentioned mothers with high knowledge they tend to provide breast milk companion food before time because the mother factor pays more attention to appearance. Another opinion on the knowledge of early breast milk companion feeding, Notoatmodjo (cited in Ana and Fitria, 2019) mentions that the higher one's knowledge then one will be more sensitive to health problems for themselves and also the family. So the higher the knowledge of the mother, the less chance to provide breast milk complementary food too early. One's knowledge will affect one's mindset and attitude and ultimately affect behavior change (Ana and Fitria, 2019).

Age-appropriate feeding of breast milk is influenced by knowledge, habits, and culture in the area. Heryanto explained that factors that support mothers to provide breast milk complementary food too quickly in addition to knowledge are also influenced by next of kin, such as husband/parent.

Similar research was also conducted by Septiani, who found the reason mothers prematurely gave complementary food was due to a long standing. Research by Lestari et al. mentioned that the effect that will occur if giving breast milk complementary food before the age of six months will influence the nutritional status of the child. It is also mentioned that children who are given MP-ASI at the right age have better nutritional status compared to children who have MP-breast milk from birth.

Research conducted by Rahmawati on feeding breast milk complements too early shows that 59.4% of mothers already have experience in giving MP-ASI to children before and according to the results of the test mothers have a good knowledge of MP-ASI. According to Mufida et al.'s research, knowledge of MP-ASI is very important because its role is not as a substitute for breast milk but in addition to supplementing breastfeeding. Therefore, knowledge is needed for providing age-appropriate breast milk complementary food.

Previous research on factors that influence breastfeeding too early shows one such is low maternal knowledge. Research conducted by Kursani found low maternal knowledge is potentially four times greater to provide breast milk complementary food too quickly than mothers who have high knowledge (Lestari, Lubis and Pertiwi, 2014; Rahmawati, 2014; Septiani, 2014; Heryanto, 2017).

Notoatmodjo (2012 cited in Iswati. 2019) explains using methods with imaginative emo demo education aimed at achieving behavioral changes in the community, especially in the field of health

This success is determined by the selection of methods that correspond to the characteristics of the community as well as factors that will be influenced for the results of the education given.

Wilcoxon test results showing post-test scores on MP-ASI is greater than the pre-test score of MP-ASI with a significance score (p=0.000) smaller than α=0.05, which means that there is a difference in the level of knowledge of the mother before and after being educated about MP-ASI.

In research on breast milk complementary foods, the average increase in maternal knowledge is not very significant, there are still only 40% of mothers who only know enough about feeding breast milk complementary food appropriately. However, previous research conducted by Zakkiyah, Natalia and Ekasari (2020) found the emo demo method on feeding breast milk companions in Baduta mothers managed to increase knowledge significantly.

In addition to providing health information, the emo demo method also shakes the psychology of respondents so that respondents will be encouraged to make behavioral changes in positive ways. Curiosity, as well as a sense of wanting to get good benefits helps to encourage to perform and change behaviors that they previously were not willing to do. The emo demo method was conducted as an intervention using the Behavioral Centered Design approach.

This approach seeks to approach psychology as an innovation to change individual behavior. Combining knowledge with the creativity of the game makes this method interesting in conveying information so that it is easy to understand and convey messages well and easily to the target.

Behavioral Centered Design theory states that to intervene in changing a person's behavior, the key step to doing so lies in the delivery stage that researchers implement in the form of activities involving direct contact with individuals, which can be through an expert or party or game media that can provide a new atmosphere for the individual so that the knowledge is well-received (Amareta and Ardianto, 2017).

CONCLUSION

There are many opinions in providing exclusive breast milk and breast milk complementary foods. Knowledge is not the only factor in the cause of the incident. In some studies, the causes of not providing exclusive breast milk and feeding of breast milk are not appropriate age including maternal knowledge, family environment, family economy, and cultural factors. In this study, researchers focused on maternal knowledge, because the fact in the field is that the mother's knowledge of breastfeeding is exclusively lacking, there are still many mothers who assume that exclusive breast milk not only providing breast milk but also additional foods such as sugar water, water or even some that give bananas.

The emo demo is one of many interactive educational methods that can be given and used to add insight and knowledge to participants with the hope that impact in the long term can change the behavior of participants after education. In the results of the Wilcoxon test, the results of the post-test score on Exclusive Breast Milk are greater than the pre-test score of Exclusive Breast Milk with a significance value (p=0.000) smaller than α=0.05, which means that there is a difference in the level of knowledge of the mother before and after being educated about exclusive breast milk. The average level of maternal knowledge about exclusive breast milk has increased. And the post-test score results on MP-ASI are greater than the pre-test score of MP-ASI with a significance score (p=0.000) smaller than α=0.05, which means that there is a difference in the level of knowledge of the mother before and after being educated about MP-ASI. The average mother's knowledge of MP-ASI also

increased before and after education. The researcher's advice for future researchers to do emo demo is not only to test the mother's knowledge but also to teach and educate through practice so as not only to know the increase in knowledge but also the skills and other variables associated with this study.

REFERENCE

Amareta, D. I. and Ardianto, E. T. (2017) 'Penyuluhan Kesehatan dengan Metode Emo Demo Efektif Meningkatkan Praktik CTPS di MI Al-Badri Kalisat Kabupaten Jember', pp. 246–250.

Ana, K. D. and Fitria, S. (2019) 'Pendamping Asi (Mpasi) Secara Dini Dan Kejadian Diare Pada Bayi 0-6 Bulan', pp. 7–13.

Anggorowati, F. (2013) 'Hubungan antara dukungan keluarga dengan pemberian ASI eksklusif pada bayi di Desa Bebengan Kecamatan Boja Kabupaten Kendal', *Jurnal Keperawatan Maternitas*, 1, pp. 1–8.

Artini, B. *et al.* (2018) 'Analisis faktor yang memengaruhi pemberian mpasi dini'.

Astuti, N. H. (2017) 'Peningkatan Pengetahuan Kader Posyandu dalam Manajemen Laktasi Melalui Metode Ceramah di Kelurahan Rangkapan Jaya Kecamatan Pancoran Mas Kota Depok', *ARKESMAS (Arsip Kesehatan Masyarakat)*, 2(1), pp. 109–114. doi: 10.22236/arkesmas.v2i1.513.

Buana, A. A. D. I. (2020) 'Usaha untuk meningkatkan cakupan asi ekslusif dengan pendekatan emotional demonstration ikatan ibu dan anak', 03(2), pp. 37–40.

Dewi Mamonto, C., Syam, A. and Indriasari, R. (2019) 'Edukasi Emotional Demonstration Tentang Pemberian Makan Anak Terhadap Tingkat Pengetahuan dan Sikap Ibu Baduta', 1.

Dian, H. P. (2018) *Hubungan tingkat pengetahuan ibu, status pekerjaan ibu dan dukungan keluarga dengan Pemberian ASI Eksklusif di Wilayah Kerja Puskesmas Air Dingin Kota Padang Tahun 2018*.

Dwi sunar prasetyono (2017) 'ASI EKsklusif'.

East Java Province Health Office (2019) *East Java Health Profile 2018*, *East Java Provincial Health Office 2018*.

Fitriana, E. I. *et al.* (2016) 'Dampak Usia Pertama Pemberian Makanan Pendamping Asi Terhadap Status Gizi Bayi Usia 8-12 Bulan di Kecamatan Seberang Ulu I Palembang', *Sari Pediatri*, 15(4), p. 249. doi: 10.14238/sp15.4.2013.249-53.

Heryanto, E. (2017) 'Faktor-Faktor yang Berhubungan dengan Pemberian Makanan Pendamping ASI Dini', *Jurnal Aisyah : Jurnal Ilmu Kesehatan*, 2(2), pp. 141–152. doi: 10.30604/jika.v2i2.56.

Iswati, R. S. *et al.* (2019) 'Peningkatan Cakupan ASI Eksklusif Melalui Pelatihan Kader Kesehatan Dengan Metode Emo Demo Siap Bepergian Di Kelurahan Siwalankerto Kecamatan Wonocolo Kota Surabaya', (1), pp. 41–48.

Lestari, M. U., Lubis, G. and Pertiwi, D. (2014) 'Hubungan Pemberian Makanan Pendamping Asi (MP-ASI) dengan Status Gizi Anak Usia 1-3 Tahun di Kota Padang Tahun 2012', *Jurnal Kesehatan Andalas*, 3(2), pp. 188–190. doi: 10.25077/jka.v3i2.83.

Ministry of Health (2014) *PMK No.25 tentang Upaya Kesehatan Anak*.

Nababan, L. and Widyaningsih, S. (2018) 'Pemberian MPASI dini pada bayi ditinjau dari pendidikan dan

pengetahuan ibu Early Breastfeeding Supplemental Food In Baby Viewed From Maternal Education and Knowledge', *keperawatan dan kebidanan Aisiyah*, 14(1), pp. 32–39. doi: 10.31101/jkk.547.

Nunik, A. (2017) 'Hubungan antara Pengetahuan Ibu Dan Pola Pemberian Makanan Pendamping ASI dengan Status Gizi Anak di Kelurahan Manyaran Wilayah Kerja Puskesmas Manyaran Kota Semarang"', pp. 4–16. doi: 10.1017/CBO9781107415324.004.

Oktora, R. (2013) 'Description of Exclusive Breastfeeding among Working Mother in Serua Indah Village , Jombang Subdistric , Tangerang Selatan Rasti Oktora', *Jurnal Kesehatan Reproduksi*, 4(1), pp. 30–40.

PP No.33/2009 (2012) *Peraturan Pemerintah No.33 tentang Pemberian ASI Eksklusif*.

Prabasiwi, A., Fikawati, S. and Syafiq, A. (2015) 'ASI Eksklusif dan Persepsi Ketidakcukupan ASI', *Kesmas: National Public Health Journal*, 9(3), p. 282. doi: 10.21109/kesmas.v9i3.691.

Rahmawati, R. (2014) *Gambaran Pemberian MPASI pada Bayi Kurang dari 6 Bulan*.

Riskesdas, K. (2018) *Hasil Utama Riset Kesehata Dasar (RISKESDAS), Journal of Physics A: Mathematical and Theoretical*. doi: 10.1088/1751-8113/44/8/085201.

Safitri, I. (2014) 'Hubungan IMD terhadap kelancaran ASI', p. 1.

Septiani, W. (2014) 'Hubungan Pemberian Makanan Pendamping Asi Dini dengan Status Gizi Bayi 0-11 Bulan di Puskesmas Bangko Rokan Hilir', *Jurnal Kesehatan Komunitas*, 2(4), pp. 148–153. doi: 10.25311/jkk.vol2.iss4.63.

Sihombing, S. (2018) 'Hubungan Pekerjaan Dan Pendidikan Ibu Dengan Pemberian Asi Ekslusif Di Wilayah Kerja Puskesmas Hinai Kiri Tahun 2017', *Midwifery Journal*, 5(01), pp. 40–45.

Thermometer, A. (2010) 'Anger Thermometer', *Kesehatan Masyarakat Nasional*, 16424, pp. 1–2. doi: 10.21109/kesmas.v4i3.184.

Ulfah, A. (2014) *Hubungan Tingkat Pendidikan Dan Pengetahuan Mengenai Asi Ekslusif Dengan Riwayat Pemberian Asi Ekslusif Di Rsia Bunda Asy-Syifa Bandar Lampung*.

WHO (no date) *Breastfeeding*.

Wulansari, M. C. (2020) 'Pelatihan Edukasi Pemberian Kolostrum dengan Metode Emotional Demonstration (Emo-Demo) pada Kader Posyandu Sebagai Upaya Pencegahan Stunting', 17, pp. 21–25.

Zakiyyah, M., Natalia, M. S. and Ekasari, T. (2020) 'Pengaruh Emo Demo Terhadap Pemberian Menu MP ASI Pada BADUTA The Influence Of Emo Demo Against Provision Of MP ASI Menu on BADUTA dilakukan desa lokus program pencegahan dan Probolinggo , salah satunya adalah Desa', 7(1), pp. 42–4

ANALYSIS OF MANAGEMENT ELEMENTS AND MEDICAL RECORD PROCESSING SYSTEM AT BHAYANGKARA HOSPITAL PEKANBARU

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ABSTRACT

Introduction: Processing of medical records in hospitals is to support the achievement of administrative order in order to achieve the goals of the hospital, namely improving the quality of health services in hospitals. The results of preliminary observations in processing medical record files at Bhayangkara Hospital were that there were several obstacles including the not yet done assembling, indexing and analyzing medical records and delays in returning medical record files. The aim this study was to determine the elements of man, money, methods, materials, machines in the medical record processing system at Bhayangkara Hospital to improve the quality of medical record services at the hospital. **Methods:** Qualitative Research and informants: This study amounted to eight people. The number of human resources is insufficient and have never attended training. Standard operating procedures have never been socialized and existing policies need improvement. **Result:** Coding activities are often constrained by doctors' writing and completeness of diagnoses and medical actions. Retrieval activities are often constrained by medical record files that are still in the inpatient room and in the case mix room. **Conclusion:** Overall from the research results, the implementation of medical record processing is not appropriate and must be regulated according to existing guidelines in order to produce medical records that are accurate, readily available, usable, easy to trace back and have complete information so as to create quality information and it is recommended to use electronic medical records**.**

Keywords: Medical Record Processing, Management Elements, Minimum Service Standards

INTRODUCTION

Health is a state, whether physically, mentally, spiritually or socially, which enables everyone to live productively socially and economically. A health worker is any person who devotes himself to the health sector and has knowledge and / or skills through education in the health sector which, for certain types, requires the authority to carry out health efforts (President of the Republic of Indonesia, 2009).

The National Health System (SKN) is a form and method of implementing health development that combines the various efforts of the Indonesian nation in one step to ensure the achievement of health development goals (Department of Health, 2009).

Hospitals are organized on the basis of Pancasila and are based on human values, ethics and professionalism, benefits, justice, equal rights and anti-discrimination, equity, protection and patient safety, and have social functions. Every patient has the right to obtain information about the rules and regulations that apply in the hospital; obtain information about patient rights and obligations; receive services that are humane, fair, honest, and without discrimination; obtain quality health services in accordance with professional standards and standard operating procedures; and obtain effective and efficient services so that patients avoid physical and material harm (President of the Republic of Indonesia, 2009a).

The results are based on the author's observations with several Type C Hospitals

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in Pekanbaru City regarding medical record processing that has been implemented, both the availability of human resources, the medical record information system used, and the medical record storage room. Based on these observations, the writer is interested in conducting research at the Bhayangkara Hospital TK III Pekanbaru, Riau Police.

Bhayangkara Hospital TK III PekanbaruPolda Riau is one of the Type C hospitals in Pekanbaru City. Based on the results of observations and interviews for Medical Record Processing at Bhayangkara Hospital TK III Pekanbaru, it has not been optimal. Data processing and completeness of outpatient and inpatient status for new patients use the Hospital Management Information System (SIM RS) which started in September 2019 using the Kanza Hospital SIM. From the initial survey conducted by the author based on observations and interviews with education and training officers, registration officers, filing officers, hospital statistics and reporting officers, it was found that in processing medical record files at Bhayangkara Hospital TK III Pekanbaru, Riau Police, there were several obstacles including not doing assembling, indexing. and analysis of medical records due to the absence of a human resource responsible for these activities Recent medical record file processing activities include coding by case mix officers, hospital reporting statistics, hospital correspondence, storing medical records (filling), and taking medical records.

METHODS

This research is a descriptive study with a qualitative method approach to obtain clear information about the causes of the non-optimal processing of medical record files through in-depth interviews with individuals to obtain a complete and in-depth description of a condition through input, process and output components, and describe a situation objectively, namely describing the processing of medical records at the Bhayangkara Hospital TK III Pekanbaru, Riau Police.

The location of this research was carried out at the Medical Records Unit of the Bhayangkara Hospital TK III Pekanbaru, Riau Police. This research was conducted in June 2020. The selection of subjects in this study used a purposive (non-probability) method, namely the subjects were selected according to the principle of suitability and adequacy.Nomor:0231/KEPK/STIKes-HTP/V/2020

Table 1. Characteristics of Research Informants

No.	**Main Informant**	**Number**	**Informant Code**
1.	Head of Medical Records Unit	1 person	IU1
2.	Registration Officer	2 person	IU2 dan IU3
3.	Filing Officer	1 person	IU4
4.	Case Mix clerk	1 person	IU5
No.	**Supporting Informants**	**Number**	**Informant Code**
5.	Head of Bhayangkara Hospital	1 person	IP1
6.	Outpatient Doctor	1 person	IP2
7.	Inpatient Doctor	1 person	IP3
Total Number of Research Informants		**8 persons**	

RESULTS

The informants in this study were eight people consisting of the Head of the Hospital, the Head of the Medical Records Unit, outpatient doctors, inpatient doctors, registration officers, filing officers, and case mix officers. From the results of the observation, it was found that there was no medical record officer who was responsible for the assembling processing activities, and retrieval and storage was carried out by the same officer and the officer also carried out the task of registering patients. For standard operating procedures, each task is available. Materials such as medical record forms, medical record folders, and informed consent are available in sufficient numbers; medical cards are only available for general patients, while register and tracer books are not yet available. There are currently two computers located at Registration and filing cabinets; archive racks, INA-CBGS applications, and SIMRS applications are also available, for rotary filing there are only six screens and this number is still lacking for storing medical record files, while the card drawer and tickler files are not yet available.

Based on the results of research on the human element, it was found that the availability of human resources in the medical record unit of Bhayangkara Hospital TK III Pekanbaru was 12 people, with details of one Head of the Medical Record Unit with an educational background of S1 Profession as a doctor, eight medical record officers with a D3 Record background. Medically, there were two medical record officers with a Bachelor of Nursing background and one medical record officer with a high school education background. To date, all medical record officers at Bhayangkara Hospital TK III Pekanbaru, Riau Police have never attended any training in the field of medical record processing.

In the money element, it is found that the availability of funds for operations in the medical record unit is based on funds from the government and the Indonesian Police, where each unit submits what RAB will be needed. Based on the results of interviews, there are still unrealized submissions pending approval from the Indonesian Police, namely proposals for expansion of the medical record unit room and purchase of rotary filing. In the method element, it was found that the standard operating procedures for processing medical records at Bhayangkara Hospital were already written but the implementation was not in accordance with the existing SPO because medical record officers had never seen the SPO and had never been socialized. Meanwhile, there is already a policy at Bhayangkara Hospital but there needs to be an improvement in monitoring and evaluation of the implementation of existing policies according to the SPO and management system. In the material element, it was found that the processing of medical records at Bhayangkara Hospital was still inadequate, including not using tracer and register books for recording in and out of medical record files. Materials that are already available include medical record forms, informed consent, patient medical record maps, differentiated by general patients (general payments, health bpjs and other insurance) and POLRI membership patients.

In machine elements, it was found that the processing of medical records at Bhayangkara Hospital was still inadequate, including the lack of computers and printers in the registration room, while in the filing room there was a lack of medical record racks to store patient medical record files so there were still many medical record files that were located on the floor in cardboard

boxes. - cardboard and lighting is not enough, hot, and uncomfortable. Where the storage racks in the medical record unit are inadequate, this can be seen from the average height of more than 2.5 meters so that officers sometimes need stairs and the distance between the racks is approximately only 40 cm, so it is very narrow.

Assembling activities have not yet been carried out at Bhayangkara Hospital because there is no officer who is responsible for assembling activities. The study also obtained more than one patient identification form in a medical record file, this shows that when searching for files, many files are updated because old files are difficult to find.

Coding activities have been running at Bhayangkara Hospital and there are several obstacles ranging from unclear doctor's writings and incompatibility of diagnoses with ICD-X codes. Officers coded using the ICD-X software reference for primary and secondary diagnostic codes or used a summary coding list and did not communicate to the doctor if the written diagnosis was unclear. The accuracy of the coding is still lacking because it does not include a code for disease complications and medical measures given to patients. .

Filing activities have been running at Bhayangkara Hospital but have not been optimal and there are several obstacles starting from the storage room, and the shelf where the medical record files are placed. Filing activities are responsible for storing and retrieving all information data that have been successfully obtained for future purposes. In the process of working, there might be obstacles. In the filing section, the obstacles faced in the implementation process are still frequently missing files, meaning that there are misplaced medical records and documents that have not been placed in a storage shelf.

Retrieval activities have been running at Bhayangkara Hospital but have not been optimal and there are several obstacles ranging from medical record files that are not found or medical record files that are still in the case mix and inpatient rooms. The results of field observations showed that the integration of medical record documents encountered obstacles where, at a time when there were many patients, the officers became busier and the workload increased because they handled both outpatient and inpatient units. The patient admission place must also be on full duty 24 hours with the change of shifts to three starting from the morning at 08.00 - 14.00, afternoon at 14.00 - 20.00 and evening at 20.00 - 08.00. The morning shift officer is more busy with an increased workload, while the afternoon and evening shift officers are concurrently with other departments so that, if the patient is hospitalized for a long time and comes in during the afternoon or evening hours, usually the old patient's medical record document will be sought by the officer the next day, not directly at that moment.

Processing of Medical Records at Bhayangkara Hospital TK III Pekanbaru Riau Police did not comply with the Minimum Service Standards at the Hospital. The minimum service standard for retrieval is <15 minutes, while what happened at Bhayangakara Hospital for taking medical records it was 15-30 minutes. Storage activities should be no later than 24 hours after the patient finishes treatment and goes home, while what happens at Bhayangkara Hospital for storage can be more than three days according to the return of medical record files from the Case Mix Room, ER or inpatient care.

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DISCUSSION

Human Elements in Processing Medical Records.

Based on the results of research on human elements, it was found that the availability of human resources in the medical record unit of Bhayangkara Hospital TK III Pekanbaru was 12 people, where the existing human resources were not sufficient and still worked concurrently.

From the findings obtained through interviews and observations, this study is in line with the research conducted by Provost and Fawcett (2013) which states that decreased performance is influenced by a lack of employee knowledge which causes employees not to know the information needed to do work (Provost and Fawcett, 2013).

According to the Minister of Health Decree No.377 / Menkes / SK / III / 2007, a medical record employee or medical recorder must have competence. These competencies include: 1. Classification and Codification of Diseases and Problems Related to Health and Medical Measures. In this case, the medical recorder is able to determine disease and action codes appropriately in accordance with the classification applied in Indonesia (ICD-10). 2. Legal and Professional Ethical Aspects. Medical recorders are capable of performing tasks in providing high quality medical record services and health information with due observance of applicable laws and professional ethics. 3. Management of Medical Records and Health Information. Medical recorders are able to manage medical records and health information to meet the needs of medical services, administration, and health information needs as materials for decision-making in the health sector. 4. Maintaining Quality Medical Records. Medical recorders are able to plan, implement, evaluate and assess the quality of medical records. 5. Health Statistics. Medical recorders are able to use health statistics to generate information and forecasts (forecasting). 6. Management of Health Information Management Unit / Medical Records. Medical recorders are able to manage work units related to planning, organizing, structuring and controlling health information management work units (MIK / medical records in health service installations. 7. Professional Partnerships. Medical recorders are able to collaborate inter and intra professions related to health services (Ministry of Health of the Republic of Indonesia, 2007).

The medical record officer is a major aspect in circulating the medical records of a hospital. Medical record officers have big duties and responsibilities in maintaining the integrity of a medical record. Medical records officers are expected to really know the ins and outs of medical records in a broad and in-depth manner. Based on the number of employees, it is sufficient for the needs, while, in terms of quality and skills, there is still a need for additional workforce with a medical record education background so that they are able to work in accordance with their expertise or improve the development of insights and skills by involving existing employees in education and training related to medical record management.

Researchers argue that, in the implementation of medical record management, it needs to be supported by training because medical record training is important for medical record officers in order to add insight and staff performance to be even better and in accordance with the SPO set by Bhayangakara Hospital TK III Pekanbaru regarding medical record processing. The filing officer said that he had never attended special training for filing and the coding officer said that he had never attended special training for coding.

This is in line with the research conducted by Hanggraeni (2014) which

states that training is the process of training workers to become experts to help them do their current work optimally (Hanggraeni, 2014).

Elements of Money in Processing Medical Records.

Based on the results of interviews, there are still unrealized submissions pending approval from the Indonesian Police, namely proposals for expansion of the medical record unit room and purchase of rotary filing.

Based on the findings from the results of interviews and observations, this research is in line with the research conducted by Aryanto and Fransiska (2012) which states that the budget planning process is based on a fixed hospital program and has been carried out quite effectively. The resulting output is in the form of documents recapitulated by the planning and development division (Aryanto and Fransiska, 2012).

According to good planning theory, it does not separate planning and implementation such as budgeting for the maintenance of equipment used. Budgeting must be balanced, that is, the work plan is prepared based on needs and refers to the standards set by the Minister of Health. This is in line with Harold's statement, namely one of the problems that need to be controlled in planning is uncoordinated planning among plan makers about goals and about critical planning premises, which affects the planning field (Newig and Koontz, 2014).

Researchers argue that the availability of funds in hospital operations is very important in supporting the continuity of the hospital where the available funds are based on the submission of the head of the hospital to the Indonesian Police. It is better if the hospital also collaborates with other private insurers so that they can increase hospital income and need a budget for the implementation of electronic medical records (EMR).

Elements of Method in Processing Medical Records.

Based on the results of observations and interviews for SPO, existing policies have not been implemented according to SPO.

Based on the findings from the results of interviews and observations, this research is in line with the research conducted by Ulfa (2018) which states that the elements of methods in processing medical records must exist because the system is structured to facilitate, tidy up, and organize work. Standard Operating Procedure is a system designed to facilitate, tidy up and order our work. This system contains a sequence of processes for doing work from beginning to end (Ulfa, 2018).

This is in line with the theory based on the Regulation of the Minister of Health of the Republic of Indonesia Number 512 / Menkes / PER / IV / 2007 concerning License to Practice and Implementation of Medical Practice Chapter I article 1 paragraph 10. Standard operational procedure sis a set of standardized instructions / steps to complete a medical practice and certain routine work processes, in which SOP provide the right and best steps based on mutual consensus to carry out various activities and service functions made by health service facilities based on professional standards. Implementation of procedures is often difficult, covering three things: (1) The existence of procedures often requires a long debate, so that the procedure is never completed; (2) Implementation needs to be really running, not just written, and (3) Monitoring and evaluation must be continuously carried out so that the procedure actually runs better, not just being there.

The researcher argues that, in the preparation of SOPs in medical record processing, it is necessary to involve the people in charge in every medical record processing so that the existing SOPs can be

better understood and socialized to the related unit. Based on the results of the study, it was found that there is already a policy at Bhayangkara Hospital but there needs to be improvement in monitoring and evaluation of the implementation of existing policies according to the SPO and management system.

Based on the findings from the results of interviews and observations, this research is in line with the research conducted by Giyana (2012) regarding the analysis of the inpatient medical record management system at Semarang Hospital, which states that written policies and procedures must be available according to the management of the medical record unit and become a reference for medical record staff on duty, which has been regulated according to the Decree of the Director of Semarang City Hospital Number: 445 / 044.10 / 2009 concerning the Use of the Manual Book for Medical Record Management at Semarang City Hospital. According to standard V (Giyana, 2012).

According to the theory from Soeprapto cited in Rakhmawati and Rustiyanto (2016), a good and correct medical record management system will support the maintenance of good medical records. Evaluation is a systematic way to learn based on experience and use the services learned to improve ongoing activities and promote better planning with careful selection for future activities (Rustiyanto, 2010). Researchers argue that, in making a policy at the hospital, it is necessary to have a meeting to form a team in hospital policy-making involving each head of the room, the person in charge of processing medical records, by which the existing policies can run properly.

Material Elements in Medical Record Processing

The material in processing medical records at Bhayangkara Hospital is still inadequate, including not using tracer and register books for recording entry and exit of medical record files.

Based on the findings through interviews and observations, this research is in line with the research (Asmono and Dwi, 2014) which states the causes and impacts of not using a tracer in the storage section of the Medical Record Files of Dr. Yap Yogyakarta Eye Hospital with qualitative research used to find the following factors. The cause of not using a tracer is hasty HR, the facilities in the storage section are full and the regular retrieval and storage procedures related to the use of the tracer are not carried out, which results in misfiles and medical record files that are difficult to trace (Asmono and Dwi, 2014).

The paper material for medical record folders is in accordance with the applicable provisions made of yellow buffalo paper, is not easily torn and has a color code for storage. This material was deemed good enough by the medical record officer informant and in accordance with the provisions of the Ministry of Health,.(Ministry of Health of the Republic of Indonesia, 2006).

Researchers argue that, in medical record processing materials, it is necessary to use tracer and book the in and out of medical record files so that it can make it easier to restore medical records and trace medical record files that have not been returned.

Machine Elements in Medical Record Processing

Machines in processing medical records at Bhayangkara Hospital are still inadequate, including the lack of computers and printers in the registration room, while in the filing room there is a lack of medical record racks to store patient medical record files so there are still many medical record files that are placed on the floor in boxes and with less lighting, heat, and less ease.

Based on the findings from the results of interviews and observations, this research is in line with the research conducted by Hubaybah (2018) which states that good storage equipment, good lighting, room temperature regulation, room maintenance, and attention to the safety factor of officers for a medical record storage room really helps maintain and encourage work enthusiasm and employee productivity. Good lighting or lights, avoid the officers' vision fatigue. It is necessary to pay attention to the regulation of room temperature, humidity, dust prevention and fire hazard prevention (Hubaybah, 2018).

Similarly, Ritonga et al. (2018) state that the size of the shelves must be arranged in such a way that archive participants do not need to climb when looking for archives. File shelf space height should be 35-36 cm, shelf width 38-40 cm, and shelf length depending on the existing office space. Try not to make the height of the shelf beyond the reach of human hands, so that to search for files, officers do not need to be supported / climb because the height of the archives is not accessible to human hands (Ritonga et al., 2018).

Researchers argue that, in the processing of medical records, it is necessary to have facilities and infrastructure that support the processing of medical records where there is a need for computers to be used in patient registration, inputting visits, reporting to hospitals and printing of patient eligibility letters, supported by a printer in the registration room. Meanwhile, medical record racks must be in accordance with the standards set by WHO so that the existence of these standards can make it easier for medical record officers to retrieve patient medical record files. Researchers also think that the hospital should start thinking about using electronic medical records.

This is in accordance with the research carried out by Maha Wirajaya and Made Umi Kartika Dewi (2020) that the storage of traditional medical record files is generally in the form of folders containing papers that record patient health data. Storage like this requires a large space, when the file is needed for medical purposes it is rather slow to obtain because it takes time to look for it. Conversely, if all these files can be computerized, it will facilitate the process of searching, retrieving and processing data. The process can be carried out quickly and accurately, so that medical actions that require a patient's medical history can be carried out quickly.

Assembling Activities in Medical Record Processing.

Assembling activities have not yet been carried out at Bhayangkara Hospital because there is no officer who is responsible for this.

Based on the findings from the results of interviews and observations, this research is in line with the research conducted by Giyana (2012) which states that the process of managing medical records starts from the assembling section. Assembling is a part of the medical record unit that functions as a researcher for completing the contents and assembling of a patient's medical record documents before being stored and after receiving health services (Giyana, 2012)

According to the theory, assembling activities include checking the completeness of filling in medical record files and forms that must be in the medical record file (Budi and Citra, 2011).

Researchers argue that assembling activities really need to be carried out in processing medical records where this is one thing that should not be ignored. The assembly at Bhayangakara Hospital itself has not been carried out, causing many files and medical record documents to be incomplete. According to the existing SPO, each patient's medical record document after receiving

service must be assembled, following hear, see and check the completeness of filling in the medical record and returning it on time according to the minimum service standards that have been determined by the Bhayangkara Hospital which is contained in the SPO, namely <24 hours. Delays in returning and inaccuracy of medical record documents have an impact on the management of the patient's medical record system and the quality of service. For this reason, the researcher suggests that the application of electronic medical records in the assembling section can be a solution to make it easier to track the filling and completeness of medical record documents.

Coding Activities in Medical Record Processing.

Coding activities at Bhayangkara Hospital contained several obstacles, starting from unclear doctor's writings and incompatibility of diagnoses with ICD-X codes. Officers coded using the ICD-X software reference for primary and secondary diagnostic codes or used a summary coding list and did not communicate to the doctor if the written diagnosis was unclear. The accuracy of the coding is still lacking because it does not include a code for disease complications and medical measures given to patients. .

Based on the findings from the results of interviews and observations, this research is in line with the research conducted by Pujihastuti, Sudra and Sugiarsi (2014) which states that the Relationship of Completeness of Information with the Accuracy of Diagnosis and Action Codes on inpatient medical record documents with the chi-square test shows that there is a significant relationship of completeness of information in medical record documents with the accuracy of disease diagnosis codes in inpatient medical record documents (Pujihastuti et al., 2014).

According to the theory of medical personnel, a coder is responsible for the accuracy of the code of a diagnosis that has been determined. Therefore, for things that are less clear and incomplete, before the code is set, they must first communicate with the doctor who made the diagnosis. Activities and actions, as well as diagnoses in medical records must be coded to support health planning, management, and research functions (Ministry of Health of the Republic of Indonesia, 2006).

Another thing that was obtained from the results of in-depth interviews with informants revealed that incompleteness and delays in returning medical record documents had an effect on the length of the coding process.

Based on the findings from the results of interviews and observations, the research conducted by Kresnowati, (2013) states that the Jamkesmas Claims Administration Analysis of RSUD R.A.A Soewondo with this type of qualitative research shows that there are coding problems with repairing medical record files that take a long time (Kresnowati, 2013).

The coding process requires accuracy and accuracy of the contents of medical record documents, in this case diagnosis and medical action, so that the quality of the results is good, meaning that the coding process takes a long time.

This is in line with Pepo and Yulia's (2015) research on the completeness of medical resume diagnosis on the accuracy of clinical coding of obstetrics cases at Atma Jaya Hospital Jakarta with a quantitative research design showing that the completeness of writing diagnoses on medical resumes affects the accuracy of clinical coding of patients with obstetric cases (Pepo and Yulia, 2015).

Direct observation was made at the table of the coding section of many piles of unprocessed medical record documents. The

obstacles experienced were the delay in returning medical record documents, the doctor's writing was difficult to read and the existence of non-standard abbreviations.

This is in accordance with Pri et al.'s (2014) research on the Analysis of Medical Record Management at the Grahasia Mental Hospital, Yogyakarta, which shows that the difficulty in the coding process is that the doctor's writing is difficult to read and the existence of non-standard abbreviations.

This is in line with Rudy and Calvin's (2014) research on the Accuracy Level of Inpatient Morbidity Coding to Support Accuracy of Reporting in the Medical Records Section of CahayaKawaluyan Hospital with quantitative research suggesting the factors causing the lack of coding accuracy, namely difficult to read doctor's writing (14.1%) and incomplete supporting information(10.8%) and the use of uncommon abbreviations (Sam et al., 2013).

The researcher argues that the delay in coding is due to the manual operation of the Bhayangkara Hospital TK III Pekanbaru at the Riau Police. This is in accordance with the field observations of the medical record coding unit combined with the administration, education and training of the head of the medical record unit, while the medical records department, especially coding, did not exist. Researchers suggest using an electronic medical record in the coding section where this can help work while maintaining the quality of the information made in the coding section.

This is in accordance with Hakam and Alis Setiyadi (2014) who state that the quality of an information can be seen from the dimensions that the information has. The quality of information consists of three things, namely relevant, which means that according to information needs, on time meaning that information must arrive quickly to the recipient and must not be late, and accurate meaning that it describes information clearly and is not engineered (Hakam and Alis Setiyadi, 2014).

Filing Activities in Medical Record Processing.

Filing activities are not yet optimal and there are several obstacles starting from the storage room, the shelf where the medical record files are placed. Filing activities are responsible for storing and retrieving all information data that have been successfully obtained for future purposes. In the process of working there may be obstacles. In the filing section, the obstacles faced in the implementation process are still frequently missing files, meaning that there are misplaced medical records and documents that have not been placed in a storage shelf.

Based on the findings from the results of interviews and observations, this study is in line with the research conducted by Nuraini, (2015) at the Tangerang "X" Hospital, which states that filing activities are less than optimal due to inadequate storage space and officers from other departments are free to enter and exit to borrow and return medical record files to storage racks (Nuraini, 2015).

This is in line with Astuti and Anunggra's (2013) research that filing is the process of systematically arranging and storing materials, so that these materials can be found easily and quickly whenever needed. Filing at the "X" Hospital based on observations still encountered obstacles so that sometimes finding documents was difficult and long (Astuti and Anunggra, 2013).

In the implementation of storing medical record files, it is necessary to have adequate facilities for the medical record files themselves and for the staff executing medical record file storage. Storage of medical record files can be arranged alphabetically and by number making it

easier to search. Patient medical record files require storage equipment in the form of storage racks. The selection of storage racks must be done by taking into account the storage location, medical record numbering system, the length of time to store medical records and the type and price of storage equipment, while for equipment between one shelf and another, there is a need for distance to make it easier for officers to carry out their duties. The numbering system used in the medical record unit is the unit numbering system, where patients are given one number the first time they register and patients are given the same number for subsequent registration. In the unit numbering system, all patient medical records are stored in one folder. If the patient has more than one number, then these numbers will be put together (Nuraini, 2015).

Researchers argue that inadequate storage space and shelves as well as the inconvenience of power to work due to limited space are issues. Lack of personnel and lack of knowledge about medical records, and the absence of an integrated computer made older officers look for medical record documents and enter medical record documents that did not match the medical record number and there were two medical record numbers for one patient, which made it possible to have two medical record documents. The results of direct observation found that the storage space was narrow and the storage racks were insufficient so that many medical record documents were piled on the floor and put in boxes. It feels like working in a storage room is not comfortable, there is limited space for movement, and the air conditioner is not cold.

Researchers suggest using an electronic medical record because it can save storage space for medical records because each medical record has been stored in an EMR application and makes it easier for all doctors to access patient medical records. Using EMR does not require many medical record storage racks; this is in accordance with the research conducted by Kurniadi and Pratiwi (2017) where the integrity of patient care using EMR is assured (Kurniadi and Pratiwi, 2017).

Retrieval Activities on Medical Record Processing.

The retrieval activity at Bhayangkara Hospital was not optimal and there were several obstacles, starting from the medical record file that was not found or the medical record file which was still in the case mix and inpatient room.

Based on the findings from the results of interviews and observations, this research is in line with the research conducted by Fitri (2018) which states that the factors causing delays in outpatient medical record document services from the Filling Section of PantiWilasaCitarum Hospital Semarang are human factors including the number of visits are not proportional to the number of officers available so that the high workload which affects the incidence of misfiles on average for each file rack is 173 documents / rack from each existing file rack (Fitri, 2018).

According to reward theory, it is needed to motivate a person, including employees, to improve their performance. Lack of motivation plus the lack of awards give results in lower performance in completing medical record documents (Ady and Wijono, 2013).

Researchers argue that there needs to be a reward or appreciation to nurses / midwives who work in Inpatient Care to immediately complete the medical record documents after the patient returns so that the return of medical records in the Medical Records Unit can be in accordance with the Minimum Service Standards, namely the files are returned to the Medical Records Unit 1x24 hours. So that, when the patient comes back for treatment or re-controls, the medical

record file is already in the Medical Records Unit.

Minimum Service Standards in Medical Record Processing.

The minimum service standard for retrieval is <15 minutes, while what happened at Bhayangakara Hospital was that taking medical records was 15-30 minutes.

From the findings obtained through interviews and observations, this research is in line with the research conducted which states that the impact of non-compliance with medical record processing is not in accordance with Minimum Service Standards, causing delays in processing hospital report data and inpatient medical record documents not stored on a document storage rack making it difficult to find documents, while for patients it will affect the next treatment process. This will affect the information reported to hospital leaders to be not timely and inaccurate (Tanjung and Sukrianto, 2017).

According to the Minimum Service Standard Theory for Medical Record SPM in KEPMENKES Number 129 / Menkes / SK / II / 2008 concerning Minimum Hospital Service Standards in the medical record service section there are minimum service standards such as completeness of filling in medical records 24 hours after completion of service and describing the responsibility of doctors in completing medical record information. A complete medical record is a medical record that has been filled in completely by the doctor within <24 hours after completion of outpatient services or after an inpatient is decided to go home, which includes the patient's identity, history, care plan, implementation of care, follow-up and resume.

Completeness of the informed consent after obtaining clear information illustrates the doctor's responsibility to provide it to the patient and to get the patient's consent for the medical action taken. Informed consent is the consent given by the patient / patient's family on the basis of an explanation of the medical action to be performed on the patient.

Time to provide medical record documents for outpatient services shows the speed of outpatient registration services. Outpatient medical record documents are medical record documents of new patients or old patients used in outpatient services. Time to provide medical record documents starts from the patient registering until the medical record is provided / found by the officer.

Regarding time to provide medical record documents for inpatient services, the speed of inpatient medical record service is illustrated. Inpatient medical record documents are medical record documents of new patients or old patients used in inpatient services. The time to provide medical record documents for inpatient services is the time when the patient is decided to be hospitalized by the doctor until inpatient medical records are available in the patient ward.

CONCLUSION

From the results, medical record processing in the assembling section has not been running. The constraints faced were limited human resources so that the assembling activity had not been implemented at all. Processing of medical records in the coding section takes a long time, adjusting for the delay in returning medical record documents to the filing section. This process is often hampered by hard-to-read doctor's writings and the use of non-standard abbreviations that affect the coding process so that the resulting data are inaccurate. Processing of medical records in the filing section has not been going well because of inadequate storage racks for medical records, and there are still many medical record files that are located in

boxes. Processing of medical records in the retrieval section has not gone well and has not met the minimum service standards for taking medical records. This process is constrained because there are still patient medical files that have not been returned to the medical record unit. Standard operational procedures and policies from Bhayangkara Hospital TK III Pekanbaru already exist, but medical record officers are still working not in accordance with existing standard operating procedures. The availability of computers (two units) of printers (1) is still insufficient because the existing computers are used alternately for inputting the INACBGG application, printing Patient Eligibility Letters, reporting visits, and the SIMRS application. Meanwhile, the number of medical record racks is still insufficient and the storage space is full and crowded, plus there is lack of lighting and air conditioning.

Maximizing the performance of existing medical record officers where the patient's medical record files have not been treated for 3-5 years can be done by periodically scanning the medical record files and destroying the medical records. This can also be useful in reducing the pile of medical record files that do not yet have a storage shelf.

Additional tasks can be given, such as carrying out assembling with the consequence of having additional tasks adjusted to overtime wages for medical record officers.

It is necessary to hold meetings at least twice a year so that communication occurs between doctors, hospital leaders, and medical record officers to discuss incomplete medical records. As well as providing sanctions to healthcare providers who do not complete medical records.

The process of coding activities can be improved by completing medical action codes based on ICD X and continuous coordination with doctors to clarify the writing on the medical record file. As well as socialization, monitoring and evaluation to medical record officers regarding the existing standard operating procedures and medical record officers must work in accordance with the existing.

There needs to be an additional storage rack for medical record files, computers and smartphones. As well as organizing the relocation of the medical record room to another, wider room so that the supporting facilities, such as record racks, can be fulfilled in the number as needed, and the medical record storage room can be designed to make it easier for officers in their activities to retrieve medical record files.

The long-term suggestion is the use of electronic medical records (EMR) because this saves the use of storage space, improves the efficiency of taking medical record files, and reduces the incidence of missing files.

REFERENCES

Ady, F. and Wijono, D. (2013) 'Pengaruh Motivasi Kerja terhadap Kinerja Karyawan', *Jurnal Maksipreneur: Manajemen, Koperasi, dan Entrepreneurship*. doi: 10.30588/jmp.v2i2.278.

Aryanto, R. and Fransiska, M. (2012) 'The Role of Government Assistance to Generate Competitive Leadership, Commitment, Motivation, Innovation, Environment and its Impact on the Performance of TenunCual Union Industry Cluster in Bangka Belitung Province', *Procedia - Social and Behavioral Sciences*. doi: 10.1016/j.sbspro.2012.11.106.

Asmono and Dwi, M. (2014) 'Faktor-Faktor Penyebab dan Dampak Tidak Menggunakan Tracer di Bagian Penyimpanan Berkas Rekam Medis Rumah Sakit Dr Yap Yogyakarta',

Tracer Rekam Medis.

Astuti, R. and Anunggra, D. I. (2013) 'Faktor-Faktor penyebab Terjadinya Missfile di Bagian Filing Rumah Sakit Umum Daerah Banyumas Tahun 2013', *Penelitian Ilmiah. Juni*.

Budi and Citra, S. (2011) *Manajemen Unit Kerja Rekam Medis, Quantum Sinergis Media*.

Department of Health (2009) 'Undang-Undang Nomor 36 Tahun 2009', *Undang- undang Nomor 36 Tahun 2009*.

Fitri, R. R. (2018) *Analisis Faktor Penyebab Kejadian Missfile Bagian Filing di Puskesmas Kencong Kabupaten Jember Tahun 2017*, *Politeknik Negeri Jember*.

Giyana, F. (2012) 'Analisis Sistem Pengelolaan Rekam Medis Rawat Inap Rumah Sakit Umum Daerah Kota Semarang', *Jurnal Kesehatan Masyarakat Universitas Diponegoro*, 1(2), p. 18739.

Hakam, F. and Alis Setiyadi, N. (2014) 'Pengembangan Sistim Pencatatan dan Pelaporan data di Klinik Muhammadiyah Medical Center', *Jurnal Kesehatan Masyarakat Andalas*. doi: 10.24893/jkma.8.2.67-71.2014.

Hanggraeni, D. (2014) 'Manajemen Risiko Perusahaan (Enterprise Risk Management) dan Good Corporate Governance', *Penerbit Universitas Indonesia*.

Hubaybah (2018) 'Analisis Manajemen Pengelolaan Sistem Rekam Medik Pada Puskesmas Paal X kota Jambi', *Jurnal Kesmas Jambi (jkmj)*, 2(2), pp. 1–7.

Kurniadi, A. and Pratiwi, R. (2017) 'Patient Clinical Data Integration in Integrated Electronic Medical Record System for Health Care Facilities in Indonesia', *Jurnal Kesehatan Masyarakat*, 13(2), pp. 239–246. doi: 10.15294/kemas.v13i2.8103.

Lily Kresnowati, D. E. (2013) 'Analisis Faktor-Faktor Yang Mempengaruhi Akurasi Koding Diagnosis Dan Prosedur Medis Pada Dokumen Rekam Medis Di Rumah Sakit Kota Semarang', *Laporan Akhir Penelitian Dosen Pemula Administrasi Rumah Sakit*.

Maha Wirajaya, M. K. and Made Umi Kartika Dewi, N. (2020) 'Analisis Kesiapan Rumah Sakit Dharma Kerti Tabanan Menerapkan Rekam Medis Elektronik', *Jurnal Kesehatan Vokasional*, 5(1), p. 1. doi: 10.22146/jkesvo.53017.

Ministry of Health of the Republic of Indonesia (2006) 'Pedoman Penyelenggaraan dan Prosedur Rekam Medis Rumah Sakit di Indonesia', *Deirektorat Jendral Bina Pelayanan Medik*.

Ministry of Health of the Republic of Indonesia (2007) 'Keputusan Menteri Kesehatan Republik Indonesia Nomor 377/ Menkes/ SK/ III/ 2007 Tentang Standar Profesi Perekam Medis dan Informatika Kesehatan', *Keputusan Menteri Kesehatan Republik Indonesia Nomor 377/ Menkes/ SK/ III/ 2007 Tentang Standar Profesi Perekam Medis dan Informatika Kesehatan*.

Newig, J. and Koontz, T. M. (2014) 'Multi-level governance, policy implementation and participation: The EU's mandated participatory planning approach to implementing environmental policy', *Journal of European Public Policy*. doi: 10.1080/13501763.2013.834070.

Nuraini, N. (2015) 'Analisis Sistem Penyelenggaraan Rekam Medis di

Instalasi Rekam Medis RS " X " Tangerang Periode April-Mei 2015', 1, pp. 147–158.

Pepo *et al.* (2015) 'Kelengkapan penulisan diagnosa pada Resume Medis Terhadap Ketepatan Pengkodean Klinis Kasus Kebidanan', *Jurnal Manajemen Informasi Kesehatan Indonesia*. doi: 10.33560/.v3i2.88.

President of the Republic of Indonesia (2009) 'UU RI momor 44 tahun 2009 tentang rumah sakit', *Jakarta*. doi: 10.1017/CBO9781107415324.004.

President of the Republic of Indonesia (2009) 'UU RI No 36 Tentang Kesehatan', *UU RI No 36 2009*.

Pri *et al.* (2014) 'Grhasia Yogyakarta', pp. 22–30.

Provost, F. and Fawcett, T. (2013) 'Data Science and its Relationship to Big Data and Data-Driven Decision Making', *Big Data*. doi: 10.1089/big.2013.1508.

Pujihastuti *et al.* (2014) 'Hubungan kelengkapan Informasi dengan Keakuratan Kode Diadnosis dan Tindakan pada Dokumen Rekam Medis Rawat Inap', *Jurnal Manajemen Informasi Kesehatan Indonesia*. doi: 10.33560/.v2i2.25.

Rakhmawati, F. and Rustiyanto, E. (2016) 'Analisis Kebutuhan Petugas Rekam Medis Berdasarkan Beban Kerja di Instalasi Rekam Medis RS Aisyiah Muntilan', *Jurnal Kesehatan Vokasional*. doi: 10.22146/jkesvo.27446.

Ritonga *et al.* (2018) 'Analisa Kebutuhan Rak Penyimpanan Berkas Rekam Medis Rawat Jalan Di Rumah Sakit Umum Madani Medan', *Jurnal Ilmiah Rekam Medis dan Informasi Kesehatan*.

Rudy J, M. and Calvin, L. (2014) 'Tingkat Akurasi Kodefikasi Morbiditas Rawat Inap Guna Menunjang Akurasi Pelaporan di Bagian Rekam Medis Rumah Sakit Cahya Kawaluyan', in *Jurnal Kesehatan 'Caring and Enthusiasm' No. 1 Vol. 2 April 2014 - ISSN : 977-2338-7823-01*.

Rustiyanto, E. (2010) 'Statistik Rumah Sakit Untuk Pengambilan Keputusan', *Yogyakarta: Graha Ilmu*.

Sam, R. *et al.* (2013) 'PENDAHULUAN Rekam medis menurut Permenkes no . 269 / MENKES / PER / III / 2008 merupakan berkas yang berisikan catatan dan dokumen tentang identitas pasien , kelengkapan (assembling), pengkodean penyakit dan tindakan medis (coding), serta tabulasi (i', pp. 15–35.

Tanjung, I. and Sukrianto, D. (2017) 'Perancangan Sistem Informasi Rekam Medis Terpadu Dalam Upaya Meningkatkan Pelayanan Rumah Sakit Jiwa Tampan Prov. Riau', *Jurnal Intra-Tech*.

Ulfa, H. M. (2018) 'Analisis Unsur Manajemen dalam Pengolahan Rekam Medis di Rumah Sakit TNI AU Lanud Roesmin Nurjadin', *KESMARS: Jurnal Kesehatan Masyarakat, Manajemen dan Administrasi Rumah Sakit*. doi: 10.31539/kesmars.v1i1.146.

CORRELATION OF FREE LARVAE INDEX AND POPULATION DENSITY WITH DENGUE FEVER INCIDENCE RATE

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ABSTRACK

Introduction: Dengue Hemorrhagic Fever (DHF) is a disease caused by the dengue virus that infects the body. Dengue is a common viral infection in warm tropical climates. The infection is caused by one of four closely related dengue viruses. The disease now plagues many countries and even more than 100 countries within the WHO, including Africa, the Americas, the Eastern Mediterranean, Southeast Asia, and the Western Pacific. The Americas, Southeast Asia, and the Western Pacific are the most severely affected regions, with Asia representing 70% of the global disease burden. The high incidence rate of DHF in various regions of Indonesia is the background by several factors, one of which is the density of the seaters. The aim of this study was to analyze the correlation between population density and larvae free index and Incidence Rate (IR) Dengue Hemorrhagic Fever (DHF) in Blitar Regency in 2013-2017. **Methods:** The data were analyzed quantitatively using Spearman correlation tests to analyze relationships between variables. **Result:** The results of the analysis found there was no correlation between dengue fever incidence rate and larvae free index ($p = 0.603$ $r = -0.117$), and there was a correlation between the incidence rate of dengue fever and population density ($p = 0.002$ $r = 0.619$). **Conclusion:** High population density is a risk factor for DHF events in Blitar Regency, so there needs to be an anticipation of preventive measures such as the implementation of 3M and counseling of the impact of high population density.

Keywords: Incidence rate DHF, free larvae index, Population density

INTRODUCTION

Dengue Hemorrhagic Fever (DHF) is known as a disease that infects the body with the dengue virus as the cause (Nisa, 2015). Dengue is a common viral infection in warm tropical climates. The cause of infection is one of four dengue viruses that are closely related or known as serotypes and this can cause a broad spectrum of symptoms, including some that are very mild (invisible) to those that may require medical intervention and hospitalization. In severe cases, death can occur (WHO, 2020). In the past, the epidemic of severe dengue fever only occurred in nine countries before 1970. The disease now plagues many countries and even 100 more countries within the WHO now include Africa, the Americas, the Eastern Mediterranean, Southeast Asia, and the Western Pacific. The Americas, Southeast Asia, and the Western Pacific are the worst affected regions, with Asia representing 70% of the world's disease burden (WHO, 2020).

Indonesia is a tropical country in Asia, this condition is suitable for Aedes Aegypti mosquitoes to grow and breed, especially when the rainy season comes and many puddles or rainwater shelters become breeding grounds (Hasan et al., 2016). Currently, DHF disease is one of the public health problems in Indonesia, Indonesia's health profile in 2018 reported 65,602 cases of dengue fever, which indicates a decrease in the incidence rate compared to the previous year which reached 68,407 occurrences although the decrease is not so

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significant (Kemenkes RI, 2018). Regions in Indonesia have very different disease patterns (Pongsilurang et al., 2015). Based on incidence rate (IR) data recorded in 2014 reached 39.80 per 100,000 inhabitants; this figure includes data from 34 provinces in Indonesia, and in the following year reached 50.75 per 100,000 inhabitants, while in 2016 the IR figure continued to increase to reach 78.85 per 100,000 inhabitants. When looking at the national target, the IR figure is still above the target of 49 per 100,000 residents (Directorate General of Disease Control and Environmental Health, 2011). According to the East Java Provincial Health Office, the number of cases of DHF incidents in 2018 in East Java reached 9,452, an increase in cases from the previous year which reached 7,866 cases. Also, the DHF pain rate in East Java in 2018 reached 1.2%; this indicates the DHF pain rate still does not meet the target of <1% (Indonesian Ministry of Health 2018). In East Java, one of the areas with the highest DHF cases was Blitar Regency, the last data researchers obtained were the incidence rate (IR) cases of dengue fever in 2016 of 26.8 per 100 thousand residents with a Case Fatality Rate (CFR) of 2.3% (Indonesian Ministry of Health, 2017).

The higher incidence of DHF in various regions of Indonesia is driven by several factors such as population density, the higher number of humans than the higher human chance of being bitten by the Aedes Aegypti mosquito. This is one of the background causes of DHF (Pongsilurang et al., 2015). According to Masrizal and Sari (2016), DHF has a significant relationship with population density. Chandra (2019) found one of the factors that can influence the incidence of DHF is population density. It is also explained that the high population density is directly proportional to the incidence of DHF in the area (Chandra, 2019). The increasing population and spread of dengue fever in Indonesia are also due to the high mobility of the population, the development of urban areas, changing climate, increasing population, and changes in population distribution (Haryanto, 2018).

The high case of dengue fever undeniably occurs due to the presence of Aedes Aegypti mosquito. Aedes mosquitoes themselves have a life cycle that is from the form of eggs, larvae, pupae, to adult mosquitoes. This mosquito lays eggs or chooses a place in clean, clear, and calm water usually found in water shelters inside or outside the house with its open conditions (Ridha et al., 2013). Alternatives to control are needed, especially in areas with high and persistent transmission, namely city or district areas that have a high incidence rate (IR), this is related to controlling the prevalence of DHF cases because it requires the observant and fast treatment of diseases (Qi et al., 2015).

The purpose of this study was to analyze the correlation between free larvae index and population density with incidence rate (IR) and dengue fever (DHF) in Blitar Regency in 2013-2017.

METHOD

This research is quantitative research by conducting secondary data processing from year to year or called time-series sourced from the Blitar District Health Office covering all sub-districts in the Blitar Regency, which consisted of 22 sub-districts in 2013-2017. Incidence rate (IR) and free larvae index data are obtained from the Blitar District Health Office while population data are obtained from the Central Bureau of Statistics. Data collection was conducted after obtaining a research license from the National Unity and Political Agency of East Java Province and Blitar Regency as well as the use of secondary data by related agencies.

The data obtained are then categorized incidence rate of DHF cases

which is the number of cases/number of at-risk population per 100,000 residents in the district of IR <20 per 100,000 inhabitants and IR > 20 per 100,000, then the population density with Medium 500-1249 people/km^2 criteria rarely <500 people/km^2, solid 1250-2499 people/km^2, very dense 2500-3999 people/km2, free larvae index categorized as free larvae index (= ≥ 95%) and not free larvae index (= < 95%). Map creation in this study uses the QGIS application. The test used in analyzing the relationship between free variables is incidence DHF rate and bound variables, namely free larvae index and population density, were conducted with Spearman correlation test and 95% trust level. This research has been licensed by the ethics committee of the Faculty of Public Health Airlangga University with the number 571/EA/KEPK/2018.

RESULT

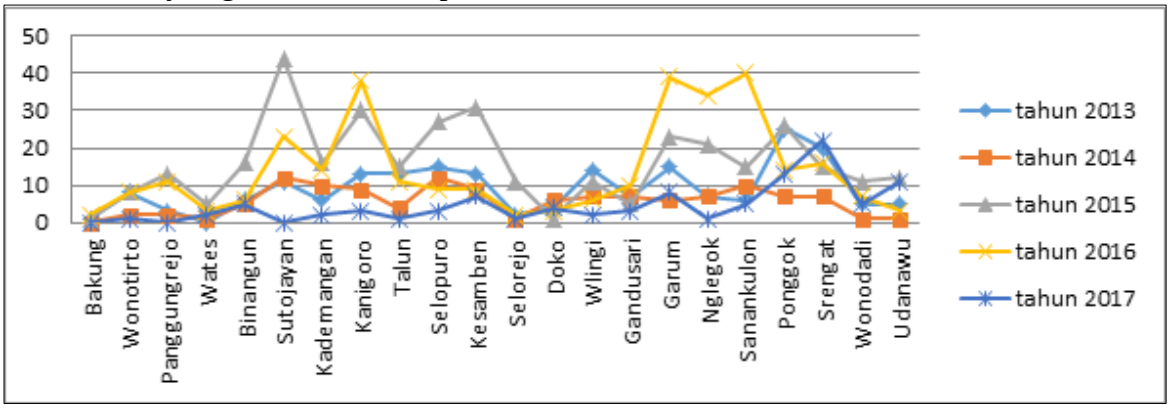

Figure 1. Graph of Dengue Dengue Fever Incidence per District in Blitar Regency in 2013-2017

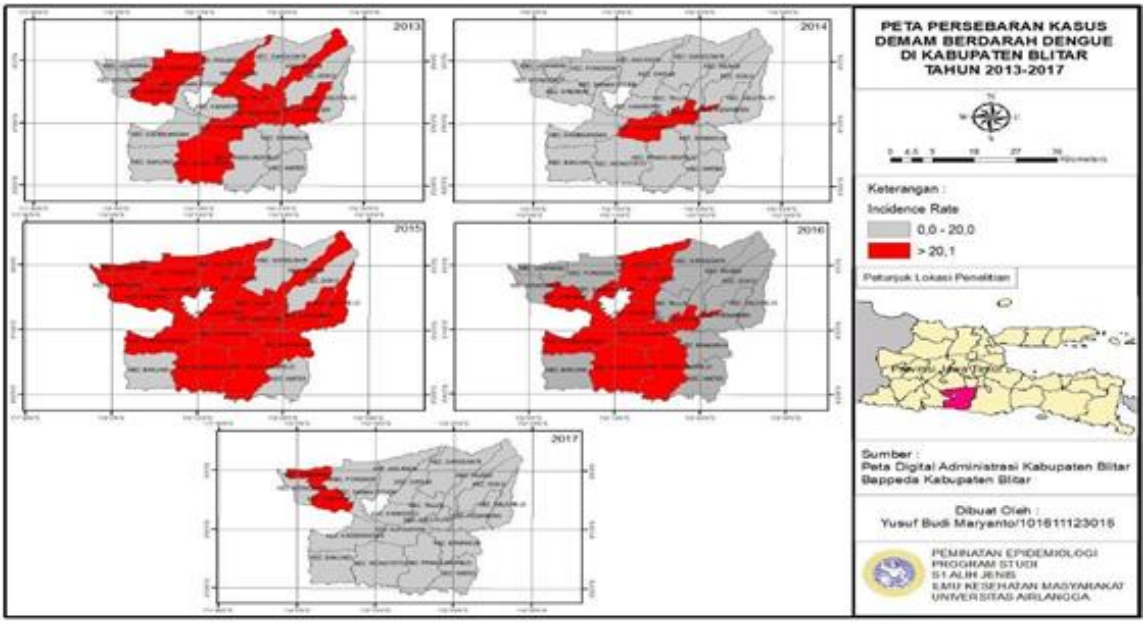

Figure 2. Map of the Incidence Rate Distribution of Dengue Hemorrhagic Fever Cases in Blitar Regency, 2013-2017

Distribution of Incidence Rate of Dengue Dengue Fever Cases in Blitar Regency

Blitar Regency is one of the endemic areas of dengue fever cases in East Java. This can be known with the high incidence of dengue fever every year. In the data of dengue fever cases in 2013-2017, although every year the trend of DHF incidence shows a decrease, Blitar Regency is still one of the regions that have cases in the high category.The number of dengue fever cases in Blitar Regency in 2013-2017 is likely to increase and decrease (Figure 1). Based on the data shown in Figure 1, 2015 became the year with the highest dengue fever cases which was 357 cases and in 2016 with 308 cases, then, in 2017, it tended to decrease from the previous year. The highest number of cases in the last five years is found in three sub-districts, namely Kanigoro sub-district with 93 cases (8.5%), Garum sub-district with 91 cases (8.4%), and Sutojayan Sub-District with 90 cases (8.3%). Dengue fever cases can be known by incidence rate which is the frequency of infectious diseases in the community in a region and at any given time compared to the number of at-risk populations. Based on the map of dengue fever cases in Blitar Regency in Figure 2, the average case of dengue fever during 2013-2017 with a value of more than 20 per 100,000 inhabitants is in eight sub-districts, namely, Sutojayan Sub-district 37.7 per 100,000; Selopuro sub-district 31.1 per 100,000 residents; Kesamben sub-district 28.3 per 100,000; Garum sub-district 28.2 per 100,000; Sanankulon sub-district 27.3 per 100,000 inhabitants; Srengat sub-district 24.7 per 100,000 inhabitants; Kanigoro Sub-district 24.3 per 100,000 inhabitants; and Nglegok Sub-district 20.1 per 100,000 inhabitants. The incidence rate of DHF cases is lowest in Bakung sub-district with 3.1 per 100,000 inhabitants.

Table 1. Average IR Figure per Year

Year	Average IR (per 100.000 population)
2013	17,5
2014	11,1
2015	31,2
2016	26,8
2017	19

Source : Blitar District Level Health Office

According to Table 1, dengue fever cases in the past five years decreased in 2014 and 2017. The peak case of DHF disease occurred in 2015; almost all districts have an IR value of more than 20 per 100,000 inhabitants. In 2016, there were cases of dengue fever on a high scale even though the number was not as large as in 2015. This is likely due to the 5-year cycle of dengue fever cases that also occur in several regions in Indonesia with different year sizes.

Distribution of Free Larvae Index in Blitar Regency

Based on the data of the Blitar District Health Office in Table 2, it is found that free larvae index in Blitar Regency every year changes both down and up. Here is the average free larvae index data in Blitar Regency every year

Table 2. Average Number of Free Larvae Index per Year

Year	Average Free Larvae Index
2013	80.5
2014	81.5
2015	79.9
2016	76.5
2017	78.9

Source : Blitar District Level Health Office

Figure 3 shows the map of the distribution of free larvae index figures in Blitar Regency, which illustrates that, overall, only a small number of districts in Blitar Regency that have a value of free

larvae index > 95% and an average of five years shows the figure <95%. It is observed a decrease in free larvae index figures, which indicate a positive trend;, this is indicated by the council in 2013 to 2015 which has five sub-districts that reached the target, in 2016 increased by only two sub-districts and, in 2017, there were no sub-districts with free larvae index > 95%.

Figure 3. Map of Free Larvae Index Distribution in Blitar Regency 2013-2017

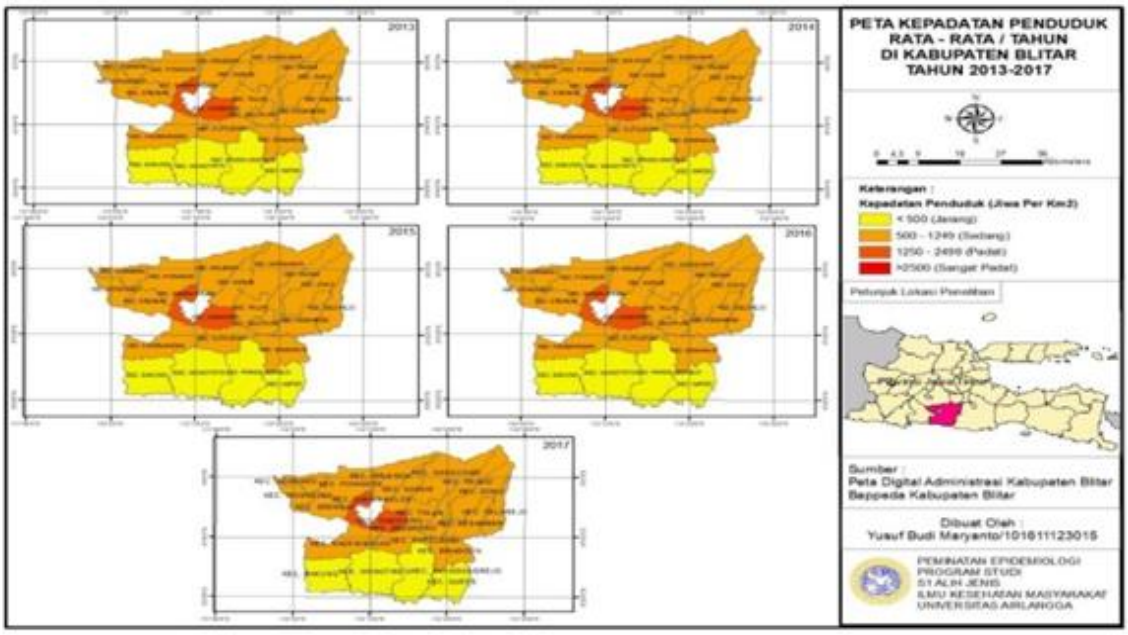

Figure 2. Map of the Incidence Rate Distribution of Dengue Hemorrhagic Fever Cases in Blitar Regency, 2013-2017

Population Density in Blitar Regency

The Office of the Central Bureau of Statistics of Blitar Regency noted that the population over a period of five years, namely 2013 to 2017, increased. It can be seen in Table 3 that the average increase occurred from 2013 to 2017 and reached 12.8

million people. The increase or increase in the population occurs each year with various causative factors, one of which is the large number of people who migrate (displacement of residents) from other districts/cities to Blitar Regency.

Table 3. Average Population Density per Year

Year	Average Population Density (People/ km^2)
2013	837.6
2014	841
2015	844.6
2016	847.5
2017	850.4

Source : Central Bureau of Statistics Blitar District

Figure 4 shows a map of the distribution of population density in the Blitar Regency which tends to have similarities from 2013 to 2017. The Kanigoro and Sanankulon sub-districts are densely populated areas and there are four sub-districts in the southern Blitar region with sparse population density. The district with the highest average population density is 1,665 people/km^2, the lowest population density is in the Wonotirto sub-district of 217 people/km^2. Overall data over a period of five years show the average population density in the Blitar Regency is 844 people/km^2. Several other factors that are the reason for the increase in population in the Blitar Regency include economic, social, cultural, natural resources, and good geographical conditions, as well as the number of natural and artificial tourist attractions found in Blitar Regency.

Bivariable Analysis

The test results obtained based on the data of each variable found that the incidence rate DHF variable with a population density of $p = 0.002$; this indicates that $p < \alpha$, which means there is a relationship between the two variables; then obtained r (correlation value) of 0.619 with positive value shows a moderate relationship between incidence rate and population density. Furthermore, analysis of the relationship between variable incidence rate DHF and free larvae index found $p = 0.603$, this indicates $p > \alpha$ which explains that the result of the analysis of the relationship of the two variables is that there is no significant relationship (Table 4).

Table 4. Bivariate Analysis

Variable	p-Value	R	Desc.
Free Larvae Index	0.603	-0.117	There was no correlation
Population Density	0.002	0.619	There was a correlation

DISCUSSION

Incidence Rate Relationship with Free Larvae Index

An indicator of the presence of the Aides Aegypti mosquito population in an area is the presence of Aaides Aegypti larvae in the area. The percentage of the number of houses not found having larvae in them against the total number of houses inspected is the definition of free larvae index (Directorate General of Disease Control and Environmental Health, 2011). The density of DHF disease vectors can be seen using several sizes, one of which is a free larvae index based on the house index, but this figure is neither environmental sanitation nor containers that are likely to be the breeding ground for dengue fever vectors, so it cannot describe how large is the vector breeding place for dengue fever. Based on the data, there are several sub-districts with high IR values and high free larvae index values: Garum, Sutojayan, and Kesamben sub-

districts. This is a note, in theory, that the value of free larvae index high incidence rate of dengue fever cases should tend to be low because this variable will be the opposite, as is the case with research in Jember Regency which states that free larvae index is inversely proportional to dengue fever cases (Kurniawati et al., 2015). This phenomenon can occur due to some technical errors during the reporting process, or because of the implementation of larvae monitoring that has not been running to the maximum.

Results obtained from a Spearman correlation analysis showed no meaningful relationship between DHF incidence rate and free larvae index in Blitar Regency with p-value = 0.603. This result is in line with Murdani et al.'s (2017) research which suggests that there is no relationship between free larvae index and DHF Event. Chandra's (2019) research conducted in Jambi City also found that free larvae index's achievement does not affect DHF events and also explained that it can occur because DHF transmission can occur due to other factors. TPrasetyowati and Kushartanti (2019) also explained in their research in Semarang that the amount of free larvae index descriptively does not affect DHF events when viewed in a scriptive way. According to the explanation, this phenomenon can be caused in part because house sampling has not been done regularly. Contrary to previous findings, research in Magetan Regency found that free larvae index variables influenced DHF events in the various sub-districts studied (Ghafarul, 2015). According to Kinansi et al. (2017). the condition of an area whose free larvae index has not reached or is less than 95% has a risk in the increased incidence of DHF. According to Kurniawati and Yudhastuti (2016)there is a link between free larvae index and DHF event, although the analysis results show a weak relationship, according to the study this occurs because not all larvae of Aedes mosquitoes can survive until becoming adult mosquitoes . The low reach of free larvae index shows that there are still many larvae found in each house, and, according to research conducted by Anggraini (2018), there is a meaningful link between the presence of Aedes larvae and the incidence of DHF .

No cure or vaccine for the DHF virus has been found, making preventive efforts one of the most effective DHF disease control strategies (Directorate General of Disease Control and Environmental Health, 2007). The dengue fever eradication strategy is currently focused on dengue fever vectors. Another thing that is noticed is that the size of the larvae index before and after the control can be used to study the results of the vector control. Mosquito Nest Eradication Program is one of the options in DHF control measures, an activity that has been carried out in Indonesial its implementation can be carried out by various levels of age and from all levels of education. Free larvae index is the benchmark for the success of the PSN program with free larvae index = 95% expected cases of events and transmission can be prevented (Kemenkes RI, 2016). However, free larvae index in Blitar Regency in 2013-2017 experienced a bad trend that did not reachthe target = 95%. Many things can background the phenomenon that occurs in Blitar Regency, one of them can be due to larvae monitor implementers who have not met the national standards that have been set (Suryani, 2018). In this case, the movement of one house one larvae monitor (Jumantik) was launched by the government for continuous enrichment of PSN with 3M plus as the core message carried out by the community (Kemenkes RI, 2016).

Relationship between Incidence Rate and Population Density

Population density can be interpreted as a condition in which the human julmlah at a certain space boundary continues to

increase compared to the area it occupies thus creating dense space conditions. From a descriptive description of the average incidence rate (IR) of dengue fever cases associated with population density, it can be known that a high population density of >1000 people/km2 will be comparable to the high number of dengue fever cases. Density and population are among the factors affecting the high incidence rate of DHF(Paomey et al., 2019). This is related to the flying distance of DBD disease vectors, namely Aedes mosquitoes that have a flying distance of < 50 meters per day (Directorate General of Disease Control and Environmental Health, 2007). A report by the CDC says that the flying range of Aedes mosquitoes can reach ≤ 200 meters (CDC, 2010). If it is associated with a condition of high population density, then it can be a risk factor for the transmission of dengue fever.

Based on the results of the analysis, it obtained a value of p = 0.002 which when compared (p < 0.05) indicates that there is a meaningful relationship between dengue fever cases with population density and from r (correlation value) obtained r = 0.619, which means a moderate relationship between the two variables . The results are in line with research in Karang Malang sub-district conducted by Setyaningsih and Setyawan (2014) who explained the relationship between DBD case distribution and population density. Other similar research explains that population density has a moderate and positive pattern with dengue fever cases (Rahmi and Sari, 2017). This is in line with research outside Java Island area in Palopo City which found a link between DBD incidence and population density (Ashlihah et al., 2016). The spatial picture of dengue fever sufferers in Bitung City based on population density shows that there is a link between population density and cases of dengue fever spatially, in this case that the population density is directly proportional to the number of cases of DBD (Paruntu et al., 2018). Similarly, Masrizal and Sari's (2016) research explains the link between DBD events and population density in Tanah Datar Regency of West Sumatra Province.

Several other studies have different results related to this, namely in a study in the working area of Umbulharjo Health Center Yogyakarta, Setiawan et al. (2017) explained that there is no relationship of dengue fever incidence with population density . In A study conducted in Jakarta, it was also suggested that, spatially, the distribution of the population did not Affect the distribution of existing DHF cases (Nandini and Susilowati, 2017). Handayani et al. (2017) also explained the same in THEIR research in Padang city, that there is no link between population density and DBD event.

The condition of high population density resulting in the distance between houses of the population is increasing the risk of DBD disease spreading higher, because the flying distance of dengue fever mosquito vectors will be shorter; in addition, the risk of exposure to DBD will also increase when members of

one residence are exposed to DBD because it creates conditions that support to transmit dengue fever disease (Ratri et al., 2017). This condition is also supported by the rapid mobilization of the population to and from various regions with modern means of transportation (Chandra, 2019). High density conditions can be caused by various factors that occur in various regions. either in the city or in the suburbs (Handayani et al., 2017). This is supported by many studies that find high population density in various areas. It is undeniable that humans are carriers of dengue virus, which means that the higher the human population, the higher the risk of transmission. All of these things can occur if the prevention of the development of A. Aegypti mosquitoes is not included in the handling of the problem (Chandra, 2019).

Preventive measures in the transmission of DBD by suppressing the rate of development of Aedes Aegypti mosquitoes are absolute of course, but, in addition, building public awareness by counseling about the impact of population density becomes another important point (Handayani et al., 2017).

The advantage of this study is that the data used are over a period of five years, which is expected to present existing conditions and, based on the data, a map was created using QGIS to make more clearly visible the distribution area. However, there are some flaws in this study, namely the last year of the data used is from 2017.

CONCLUSION

Public health problems are still found in Blitar Regency today, one of which is dengue fever, which makes it one of the areas with the highest DHF incidence rated in East Java. The distribution of incidence rate of DHF disease cases in Blitar Regency in 2013-2017 mostly reached >20 per 100,000 residents, with the free larvae index having an average value of < 95% and the population density is increasing year on year. But, in the five years, the population density in Blitar Regency belongs to the moderate category with the highest average figure reaching 850.4 million inhabitants in 2017. The results of Spearman's correlation analysis found no significant link between the incident rate of DHF disease and the free larvae index, while the relationship between the incident rate of DHF disease and population density found a significant relationship with a positive pattern. Prevention measures are very important in reducing the incidence of DHF and the implementation of government programs in suppressing the spread of DHF should be done appropriately, as well as building awareness of the community in preventing the development of Aedes Aegypti mosquitoes, one of which is to do 3M. In addition, the government is considered necessary to counsel the impact of high population density and the equalization of the population so that there is no population density resulting in an increased risk of dengue fever events in the region.

REFERENCES

Anggraini, S., 2018. The Existance of Larvae and Dengue Fever Incidence in Kedurus Sub-District in Surabaya. JKL, Volme. 10, No. 3, 252-258. https://doi.org/10.20473/jkl.v10i3.2018.252-258

Ashlihah, S., Indriani, C., Lazuardi, L., 2016. Pola spasial-temporal kejadian demam berdarah dengue di kota Palopo. BKM Journal of Community Medicine and Public Health, Vol. 32, No. 2, 45-52. https://doi.org/10.22146/bkm.6861

CDC, 2010. Dengue and the Aedes albopictus mosquito. Center for Disease Control and Prevention (CDC).

Chandra, E., 2019. Pengaruh Faktor Iklim, Kepadatan Penduduk dan Angka Bebas Jentik (ABJ) Terhadap Kejadian Demam Berdarah Dengue (DBD) di Kota Jambi, Vol. 1, No.1, 1-15. https://doi.org/10.22437/jpb.v21i1.5101

Blitar District Level Health Office, 2017. Blitar District Health Profile 2016. Blitar District level Health Office.

West Java Provincial Health Office, 2018. Health Profile of East Java Province 2018. East Java Provincial Health Office.

Directorate General of Disease Control and Environmental Health, 2011. Dengue Hemorrhagic Fever Control Module. Directorate General of Disease Control and Environmental Health.

Indonesian Ministry of Health, Jakarta.

Directorate General of Disease Control and Environmental Health, 2007. Ecology and Aspects of Vector Behavior. Directorate General of Disease Control and Environmental Health. Indonesian Ministry of Health, Jakarta

Ghafarul, W., 2015. Pemodelan Kejadian Demam Berdarah Dengue (DBD) Berdasarkan Faktor Ketinggian Tempat, Iklim dan Angka Bebas Jentik (ABJ) di Kabupaten Magetan. Universitas Airlangga.

Handayani, S., Fannya, P., Roza, S.H., Angelia, I., 2017. Analisis Spasial Temporal Hubungan Kepadatan Penduduk Dan Ketinggian Tempat Dengan Kejadian DBD Kota Padang, Vol. 8, No.10, 25-34.

Haryanto, B., 2018. Indonesia Dengue Fever: Status, Vulnerability, and Challenges. Intech Open, 81–92. https://doi.org/10.5772/intechopen.82290

Hasan, S., Jamdar, S.F., Alalowi, M., 2016. Dengue virus: A global human threat: Review of literature, Vol. 6, No.1, 1-6.

Indonesian Ministry of Health , 2018. Indonesia Health Profile 2018. ppm and PLP, Jakarta.

Indonesian Ministry of Health, 2016. Infodatin: DHF situation in Indonesia. Indonesian Ministry of Health, Jakarta.

Kinansi, R.R., Widjajanti, W., Ayuningrum, F.D., 2017. Kepadatan Jentik Vektor Demam Berdarah Dengue di Daerah Endemis di Indonesia (Sumatera Selatan, Jawa Tengah, Sulawesi Tengah Dan Papua), Vol. 16, No. 1, -9.

Kurniawati, N.T., Yudhastuti, R., 2016. Hubungan Iklim dan Angka Bebas Jentik dengan Kejadian Demam Berdarah Dengue di Puskesmas Putat Jaya. Vol. 5, No. 2, 157-166.

Kurniawati, R., Wati, D.M., Ariyanto, Y., 2015. Analisis Spasial Sebaran Kasus Demam Berdarah Dengue (DBD) di Kabupaten Jember Tahun 2014, 1-7.

Masrizal, Sari, N.P., 2016. Dengue Fever Case Analysis Based on Elements of The Climate and Population Density Through Gis Approach in Tanah Datar. Jurnal Kesehatan Masyarakat Andalas, Vol.10, No. 2, 166-171.

Murdani, A., Martini, S., Purnomo, W., 2017. Pemetaan Kejadian DBD Berdasarkan Angka Bebas Jentik dan Jenis Infeksi Virus Dengue.

Nandini, D.M., Susilowati, M.H.D., 2017. Perbandingan Wilayah Penyakit Demam Berdarah Dengue (DBD) di Jakarta Tahun 2005 - 2015. IRONS, 435-443.

Nisa, H., 2015. Epidemiologi Penyakit Menular. UIN Jakarta Press, Jakarta.

Paomey, V.C., Nelwan, J.E., Kaunang, W.P.J., 2019. Sebaran Penyakit Demam Berdarah Dengue Berdasarkan Ketinggian dan Kepadatan Penduduk di Kecamatan Malalayang Kota Manado Tahun 2019, Vol. 8, No. 6, 521-527.

Paruntu, C., Ratag, B.T., Kaunang, W.P.J., 2018. Gambaran Spasial Kondisi Lingkungan Penyakit Demam Berdarah Dengue di Kota Bitung Tahun 2018, Vol.7, No. 5.

Pongsilurang, C.M., Sapulete, M.R., Kaunang, W.P.J., 2015. Pemetaan Kasus Demam Berdarah Dengue di Kota Manado. Jurnal Kedokteran Komunitas dan Tropik, Vol. 3, No. 2. 66-72.

Prasetyowati, A., Kushartanti, R., 2019. Kajian Epidemiologi Kejadian Demam Berdarah Dengue di Wilayah

Kerja Puskesmas Rowosari Kota Semarang, Vol. 2, No. 2, 23-29.

Qi, X., Wang, Y., Li, Y., Meng, Y., Chen, Q., Ma, J., Gao, G.F., 2015. The Effects of Socioeconomic and Environmental Factors on the Incidence of Dengue Fever in the Pearl River Delta, China, 2013. PLoS Negl Trop Dis. Vol. 9, No. 10, 1-13, e0004159. https://doi.org/10.1371/journal.pntd.0004159

Rahmi A.R, Sari, P., 2017. Relationship Between The Population Density and The Occurrence of Dengue Hemorrhagic Fever In Palu At 2010-2014. Medika Tadulako, Vol. 2, No. 1, 49–58.

Ratri M, A., Wahyuningsih, N.E., Murwani, R., 2017. Hubungan Kepadatan Hunian dengan Kejadian Demam Berdarah Dengue di Semarang. Jurnal Kesehatan Masyarakat, Vol. 5, No. 5, 434–440.

Ridha, M.R., Rahayu, N., Rosvita, N.A., Setyaningtyas, D.E., 2013. Hubungan Kondisi Lingkungan dan Kontainer dengan Keberadaan Jentik Nyamuk Aedes Aegypti di Daerah Endemis Demam Berdarah Dengue di Kota Banjarbaru. Jurnal Epidemiologi dan Penyakit Bersumber Binatang, Vol. 4, No. 3, 133–137.

Setiawan, B., Supardi, F., Bani, V.K.B., 2017. Analisis Spasial Kerentanan Wilayah Terhadap Kejadian Demam Berdarah Dengue di Wilayah Kerja Puskesmas Umbulharjo Kota Yogyakarta Tahun 2013. Jurnal Vektor Penyakit,Vol.11, No. 2, 77–87. https://doi.org/10.22435/vektorp.v11i2.6464.77-87

Setyaningsih, W., Setyawan, D.A., 2014. Pemodelan Sistem Informasi Geografis (Sig) pada Distribusi Penyakit Demam Berdarah Dengue (DBD) di Kecamatan Karangmalang Kabupaten Sragen. Jurnal Terpadu Ilmu Kesehatan, Vol. 3, No. 2, 106–114. http://dx.doi.org/10.30633/88122017201725-341

Suryani, E.T., 2018. Gambaran Kasus Demam Berdarah Dengue di Kota Blitar Tahun 2015-2017, Vol. 6, No. 3, 260–267. https://doi.org/10.20473/jbe.v6i3.2018.260-267

WHO, 2020. Dengue and Severe Dengue. World Health Organization. URL

THE FACTORS PERFORMANCE OF FAMILY PLANNING OFFICERS WITH ACHIEVEMENT NUMBER OF NEW FAMILY PLANNING PARTICIPANTS LONG-TERM CONTRACEPTIVE METHODS IN TUBAN REGENCY 2017

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ABSTRACT

Introduction: The target of new KB participants for the Long-Term Contraception Method (MKJP) that was not achieved and the decline in the achievement of the new KB MKJP is the responsibility of PKB. This is due to the role of PKB as the spearhead of the success of the family planning program in the field. The purpose of this study was to determine the factors of family planning counselor teamwork related to the achievements of the new MKJP family planning participants. **Methods:** This research is a descriptive quantitative study, using a cross-sectional design. **Result:** The results of this study found that 14 of the 20 PKB teams with good leadership teams experienced a low decline and the remaining six teams experienced a high decline. The category of decreasing participants is divided into two, namely the low decline is the team that has decreased from the previous year of 11.77% - 27.54%, while the high decline category is the team with a decrease from the previous year of 27.55% - 43.31%. **Conclusion:** This happens when the team implements mutual performance monitoring, backup behavior, adaptability, and loop communication properly, so the decrease in the achievement of new MKJP KB participants will be lower, and vice versa. When the workforce is able to work well together, by paying attention to the work of one team and trying to help each other in achieving the agreed goals, it will indirectly improve performance so that it will easily reach the target.

Keyword: teamwork, decrease in new KB MKJP achievements

INTRODUCTION

According to Statistics Center data, Indonesia ranks fourth after China, India and the United States with the highest population in the world. Population census data conducted in 2019 shows that the population in Indonesia continues to increase, reaching 268,074,600 people with 3.5% of the world's population. In East Java Province in 2019, the population reached 39,698,900 people, and that number continues to increase (East Java Provincial Statistics Center, 2020).

Birth and death factors are factors that affect population growth. Based on the Performance Accountability Report of Government Agencies, the National Family Planning Population Board (Lakip National Population and Family Planning Agency) 2019 shows that the Total Fertility Rate (TFR) has reached 2.4 from the determined target of 2.1 up to 2025 (National Population and Family Planning Agency, 2019). This figure has decreased from the previous year from the TFR figure of 2.6.

One of the districts in East Java that has experienced an increase in population over the last five years is Tuban Regency. The results of population registration in 2019 in Tuban district were 1,298,302 people (Tuban, 2020). Based on the results of interviews with the Head of the Family Planning Division of Tuban Regency, it was explained that Tuban Regency is one of the three districts that is used as a trial in optimizing the number of new KB MKJP participants.

Given that there is still a decline in the achievement of new KB MKJP participants in Tuban Regency from 39.01% in 2016 to 20.91% in 2019 from the set target of 40%. The target is determined based on the Strategic Plan of the Community and Village Empowerment

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Service and Family Planning in Tuban district. The decline in 2017 occurred in almost all sub-districts in Tuban district. This means that the lower the decrease in the achievement of the new KB MKJP participants, the better the achievements of the new KB MKJP participants, and vice versa, the higher the decrease in the achievements of the new KB MKJP participants, the less the achievement of the new KB MKJP participants.

Efforts should be made to reduce the birth rate in Tuban Regency, one of which is by intensifying the family planning program in the community. To succeed the family planning program in Tuban Regency, the government can collaborate across sectors as well as commitments from Family Planning Extension agent (PKB) as National Population and Family Planning Agency staff at the Regency / City level. One of the National Population and Family Planning Agency performance indicators is determined from the achievements of the new KB MKJP participants (Bekti, 2017).

Based on the time of effectiveness, the contraceptive method is divided into 2, namely the long term which is often referred to as MKJP and the short term or the short term known as Non MKJP. Contraceptives included in MKJP include implants / implants, IUD, MOW and MOP. Contraceptives that are included in Non MKJP include injections, pills, condoms, and other methods that have a short period of time (National Population and Family Planning Agency, 2017).

PKB is a Civil Servant (PNS) who meets the qualifications and competency standards and is given full duties, responsibilities, authority, and rights by the authorized official as a certain functional position to carry out extension activities, services, mobilization and development of the Population program. , Family Planning, and Family Development (KKBPK) (Ministry of Administrative Reform and Bureaucratic Reform, 2018). This definition is based on the Regulation of the Minister for Administrative Reform and Bureaucratic Reform of the Republic of Indonesia Number 21 of 2018 concerning Functional Positions of Family Planning Instructors.

Based on the results of interviews with the Head of the Family Planning Division of Tuban Regency, the number of PKB in Tuban Regency itself in 2017 reached 67 people who were divided into 20 teams and spread over 20 sub-districts in Tuban district. In one team consisting of 2-5 people who are expected to be able to help National Population and Family Planning Agency to achieve the target achievement of family planning participants, especially new KB MKJP users in a region, by conducting regional data collection, accommodating community needs, facilitating and providing guidance to the Tribina group (BKB, BKR, BKL), compile program operations that have been planned to be integrated with village development, carry out cross-sector cooperation, and carry out recording and reporting.

Based on previous research conducted who examined the performance of PKB after the transfer of status in East Java, it was explained that the PKB performance targets in Tuban had been good. Even though it is already good, the PKB performance target has not been achieved because it is not maximal to accommodate the needs and demands of the community regarding performance program innovation, especially innovation in information and education communication. Therefore, this study was conducted to find out more about the teamwork factors between PKB in Tuban, as an effort to identify gaps so that innovations in performance can be created and increase the capacity building of PKB in Tuban.

As many as six (30%) out of 20 sub-districts in Tuban experienced a high number of decreases, and the remaining 14 districts experienced a low decline in the achievement of new KB MKJP

participants. One of the sub-districts that experienced a decline in new MKJP family planning participants in 2016-2017 was Parengan sub-district, which experienced a decline in the achievement of new KB MKJP participants by 43.31% (National Population and Family Planning Agency, 2016).

Based on these data, the problem that occurs is the decline in the achievement of new MKJP family planning participants in Tuban district in 2017 by 18.10% from 2016. One of the achievements of new family planning participants is the performance factor of PKB in providing counseling and counseling to fertile aged couples (PUS) related to the spacing of pregnancy and the side effects of using contraceptives.

The failure to achieve the target of the new KB MKJP participants and the decline in the achievement of the new KB MKJP participants in 2017 are among the responsibilities of PKB who are at the forefront of increasing the use of family planning while in the field. The purpose of this study was to determine the performance factors of the family planning extension team that could affect the achievement of new MKJP family planning participants in Tuban regency.

METHODS

This research is a quantitative study with a descriptive method to see the relationship between the factors of the family planning extension team and the decline in the achievement of new MKJP family planning participants in Tuban Regency using a cross sectional design. The population in the study were all PKB teams in Tuban Regency as many as 67 people. This study used a total sampling method so that all members of the population, namely PKB members who were divided into 20 teams, had the same opportunity to be studied, because this research unit was a team. The research was conducted in Tuban district, to be precise at the Community and Village Empowerment and Family Planning Service, in May-June 2018. There are two variables studied, namely independent variables consisting of teamwork factors including team leadership, mutual performance monitoring, backup behavior, adaptability, loop communication. The decline in the achievement of the new MKJP family planning participants in Tuban Regency is the dependent variable. Researchers distributed instruments in the form of questionnaires to measure these variables. The description of the relationship between variables will be seen after the researcher performs cross-tabulation, so that the relationship between variables will be known. There are two categories of decline in the achievement of new KB MKJP participants, namely low down and high down. The low percentage of decline was 11.77% - 27.54%, and the high percentage of decline was 27.55% - 43.31%. Meanwhile, the variable category is divided into two, namely good if PKB members do it, and vice versa. (This study passed the ethical test number 265-KEPK).

RESULT

The results of this study illustrate the factors that can influence teamwork consisting of team leadership, mutual performance monito-ring, backup behavior, adaptability, and loop communication which can affect the decline in the achievement of new KB MKJP participants.

Team Leadership

The research team leadership variable measures the ability of team members in an organization to direct tasks and responsibilities to members in one team, so that there is no high decline in the achievement of new KB MKJP participants. Following are the results of the cross-tabulation between the leadership team and the achievements of the new KB MKJP participants.

Table 1. Cross-tabulation between the leadership team and the members of KB MKJP in Tuban Regency in 2018.

Team Leadership	Achievements of New KB Participants				Total	
	Height Decrease		Low Decrease			
	n	%	n	%	n	%
Not Good	4	100	0	0	4	100
Good	2	12,5	14	87,5	16	100
Total	**6**	**30**	**14**	**70**	**20**	**100**

In Table 1, it can be seen that PKB with good leadership team experienced a decrease in the achievement of new KB MKJP participants by 14 teams, and PKB with poor leadership team experienced a decrease in the achievement of new KB MKJP participants by 0 teams. It can be seen that the better the team leadership, the lower the decline in new MKJP family planning participants (0.12 <0.5 <0.87).

Mutual Performance Monitoring

Researchers measure the ability of team members to implement strategies to ensure that work continues as expected, so as to prevent stress on team members and achieve low results in decreasing the achievement of new KB MKJP. PKB extension teams with good Mutual Performance Monitoring experienced a decrease in the achievement of new KB MKJP participants by 13 teams (86.7%), while family planning extension workers with poor mutual performance monitoring experienced a decrease in the achievement of new KB MKJP participants by one team (20%). Based on this table, it can be seen that the better the Mutual Performance Monitoring from the PKB team, the lower the decline in the achievement of new KB MKJP (0.133 <0.5 <0.86).

Table 2. Cross-tabulation between Mutual Performance Monitoring and KB MKJP participants in Tuban Regency in 2018.

Mutual Performance Monitoring	Achievements of New KB Participants				Total	
	Height Decrease		Low Decrease			
	n	%	n	%	n	%
Not Good	4	80	1	20	5	100
Good	2	13,3	13	86,7	15	100
Total	**6**	**30**	**14**	**70**	**20**	**100**

Backup Behavior

The researcher's backup behavior variable measures the ability of team members to predict needs and balance the workload among co-workers in a team, so it is hoped that there will not be a high decline from new MKJP family planning participants. The following is the cross-tabulation between the backup behavior and the achievements of the new KB MKJP participants:

Table 3. Cross-tabulation between backup behavior and the achievements of new KB MKJP participants in Tuban Regency in 2018.

Backup Behavior	Achievements of New KB Participants				Total	
	Height Decrease		Low Decrease			
	n	%	n	%	n	%
Not Good	5	55.5	4	44.5	9	100
Good	1	9.09	10	90.9	11	100
Total	**6**	**30**	**14**	**70**	**20**	**100**

In Table 3, the family planning extension team with good backup behavior experienced a decrease in new KB MKJP participants by 10 teams (90.9%), while the family planning extension team with

bad backup behavior experienced a decrease in new KB MKJP participants by four teams (44, 5%). Based on this table, it can be seen that the better the backup behavior of the PKB team, the lower the decline in the achievement of new KB MKJP (0.09 <0.5 <0.9).

Adaptability

In the adaptability variable, the researcher measured the ability to adjust between members in the organization team and their work environment, so that it was hoped that the team members would work comfortably and optimally and the decrease in new KB MKJP participants was not high. The following is the cross-tabulation result between Adaptability and the achievements of the new KB MKJP participants.

Table 4. Cross-tabulation between Adaptability and the achievements of the new KB MKJP participants in Tuban Regency in 2018.

Adaptability	Achievements of New KB Participants				Total	
	Height Decrease		Low Decrease			
	n	%	n	%	n	%
Not Good	5	83,3	1	16,7	6	100
Good	1	7,1	13	92,9	14	100
Total	**6**	**30**	**14**	**70**	**20**	**100**

In Table 4 it is known that the family planning extension team with good adaptability experienced a decrease in the achievement of the new KB MKJP participants by 13 teams (92.9%), while the FP extension team with poor adaptability experienced a decrease in the new KB MKJP participants by 1 team. (16.7%). Based on the table, it can be seen that the better the adaptability of the family planning extension team, the lower the decrease in the achievement of new FP MKJP participants (0.07 <0.5 <0.92).

Mutual Trust

In the mutual trust variable, researchers measure mutual trust and belief in interpersonal behavior so that it can create cooperation and be a way to reduce the complexity of the problem, and can reduce the high decline in new MKJP family planning participants. The following is the cross-tabulation between mutual trust and the achievements of the new KB MKJP participants:

Table 5. Cross-tabulation between mutual trust and the achievements of the new KB MKJP participants in Tuban Regency in 2018.

Mutual Trust	Achievements of New KB Participants				Total	
	Height Decrease		Height Decrease			
	n	%	n	%	n	%
Not Good	3	37.5	5	62.5	8	100
Good	1	8.33	11	91.6	12	100
Total	**4**	**20**	**16**	**80**	**20**	**100**

In Table 5 it is known that family planning extension teams with good mutual trust experienced a decrease in new KB MKJP participants by 11 teams (91.6%), on the other hand, family planning extension teams with poor mutual trust experienced a decrease in new KB MKJP participants by five teams. (62.5%). Based on this table, it can be seen that the better the mutual trust of the family planning extension team, the lower the achievement of new KB MKJP participants will be (0.08 <0.5 <0.91).

Loop Communication

Loop communication is a perception between team members in an

organization to communicate effectively and efficiently in order to convey information, namely the goals of an organization. Communication in teamwork is important for maintaining team member relationships. If communication and relationships between team members run smoothly, the goals and responsibilities of each member will also run well. In addition, through communication in teamwork it can also help team members understand their respective roles and responsibilities. The following is the cross-tabulation between loop communication and the achievements of the new KB MKJP participants.

Table 6. Cross-tabulation between loop communication and the achievements of the new KB MKJP participants in Tuban Regency in 2018.

Loop Communication	**Achievements of New KB Participants**				**Total**	
	Height Decrease		**Height Decrease**			
	n	**%**	**n**	**%**	**n**	**%**
Not Good	4	80	1	20	5	100
Good	2	13,3	13	86.6	15	100
Total	**6**	**30**	**14**	**70**	**20**	**100**

Based on Table 6, it is known that family planning extension teams with good loop communication experienced a decrease in the number of new KB MKJP participants by 13 teams (86.6%), and family planning extension teams with poor loop communication experienced a decrease in the achievement of new KB MKJP participants by one team (20%). Based on this table, it can be seen that the better the loop communication of the family planning extension team, the lower the decrease in new MKJP family planning participants (0.1 <0.5 <0.86).

DISCUSSION

Teamwork is a style of working in groups with different skills and a commitment to helping each other achieve agreed goals. It must be realized that teamwork is a mixture of several individuals who become one unit to achieve common goals. A team really needs cooperation and mutual cooperation in completing a job. For example, a member is not an expert in the field so that he cannot complete his work, but thanks to the cooperation of his colleagues in one team the work can be completed. This is what is meant by teamwork, where a heavy workload will be done together to achieve a common goal and complement each other.

Success in an organization will depend on the teamwork of the organization rather than depending on several individuals who appear to be accomplished. According to (Stephen, P. and Timothy, A. J., 2008) teamwork is a group in which the efforts of individual members produce higher performance than the number of individual inputs. A team is more effective when team members work together and contribute to each other to produce more than the work of individuals.

The teamwork factor is a factor that is quite influential on the work results of the workers. Teamwork (is different from a work group. A working group is a working group that interacts to provide input, suggestions and decision-making and help each other to complete work in the team.

Teamwork or commonly referred to as teamwork or teamwork is a style of working in groups with different expertise and a commitment to helping each other in achieving previously agreed goals effectively and efficiently. Teamwork is the ability of individuals to mingle and cooperate with each other in achieving a goal and work hand in hand to complete tasks and responsibilities for a given task.

Teamwork will always be needed to achieve success in a job. Teamwork will be a driving force that has energy and synergy for individuals who are members of a teamwork. Indirectly, cooperation will be able to bring up various good ideas or innovative thoughts. Cooperation is the synergy of strengths of several people in achieving one desired goal (Bachtiar, 2004). Mutual goals and success will be easily achieved with good cooperation so that we can work together to unite and shape innovation.

An important factor in an organization is the team members of the organization because their participation will allow for the progress of the organization. Each team member has their respective roles to carry out teamwork so that goals can be achieved immediately. When you get an assignment that requires a lot of opinion, expertise, and experience, that's where the role of teamwork will really stand out when compared to the role of individuals in a team.

Low teamwork will create losses in an organization. This is because the team members will not have good communication and result in a lack of knowledge and skills because they do not trust each other and do not exchange opinions. Delay in achieving the target from a predetermined time, the number of rules that are violated, and mutual closeness are symptoms that may arise from low teamwork that can hinder the work process.

According to Salas et al. (2005), there are five core component factors that influence teamwork improvement which is called the "Big Five Of Teamwork". The five components include team leadership, mutual performance monitoring, backup behavior, adaptability, and team orientation. The five components require other supporting aspects including mutual trust, loop communication, and share mental models.

Based on the explanation above, in this study, researchers examined the effect of teamwork factors on reducing the number of new KB MKJP participant coverage. In the teamwork factor, there are team leadership factors, mutual performance monitoring, backup behavior, adaptability, and loop communication which are also studied.

Team Leadership

Leadership in an organizational team is a very influential factor in the success of an organizational team. Team leadership is related to the ability of team members in an organization to direct and assign duties and responsibilities to members of a team. The effectiveness of teamwork will be illustrated if it can combine the aspirations and actions of each team member, and can provide understanding to each team member about common goals. Not only that, the role of a leader in an organization is also expected to be able to renew team members so that they are in a conducive situation and encourage them to actively contribute to their work.

Leadership or leadership is the process of knowing yourself, communicating your vision, trying to build trust among colleagues, and taking effective actions to improve your leadership talents. Leadership is an attitude of influencing other people's actions towards achieving goals in certain situations. This process occurs where a person motivates and guides the group towards predetermined goals.

Leadership is an attitude that is carried out by a leader. A leader is someone who is able to influence the time to work so that he can achieve the agreed goals. Leadership in an organization is considered important to determine the success of an organization, both in achieving targets and developing a program.

Leadership can occur if there is a collaboration between teams. Without time, there will be no leader. As such, leadership will involve working in teams

and not relying on the efforts of one person to advance. The movement of the leadership process is not always from top to bottom, but can also be sideways, namely to build teamwork.

Team leadership is the ability between organizational members to coordinate on an activity, develop knowledge, and assign tasks between team members, so as to create a positive atmosphere in an organization.

A good leadership style is likely to lead the team to success in achieving targets and goals. This is in accordance with the results of the study that the better and more precise the leadership style of a leader in the team, the lower the level of "dropping high" in the achievements of new MKJP family planning participants, and vice versa. Therefore, the leadership in the team can spur the enthusiasm of the FP extension agents to promote family planning with long-term methods.

Mutual Performance Monitoring

Mutual Performance Monitoring is defined as the ability to keep track of fellow team members' work while carrying out their own to ensure that everything is running as expected and to ensure that they are following procedures correctly (Salas et al., 2005, p.575). Mutual performance monitoring is a part of teamwork factors. Mutual performance monitoring is concerned with the awareness of team members in an organization to understand and develop strategies for assessing the performance of teammates and ensuring that the work is carried out as a common goal.

In a team organization, team members can monitor each other to find out difficulties or mistakes so that the effectiveness of performance will be maintained. Team members must also influence each other. The ability of team members to monitor each other and influence each other must be done equally in order to continue to maintain team effectiveness at work. If it is only imposed on a few team members, chances are that it will be less effective at work and poor communication.

If a team has members who are aware of the function of the team and help each other and monitor their teammates, the team will be effective. It is hoped that the more effective a team is, it will be able to reduce and realize mistakes beforehand or as soon as possible. Mutual performance monitoring is the ability of members to increase knowledge about teamwork and implement strategies and monitor the performance of teammates to ensure that work continues as expected.

This condition will be very important in a team organization. When team members get assignments and excess workload, it puts members in a stressful state so that they have a greater chance of making mistakes and not realizing the lack of performance.

Mutual performance monitoring in an organization is concerned with developing accurate strategies for monitoring the performance of teammates and ensuring that the work is being done as expected. When mutual performance monitoring has a low score, the decrease in the achievement of new KB MKJP participants will also be high. This is in line with the results of the study that the achievement of new KB MKJP participants will experience a high decline (four groups) if the mutual performance monitoring is not good.

Backup Behavior

Backup behavior is the ability of team members to predict the needs of other teammates. This ability to balance the workload between colleagues in a team. Backup behavior is important for social performance and team duties to help other team members perform their roles. When the team workload has exceeded the limit, the team can backup behavior by helping to lighten up and share work with other team members to reduce the workload of the members.

Backup behavior is also a part of teamwork factors. backup behavior is the ability of team members in an organization to help each other complete tasks as a team. Backup behavior can also contain support between one team member so that it can raise enthusiasm so that it is easier to achieve predetermined targets. Team members can copy to help complete tasks both in helping to do and helping in providing input between team members in order to minimize errors when there are members who have difficulty.

Team effectiveness will be maintained by performing backup behaviors, because team members will monitor each other and try to work together to ease the workload which is one of the causes of work stress. The ability to share the excess workload will allow the team to adapt to every situation around it. Backup behavior is important because in addition to improving the performance of each member, it also allows the team to adapt to the surrounding situation.

If it is related to the results of research where when the backup behavior is not good, there will be a high decrease in the achievement rate of new KB MKJP participants, compared to the value of a good backup behavior. With mutual cooperation to do a job, the goals or targets that have been set will also be achieved, such as increasing the achievement of new KB MKJP participants in Tuban Regency.

Adaptability

Adaptability is generally considered the result of a team effort. Adaptability will accelerate the movement of the team to achieve team goals. Adaptability is a process of adjustment and strategy based on changes that occur both in terms of information and work environment.

Adaptability is the ability to adjust between members of the team in the organization and their work environment. Career adaptability as an individual's way of preparing predictions for assignments and participating in work roles and adapting to changes that occur in work and working conditions.

Team members are required to be able to adapt by changing task shifts and strategies, as well as changing the priority of a task. The existence of good adaptation will make it easier for team members to communicate and interact with other members so that it can increase the effectiveness of team performance.

The ability to adapt helps the team to respond to unexpected demands, for example an infection occurs in family planning participants. Therefore, this point does not only discuss the process of changing team behavior but also the ability to deal with changes in situations that have just been encountered or are unexpected. Therefore, the adaptability process must occur properly in order to provide comfort to team members so that they can easily, quickly, and precisely achieve targets and goals.

This is in line with the results of this study which illustrate that the better the adaptability of the team members, the lower the decline in the achievement rate of the new KB MKJP. Thus, team members must maintain the adaptability process so that the target achievement of new MKJP family planning participants can still be achieved.

Mutual Trust

Mutual trust is the trust that is owned by team members in the organization to respect the rights and obligations of all team members. Mutual trust is very important in order to establish a symbiotic mutualism among the perpetrators. Belief in people's behaviorcan create cooperation and be a way to reduce the complexity of the problem.

Mutual trust in the team has an important role. Trust or trust in a team is defined as the perception that each member will do the best for his team and protect each other's rights. Trust can

increase a sense of belonging, willingness to help spread information among team members. When team members feel they belong to each other and want to share information with other members, mutual trust will be well maintained. If the mutual trust is well maintained, it is hoped that it will increase understanding between members so that it will make it easier for the organization to achieve its goals.

Additionally team members may not be willing to participate in sharing information with other members if they fear they will not be considered competent. Therefore, trust is needed in a team because when team members work, they must be able to accept risks depending on other members to achieve team goals.

As in the results of the study, that good mutual trust means the decrease in the achievement of new KB MKJP participants will be even lower, namely as many as 13 groups, and vice versa if mutual trust is not properly maintained, the decrease in the number of new KB MKJP participants will be even higher.

Loop Communication

Communication between team members is needed in teamwork, especially when team members experience high complexity. Smooth communication is needed to work together; it is useful to avoid misunderstanding between members. It is hoped that Loop communication can be an effective bridge to reduce barriers when information exchanges occur and ensure that communications can be received and understood accurately.

Loop communication is a perception between team members in an organization to communicate effectively and efficiently in order to convey information, namely the goals of an organization. Communication in teamwork is important for maintaining team member relationships. If communication and relationships between team members run smoothly, the goals and responsibilities of each member will also run well. In addition, through communication in teamwork it can also help team members understand their respective roles and responsibilities.

Loop communication involves three components, namely the communicator (sender) or message sender, message content (message), and communicant (receiver) or message receiver. Evaluation of the success of a communication can be seen from the feedback given by the communicant. Through evaluation, the communicator can judge whether the contents of the message sent can be conveyed accurately or not. The existence of training on communication is expected to be able to communicate in the team better. The hope is that the team will easily reach the target set when the communication runs smoothly so that there is not miscommunication.

In this study, the results obtained are in accordance with the theory that a good loop communication value will result in a low decrease in the achievement of the new KB MKJP participants, namely 13 teams that carry out loop communication well. It is hoped that the team can maintain this situation so that the achievement of the new MKJP family planning participants will not experience a high decline.

CONCLUSION

Based on the research that has been done, it is found that there is a relationship between teamwork factors including team leadership, mutual performance monitoring, backup behavior, adaptability, loop communication on the decline in the achievement of new MKJP family planning participants. This is evidenced by the results of research which show that the better the teamwork performance, the lower the achievement of new MJKP family planning participants will be lower. When the workforce is able to work well together by paying attention to the work of

a team and trying to help each other in achieving the agreed goals, it will indirectly improve performance so that it will easily reach the target. We recommend that in teamwork, you must really pay attention to the strengths and weaknesses of the members so that they can cover each other's weaknesses, and still maintain cohesiveness when working especially working in the field.

REFERENCES

Abdullah, R. and Musa, M. (2011) 'The study of employee satisfaction and its effects towards loyalty in hotel industry in Klang Valley, Malaysia', *International Journal Of ...*, 2(3), pp. 147–155. doi: http://ijbssnet.com/journals/Vol._2_No._3_[Special_Issue_-_January_2011]/17.pdf.

Bachtiar (2004) *Manajemen Sukses : Kiat Menghadapi Enam Hal yang Mengganggu Sukses Anda*. Yogyakarta: Saujana Yogyakarta.

Bekti R, R. (2017) *Faktor Kinerja Penyuluh Keluarga Berencana (PKB) Yang Berhubungan Dengan Capaian Peserta Kb Baru Metode Kontrasepsi Jangka Panjang (MKJP) (Studi di Kabupaten Tuban Tahun 2017)*. Universitas Airlangga.

Bowers, A, C. and E, S. (2006) *Creaing High-Tech Team, Book, Edited Book; Print*. doi: 10.1037/11263-000.

Dewi, S. (2007) *Teamwork (Cara Menyenangkan Membangun Tim Impian)*. Bandung: Penerbit Progressio.

Dila, A. N. and Rochmah, T. N. (2015) 'Analysis of Effect Communication , Leadership and Team Work for Employee Discipline', *Administrasi Kesehatan Indonesia*, 3, pp. 129–138. doi: 10.20473/jaki.v3i2.2015.129-138.

East Java Provincial Statistics Center (2020) *Provinsi Jawa Timur Dalam Angka 2020, BPS Provinsi Jawa Timur*.

Hidayat, S., Lubis, A. R. and Majid, M. S. A. (2019) 'Pengaruh Gaya Kepemimpinan, Kerjasama Tim Dan Kompensasi Terhadap Kinerja Karyawan Melalui Kepuasan Kerja Pada Pt. Dunia Barusa Banda Aceh', *Pengaruh Gaya Kepemimpinan, Kerjasama Tim Dan Kompensasi Terhadap Kinerja Karyawan Melalui Kepuasan Kerja Pada Pt. Dunia Barusa Banda Aceh*, 5(1), pp. 84–98. doi: 10.24815/jped.v5i1.14088.

Ilmiah Kesehatan Sandi Husada, J. *et al.* (2019) 'Factors That Influence the Choice of Contraception in Fertile Age Women', *Jiksh*, 10(2), pp. 121–124. doi: 10.35816/jiskh.v10i2.127.

Kuntoro (2008) *Metode Sampling dan Penentuan Besar Sampel*. Surabaya: Pustaka Melati IKAPI.

Lawasi, E. S. and Triatmanto, B. (2017) 'Pengaruh Komunikasi, Motivasi, Dan Kerjasama Tim Terhadap Peningkatan Kinerja Karyawan', *Jurnal Manajemen Dan Kewirausahaan*, 5(1). doi: 10.26905/jmdk.v5i1.1313.

Lestari, R. B., Nulhaqim, S. A. and Irfan, M. (2015) 'Teamwork Pengembangan Kemitraan (Studi Kasus Kelompok Kerja Pengembangan Kemitraan dalam Penangulangan Kemiskinan di Kota Bogor)', *EMPATI: Jurnal Ilmu Kesejahteraan Sosial*, 4(1), pp. 1–21. doi: 10.15408/empati.v4i1.9763.

Manuaba (2010) *Ilmu Kebidanan Penyakit Kandungan dan KB*. Jakarta: EGC.

Mustaqimah, N. I. (2015) *Hubungan Faktor Teamwork Terhadap Kinerja Ruang Rawat Inap Berdasarkan Teori Salas, Sims, dan Burke Di Ruang Rawat Inap*

RS Islam Jemursari Surabaya. Universitas Airlangga.

Ministry of Administrative Reform and Bureaucratic Reform (2018) 'Permenpan No. 21 Tahun 2018.'

National Population and Family Planning Agency (2016) *Laporan Kinerja Instansi Pemerintah 2016*, National Population and Family Planning Agency doi: 10.1017/CBO9781107415324.004.

National Population and Family Planning Agency (2017) *Peraturan Kepala Kependudukan dan Keluarga Berencana Nasional No 24 Tahun 2017 Tentang Keluarga Berencana Pasca Persalinan dan Pasca Keguguran*.

National Population and Family Planning Agency (2019) 'Laporan Kinerja National Population and Family Planning Agency 2019.'

Prawirohardjo, S. (2009) *Buku Ilmu Kebidanan*. Jakarta: PT Bina Pustaka Sarwono Prawirohardjo.

Putri, L. D. P. and Sariyathi, N. K. (2017) 'Pengaruh Gaya Kepemimpinan Transformasional, Kerjasama Tim Dan Komunikasi Terhadap Kinerja Karyawan Warung Mina Cabang Renon', *E-Jurnal Manajemen Unud*, 6(6), pp. 3398–3430. doi: 30156-85-60211-1-10-20170608.pdf.

Reeves, S., Simon, L. and Espin, Sherry, et al (2010) *Interprofesional Teamwork for Health and Social Care*. doi: http://93.174.95.29/main/A0C496DB89E489E988119FCBFE25AFE9.

Statistics Center, B. P. S. (2015) *Profil Penduduk Indonesia Hasil Supas 2015*.

Sartono, L. N. (2008) 'Pengaruh Kerja Tim Dan Organizational Learning Terhadap Kinerja Pegawai Badan Diklat Provinsi Kalimantan Barat', *Jurnal Manajemen Pendidikan*, pp. 797–805. doi: 112190-ID-pengaruh-kerja-tim-dan-organizational-le.pdf.

Schmidtke, J. M. and Cummings, A. (2017) 'The effects of virtualness on teamwork behavioral components: The role of shared mental models', *Human Resource Management Review*. Elsevier Inc., 27(4), pp. 660–677. doi: 10.1016/j.hrmr.2016.12.011.

Soekidjo, N. (2010) *Metode Penelitian Kesehatan*. Jakarta: Rineka Cipta.

Stephen, P. and Timothy, A. J. (2008) *Perilaku Organisasi*. 12th edn. Jakarta: Salemba Empat.

Sugiarto, T. and Ciputra, U. (2017) 'Evaluasi Proses Kerjasama Tim Dalam Bisnis Timika', 2(April).

Sulistyawati, A. (2013) *Pelayanan Keluarga Berencana*. Jakarta: Salemba Medika.

Tuban, B. K. (2020) 'Kabupaten Tuban Dalam Angka 2020.'

West, M. (2002) *Kerjasama yang Efektif*. 5th edn. Edited by S. Waluyo. Yogyakarta: Kanisius.

Wong (2007) *Human Factors in Project Management: Concepts, Tools, and Techniques for Inspiring Teamwork and Motivation*. doi: http://93.174.95.29/main/6048471A43DE44F08BD10B83FF2402E8.

Yukl, G. (2008) 'Leadership in Organizations, Seventh Edition', *Pearson Prentice Hall*, pp. 1–649. doi: 10.1017/CBO9781107415324.004.

THE INFLUENCE OF EXTERNAL FACTORS ON OBEDIENCE TO COLLECT THE REPORT OF MINIMUM SERVICE STANDARD AT SURABAYA HAJJ GENERAL HOSPITAL

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ABSTRACT

Introduction: Quality is the suitability between the work carried out and the standards or requirements that have been set. As a quality guideline, hospitals in Indonesia use minimum service standards. Based on the operational report of Surabaya Hajj General Hospital in 2016, it shows that 62.09% of units are non-obedient in collecting minimum service standard reports and 23.66% of units have collected minimum service standard-reports within a time set, that means in 12 months during 2016 from 31 working units only four units are obedient in collecting minimum service standard reports. **Methods:** The research population is 31 heads of work units of minimum service standard reports in each work unit at Surabaya Hajj General Hospital. Sample calculation uses a simple random sampling technique with confidence interval 0.05 so that a large sample is obtained, 29 unit heads. **Result:** The results of the obedience influence test in collecting a minimum service standard reports use a logistical regression of five variables to indicate if, between location status (p=0.154), legitimacy of an authority figure (p=0.661), authority figure status (p=0.782), and proximity of authority figure (p=0.711) have no significant effect. Meanwhile, peer support (p=0.009) has a significant influence on officer obedience in collecting minimal service standards reports. **Conclusion**: the support of colleagues from each subunit needs to be improved and also by providing training on interpersonal communication to officers to more easily communicate with colleagues, as well as holding discussion forums between officers in work units attended by management to improve relations between employees.

Keywords: Quality, Minimum service standard, Obedience

INTRODUCTION

The effectiveness of regional autonomy is the responsibility of the district/city government and plays a role in improving the public health level of the region. Each activity that aims to nurture and improve individual health is realized in the form of health efforts with preventive, promotive, curative, and rehabilitative approaches. As one of the health care facilities, it is expected that the hospital can provide quality services. The service provided must comply with the established standards, so that the service can reach the wider community.

In the implementation process, the hospital shall provide the minimum basic services following the Minister of Health's Decree No. 129/Menkes/SK/II/2008 on the minimum hospital service standards (Ministry of Health, 2008).

In ensuring the availability of basic services for all citizens, there need to be instruments to control performance in the field of government, especially in public services, especially in the field of health, with minimum service standard (Ministry of Health, 2016). For hospitals, minimum service standard are used as quality guidelines (Wijaya, 2012).

As a government-owned hospital of East Java Province, the Regional Public Service Agency, Surabaya Hajj General Hospital must be able to manage professionally following the public's demands for the quality of service and increasingly intense competition. The

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Surabaya Hajj General Hospital provides the minimum services that must be provided, including emergency, hospitalization, outpatient, surgery, childbirth, outpatient, and intensive care. In addition, there are also supporting services both medical and non-medical, there are as many as 31 units of work, each of which has indicators and standards that must be met and become a benchmark of service quality. Each person in charge of minimum service standard in the work unit has an obligation to make a minimum service standard report, collected before the 10th of each month (RSUD Haji Surabaya, 2017).

Quality is the level of obedience carrying out the work of the requirements and criteria that have been determined. Obedience is a fundamental element of the positive and negative aspects thoroughly carried out in social psychology (Passini and Morselli, 2010). A person's actions can be linked to psychological mechanisms, where for some people obedience is a behavior that has been ingrained in a person (Milgram, 1963).

Hospital minimum service standards as a decree that has been confirmed by the minister of health for hospitals so that the quality of service becomes guaranteed (Wijaya, 2012). According to the operational report of Surabaya Hajj General Hospital in 2016 it shows results of the average obedience of all work units for the frequency of collection of service standard reports in at least 12 months during 2016 is only 62.09% and the timeliness of collection of minimum service standard reports by all work units is only 23.66%.

The problem from the data obtained is low obedience (completeness and timeliness) in the collection of service standard reports from at least 31 service units at Surabaya Hajj General Hospital in 2016. This research aims to get an overview of the external factors of obedience that affect the collection of reports of minimum service standard in Surabaya Hajj General Hospital.

METHODS

This research was conducted using analytical methods with a cross-sectional research design. The research data were collected at a certain time to obtain a description of the factors that affect obedience in the collection of reports of minimum service standard at Surabaya Hajj General Hospital.

The research site was conducted at Surabaya Hajj General Hospital in December 2017. In this study, the data used is in the form of primary data obtained from questionnaire surveys and secondary data obtained from the minimum service standard report file and minimal service standard recap data at Surabaya Hajj General Hospital obtained in the medical services section, medical support section, and program planning and evaluation section.

This study used instruments in the form of questionnaires on the perception and assessment of respondents to research variables in the experiment conducted by Milgram's factors that influence obedience such as location status, legitimacy of authority figures, the status of authority figures, support of co-workers, and proximity of authority figures (Milgram, 1963; 1974). In addition, the study also used a recap sheet of obedience data collection of minimum service standard reports.

The research population is 31 head of work unit or in charge of minimum service standard report in every working unit in Surabaya Hajj General Hospital with the number of sample calculations with simple random sampling technique with a confidence interval 0.05 so that a large sample of 29 unit heads / responsible for minimum service standard report. Respondents from the 29 units were examined based on recommendations from the head of the installation so that it could

be known the truth that the respondent was the one who created and collected the report.

The data is processed using the STATA program with descriptive analysis and influence analysis using binary logistics regression statistical tests. This test aims to analyze the factors that affect the obedience of officers in charge of minimum service standard in the collection of minimum service standard reports. Use ordinal or categorical data to represent research data. (The protocol in this study has passed through the ethics test with certificate number 647-KEPK).

RESULT

The minimum service standard of Surabaya Hajj General Hospital is one of the guidelines for each work unit to prepare a Standard Procedure Operation (SPO). SPO is based on hospital accreditation instruments, working culture groups, and minimum service standard. This minimum service standard is also used by hospitals to control the quality of hospital services. The minimum service standards are constructed based on the resources available in the hospital (i.e. human resources, advice and infrastructure, medical equipment, medicines, and medical equipment) and certain indicators that form the basis for the provision of products/services to the community. The minimum service standard has become one of the indicators of service quality and one of the foundations for the preparation of SPO.

Each unit records the data of each minimum service standard index and collects it in the fields of the "Medical Services" section to summarize them as a report. Monitoring and evaluation of the implementation of minimum service standards are carried out every month. Currently, the minimum service standard report is the responsibility of the three deputy directors and sub-coordination of each i.e. the Field of Medical Services, Medical Support Field, and Program Planning and Evaluation Section to be recapitulation and report, it is valid since semester 2 of 2017.

A person's obedience with the order following a set standard may be influenced by several factors such as the perception of location status, legitimacy of authority figures, the status of authority figures, co-worker support, and proximity of authority figures (Sarwono, 1993; Myers, 2014). Here are the external factors that affect respondents' obedience with distribution based on the respondents' assessment as follows.

Table 1. Distribution of respondents' assessments in each variable in the collection of minimum service standard reports at Surabaya Hajj General Hospital in 2017.

Variable	Percentage
Location status	
Very un- prestigious	0%
Not prestigious	0%
Prestigious	55%
Very prestigious	45%
The legitimacy of authority figures	
Very unsuitable	0%
Not suitable	0%
Suitable	41%
Very suitable	59%
Status of authority figures	
Very unsuitable	0%
Not suitable	7%
Suitable	66%
Very suitable	28%
Peer support	
Very unsupportive	7%
Does not support	10%
Support	52%
Very supportive	31%
The proximity of authority figures	
Very less close	3%
Less close	10%
Close enough	48%
Very close	38%

Location Status

Obedience in carrying out a procedure or activity may be influenced by the location or organization where it is implemented. The location or the state of the organization may affect the reputation of the organization. Prestige can be interpreted as a reputation or influence arising from success (Ulum and Wulandari, 2016).

The results of the study (Milgram, 1963) conducted by interviewing several prospective volunteers obtained the fact that prestige or the appearance of power in the eyes of others and the location of the person is a direct factor of obedience (Jeli, 2014). The conclusion that can be drawn is that the better an organization's reputation consists of achievements or successes that have been achieved, the position that the organization has achieved, or other attributes that indicate an achievement, then the obedience of its members to the rules of the organization is also better.

The research on location status in this study relates to respondents' feelings of pride in the quality of the hospital, the feeling of pride working in a regional hospital, pride in hospitals with good minimum service standard, the feeling of being comfortable doing tasks in the hospital, the feeling of wanting to do something useful for the hospital, and the feeling of working on reports outside of work time.

The Legitimacy of Authority Figures

Authority is generated by the power that is trusted, and the validity accepted by others, that is, the accepted power is valid (Andersen and Taylor, 2008).

A person will be able to obey the orders of others who already have the legal authority of the superior. This makes subordinates aware of and accepts the legal authority of their leaders so that they can comply with the orders and regulations of their decisions (Ulum and Wulandari, 2016).

In this study, the legitimacy of authority figures relates to the respondent's trust in the validity of the employer's position, trust in the duties and authority of the employer, willingness to receive orders, views, and reprimands from superiors, and willingness to accept superiors authorized by the hospital.

Status of Authority Figures

The position of authority figures is based on the position of authority figures in a specific field (Wirawan, 2007). A person's status will be able to influence obedience where the social status is the same when compared to the higher social status, then the level of obedience will be different where they will be more obedient to those with higher social status. A person who looks professional when he gives orders by using his professional status as a symbol, then someone he instructs will obey him more. Status is the use of symbols or symbols as a force that describes one's power in a society that can be realized in the form of behavior based on the level held in a group (Ulum and Wulandari, 2016).

The status of authority figures in this study relates to the respondent's belief in the suitability of the employer's education with the job, the belief that the boss has a good attitude, the belief that the boss is a professional worker, confidence in the authority of the boss in his position, confidence in the ability of the boss to carry out his duties, and confidence in the experience of the boss in his position.

Peer Support

An important factor that can affect obedience is social support in the form of emotional support from co-workers (Kammerer et al., 2007). Support can be interpersonal activities such as providing emotional attention, providing instrumental assistance, sharing information, and other help. It is believed that it can enable

individuals to obey with regulations to improve obedience (Taylor et al., 2009).

In this study, peer support relates to co-worker engagement, assessment of the suitability of colleagues to perform tasks according to standards, the willingness of coworkers to help work, cooperation with colleagues, the efficiency of work when done with colleagues, and support from colleagues.

The Proximity of Authority Figures

According to the results of the experiment (Milgram, 1963) obedience may be higher when an authority figure approaches and appears directly and gives instructions, instructions, and orders. The presence of the supervisor in overseeing the creation of a minimum service standard report can determine the obedience of the officer in making the report. The proximity of authority figures in this study relates to the presence of superiors to provide instructions, instructions from superiors to perform tasks, reprimands and input given by superiors, the role of superiors in improving duties, supervision by superiors, and the intensity of communicating between subordinates and superiors.

The Obedience of Responsible Officers in the Collection of Minimal Service Standards Reports

It can be seen from the completeness of the files and the timeliness of the collection of the minimum service standard report whether the Surabaya Hajj General Hospital complies with the minimum service standard report. The obedience collected from 29 units in the last 11 months of 2017 was classified according to the minimum service standard reporting obedience standard of Surabaya Hajj General Hospital, which was 88%. Obedience indicators in the value of the minimum number of service standard indicators per unit, frequency of completeness of files according to the minimum service standard indicator of each unit, completeness of files according to indicators, and frequency of collection of complete and timely reports. The unit obedience level in creating a minimum service standard report can be described in Table 2 as follows.

Table 2. Unit obedience level in the collection of minimum service standard report at Surabaya Hajj General Hospital in 2017

Obedience	Frequency	Percentage
Non-obedient	17	59%
Obedient	12	41%
Total	29	100%

The entire unit has fully compiled the files according to the specified time. In Table 2 showing from 29 units in making a report on minimum service standard at Surabaya Hajj General Hospital in 2017, as many as 59% of units are non-obedient and 41% of units are obedient in making minimum service standard reports. When creating the minimum service standards report, the results were analyzed using cross-tabulations and logistic regression tests between variables and obedience personnel. Here is the effect of each variable on officer obedience in the collection of the minimum service standard report outlined in Table 3.

Table 3. The influence of each variable on the obedience of officers in the collection of reports of minimum service standard at Surabaya Hajj General Hospital

Variable	Obedience				Total		P-Value	Exp-B
	Non-obedient		Obedient					
	n	%	n	%	n	%		
Location status								
Very un-prestigious	0	0%	0	0%	0	0%		
Not prestigious	0	0%	0	0%	0	0%	0.154	1.382
Prestigious	10	66.7%	5	33.3%	15	100%		
Very prestigious	7	50%	7	50%	14	100%		
The legitimacy of authority figures								
Very unsuitable	0	0%	0	0%	0	0%		
Not suitable	0	0%	0	0%	0	0%	0.661	1.138
Suitable	8	66.7%	4	33.3%	12	100%		
Very suitable	9	52.9%	8	47.1%	17	100%		
Status of authority figures								
Very unsuitable	0	0%	0	0%	0	0%		
Not suitable	0	0%	2	100%	2	100%	0.782	0.944
Suitable	12	63.2%	7	36.8%	19	100%		
Very suitable	5	62.5%	3	37.5%	8	100%		
Peer support								
Very unsupportive	5	83.3%	1	16.7%	6	100%		
Does not support	8	88.9%	1	11.1%	9	100%	0.009	1.484
Support	3	42.9%	4	57.1%	7	100%		
Very supportive	1	14.3%	6	85.7%	7	100%		
The proximity of authority figures								
Very less close	0	0%	1	100%	1	100%		
Less close	2	66.7%	1	33.33%	3	100%	0.711	0.956
Close enough	9	64.3%	5	35.7%	14	100%		
Very close	6	54.5%	5	45.5%	11	100%		

DISCUSSION

In Table 3, the results of the influence test using the logistical regression of the five variables indicate if the status of the location, the legitimacy of the authority figure, the status of the authority figure, and the proximity of the authority figure does not have a significant influence on the obedience of officers in collecting minimal service standard reports, while peer support has a significant influence on obedience with the collection of minimum service standard reports.

The Influence of Location Status on Officer Obedience in Collection of Minimal Service Standards Report

The status of location in Table 3 shows that respondents are quite proud of Surabaya Hajj General Hospital. A p-value of 0.154 (>0.05) indicates that there is no effect on officer obedience in the collection of minimum service standard reports. The increasing prestige of employees to the status of the hospital location does not necessarily affect the level of obedience. Other studies describing similar results show that officers in carrying out work according to

procedures are not affected by the prestige achieved by the organization in which he or she works. The prestige of the worker to the status of the organization's location may affect his obedience in performing the duties according to the procedure, this is due to the number of nurses who have prestige towards the hospital draw (Putri, 2018). Based on research conducted at Bridgeport with at Yale it was found that the arrangement could affect obedience, which is too high an estimate than Milgram interpretations in the past (Haslam, Loughnan and Perry, 2014).

Another supportive study is that there is no relationship between location status and obedience. This response is because the relatively homogeneous answer is quite prestigious, which is likely based on the success of the hospital so that it progresses and increases patient visits (Mahfudhoh and Rohmah, 2015).

The results in this study are different from those conducted by Sarafino and Smith that there is a positive relationship of prestige to an organization with a worker attachment in its organization. The greater the attachment between the worker and the organization, the better the performance will be. Good performance is a job performed by workers based on the standards of implementation and rules that have been determined and still apply on the instructions of the employer so that the workers become obedient (Sarafino and Smith, 2012).

If the worker believes that the organization has a valid status, and the prestige is the organization that organizes the program, then members of that organization will obey (Shaw, 1979). Milgram's experiments were conducted at Yale University's most famous and respected venue. A questionnaire was conducted after the discussion; the experiment and the interviewees indicated that if someone has a reputation for their institution or organization, obedience may increase (Myers, 2012).

In this study, most respondents were proud of the Surabaya Hajj General Hospital (55%), but the status of the site had no effect on the obedience of the person collecting the minimum service standard report. This may be because the development of Surabaya Hajj General Hospital and the trust of the community have caused officials to do more and more work. The rapid development of Surabaya Hajj General Hospital in Surabaya may not be offset by the supporting information system. The rapid development of the Surabaya Hajj General Hospital may not be offset by the supporting information system. If the information system is operating well, the minimum service standard data should be accessed in real-time through the hospital information system.

The Influence of Authority Figures on Officer Obedience in the Collection of Minimal Service Standards Reports

According to Table 3, data from legality authorities show that collecting minimum service standard reports (i.e., p-value 0.661 (> 0.05)) has no impact on officials' obedience. Subordinates will obey other people with the legal authority of the superior so that the subordinates will more obey the orders of the superior. However, if the subordinates obtain the legal authorization from the superior, the subordinates can be made to obey with the orders and the established rules. In this case, the authority figure is the management that manages the minimum service standard report.

In addition, the legitimacy of authority figures can be interpreted as how far the leadership's right to govern, make decisions, or make policies that are acceptable and recognized by the public (Wirawan, 2007).

Milgram's experiment stipulates that when an incoming phone is received by an

experimenter that requires him to leave the laboratory, at that time someone else who is given an order to become a scribe acts like someone who rules. As a result of the experiment, 80% of the participants were unwilling to obey their orders (Myers, 2012).

If members can accept it, power can be legalized (Andersen and Taylor, 2008). The idea of legitimate authority has a close relationship with the concept of power. Power is a superior power that can influence the behavior of its members. But other opposing studies suggest that if the authority is invalid then the level of obedience will be higher.

Unauthorized authorities are co-workers rather than researchers. This goes against the Milgram paradigm that states that more legitimate authority will result in greater obedience (Haslam, Loughnan and Perry, 2014). When the authority is present then the free will of the participants does not exist. They consider that obedience is not an interpretation of resignation from self-control. This may cause participants to become obedient to the authorities present (Reicher, Haslam and Miller, 2014).

Obedience with authority can also be encouraged by providing verbal advice or appreciation. Incentives can guide participants, make them feel satisfied and show full obedience. But when participants are encouraged by receiving a previous prize, it will be able to give rise to several perspectives that are receiving gratuities. So, it can strengthen or weaken adherence to authority, depending on the perspective adopted (Dolinski and Grzyb, 2019).

Other research supporting the absence of a link between the legitimacy of authority figures and officer obedience shows that the authority of hospital management increases following duties and functions (Mahfudhoh and Rohmah, 2015) and also with the recognition of the authority of the hospital director (Ernawaty et al., 2019).

In addition, research with similar results shows that authority figures are considered following the regulations set out in giving orders on the implementation of SPO does not impact subordinates to become obedient (Putri, 2018). Obedience may be beneficial, but officer resources allow for rejection. Empathy and creativity directly fulfill past expectations of authority (Bègue et al., 2017).

Other studies suggest a different relationship between the legitimacy of authority figures and the obedience of nurses in carrying out nursing care. Subordinates with a moderate perception of the legality of the head of his room as a legitimate superior can make subordinates more obedient in carrying out their duties (Ulum and Wulandari, 2016).

In addition, according to (Karakostas and Zizzo, 2016) states that obedience with the authority can occur if there is a clear boost or pressure from monetary gains. Employees will be consistent when establishing and implementing obedience regulations. That's when the authorities obeyed.

Another experiment Williams conducted showed that participants knew that the experiments were only set-ups, but when the experimenters had legitimate authority participants did not have the guts to disobey the orders of the experimenters (Russell, 2014).

In this study, most respondents rated the legitimacy of the authority figure as very appropriate at 59%, but the validity of the authority figures at Surabaya Hajj General Hospital did not affect the obedience of officers in collecting reports of minimum service standard possibly due to the status of staffing officers. This situation also occurred in research conducted in the Bridgeport industry, Connecticut was with a lower obedience

rate of 47.5%. In this context, a legitimately recognized authority that may be due to where it is exercised will behave toward the expectations of this authority. It's just that in this experiment the authority figure is physically present (Kosloff et al., 2017).

Surabaya Hajj General Hospital is one of the government-owned hospitals where the appointment and dismissal of employees cannot be carried out easily. In non-governmental institutions, the board of directors/management is in control of employee staffing status. Underperforming employees can be punished by their superiors.

The Influence of Authority Figure Status on Officer Obedience in Collection of Minimal Service Standards Report

Based on Table 3 status of authority figures with a p-value of 0.782 (>0.05) indicates if there is no influence of authority figure status on officer obedience in collecting minimum service standard reports. The results of the above statement do not correspond to experiments conducted by Milgram that a coat or laboratory suite is used by a person will make the person seen as someone who is important, professional and has the right to rule. But when someone who gives orders is a person who has no power, obedience decreases to 20% (Jeli, 2014).

The results of this study reinforce the results of previous studies if there is no significant influence between the status of authority figures and obedience. The effect of the status of authority figures on the obedience of officers in prescribing based on formulary can be caused by several things as the status of education, knowledge, and experience of the doctor. This is because most doctors do not necessarily have the same quantity and quality status (Mahfudhoh and Rohmah, 2015).

Other studies contrary to the results of this study show a significant relationship between the status of authority figures, and the obedience of officers in carrying out handwashing based on procedural measures. If nurses have the perception that the boss is a professional, knowledgeable and experienced person, then the obedience of the officer in carrying out handwashing based on procedures that conform to the standards can be affected (Putri, 2018).

A person's authority figure is not only due to having special abilities or experience, but that ability must also be recognized by his subordinates and subordinates feel that his superiors can provide direction and be able to complete his duties, and have the knowledge he or she mastered in earnest. Authority figures should be able to build strong trust and maintain a reputation for ability in their fields (Yulk and Gary, 2005).

A higher-status authority figure tends to be able to make subordinates obey his orders. Leaders with authority status have authority and involvement that greatly affects the obedience of a subordinate in doing so (Fattori et al., 2015; Ernawaty et al., 2019). Officers in charge of minimum service standard at Surabaya Hajj General Hospital mostly have the same education and longer work experience with minimum service standard management officers in the field of management. This may affect the obedience of the officer in charge of minimum service standard in the unit at Surabaya Hajj General Hospital.

The Influence of Peer Support on Officer Obedience in the Collection of Minimal Service Standards Reports

Table 3 shows peer support is a p-value of 0.009 (<0.05) which means that peer support affects obedience with

minimum service standard report collection. The value of Exp-B shows that the impact of peer support in Surabaya Hajj General Hospital is 1484 times that of the minimum service standard report collection requirement.

This is following the principle of social validation, a person who is consistent in doing a job then others will be easier to trust him and willing to follow what he commands. A person decides to behave and think the same as the person he is in to suggest that he is behaving properly. Following directions or commands from a preferred relative or person will be easier to do than fulfilling a request from someone who is not close to him or even he hates them. One will be more adaptable to his social environment (Cialdini and Martin, 2004).

Fernald states that the environment can affect a person's obedience. A person who is in an obedient social environment will also obey, and vice versa even if obedience is important (Fernald, 2007). One's obedience can be influenced by the social support of our environment, when a person is in a disobedient environment in carrying out orders it will be able to make one disobey (Natasia and Kurniawati, 2014). In addition, peer support can increase obedience when co-workers are recruited into authority roles (Haslam, Loughnan and Perry, 2014).

In addition, other research shows a low relationship between social peer group support and regulatory obedience. Colleagues who are able to install infusions in accordance with the SPO then other co-workers tend to follow it so that it gets better. Similarly, co-workers who install infusions are not in accordance with the SPO, other co-workers will also follow it even though it can result in something fatal (Kusumadewi, Hardjajani and Priyatama, 2012).

Research conducted on workers at PT. X shows similar results that there is a relationship between peer support and obedience with the use of personal protective equipment. Coworkers can also influence a person's behavior to obey. Communication between workers to remind each other also affects workers to obey with the applicable orders or rules because a coworker is a close friend in the work environment which can be an example in performing work tasks. In addition, based on the theory presented by Green if external reinforcement factors in influencing a person's behavior are peer influence received from friends in the environment in which he or she works (Puji, Kurniawan and Jayanti, 2017).

If there is a link between peer support and obedience, other studies have cited similar results. If there is support from colleagues, it indicates that the statement is highly obedient (Mahfudhoh and Rohmah, 2015).

The Influence of the Proximity of Authority Figures to Officer Obedience in the Collection of Minimal Service Standards Reports

The proximity of the authority figures in Table 3 indicates a p-value of 0.711 (>0.05) indicating if there is no influence between the proximity of authority figures to obedience with the collection of minimum service standard report at Surabaya Hajj General Hospital. A boss who comes to give briefings and feedback is part of the supervision. The good relationship between the leader and the good member will be easier to obey his orders, followed by his direction and listened to his advice by his subordinates.

Other research suggests that there is a significant relationship between the proximity of authority figures to obedience. The closer the subordinate relationship with the boss, the higher the level of obedience in carrying out procedures in accordance with the standards (Putri, 2018). In addition, research from Milgram states that subordinate obedience rates will be higher

if subordinates have a close relationship with superiors (Griggs, 2016).

Other research results that also contradict this study are research conducted (Mahfudhoh and Rohmah, 2015) stating that the proximity of authority figures has a strong relationship with the obedience of officers in writing prescriptions based on formulary categorized moderately and in the same direction. The increasing proximity of authority figures will improve officers' obedience in writing prescriptions in accordance with established standards.

Other different studies suggest that obedience can be influenced by good relationships with authority figures. The closer the relationship with authority figures, the higher the obedience (Ulum and Wulandari, 2016).

Experiments conducted by Milgram show that if direct surveillance by an authority figure will make a person obedient, but when an authority figure is not present and does not give instructions directly or simply directs over the phone, then subordinate obedience will decrease (Atkinson, 1983). A person will have higher obedience if it is close to the authority figure, but one will be easy to resist the command of the authority figure if it does not have closeness. The image of the authorities is directly presented to the supervision and direct guidance of the action procedures to be carried out can make people obey.

In this study, obedience of officers in charge of minimum service standard is likely to be influenced by supervision from direct supervisors as well as management. Before the management policy of minimum service standard tailored to the deputy director who led, all reports of service standards from at least 31 units in Surabaya Hajj General Hospital were managed by the field of medical services. Communication between management and the person in charge of reports from each unit can also be the cause.

CONCLUSIONS

Based on the results and discussion in this study can be concluded that there is no significant influence between the status of the location, the legitimacy of the authority figure, the status of the authority figure, and the proximity of the authority figure. The variable support of colleagues shows a significant influence on the obedience of officers in the collection of reports on the achievement of minimum service standard at Surabaya Hajj General Hospital. These variables are one of the hallmarks of the behavior of officers in government organizations. In addition, too few sample numbers are likely to cause the influence of some of these variables to be invisible.

Advice for Surabaya Hajj General Hospital in improving obedience with the collection of minimum service standard report is to increase the support of colleagues from each subunit to be able to collect data more time so that the person in charge can create and collect minimum service standard reports on time. In addition, it can also be by providing training on interpersonal communication to officers to more easily communicate with colleagues, as well as holding discussion forums between officers in work units attended by management to improve relations between employees.

REFERENCES

Andersen, M. L. and Taylor, H. F. (2008) *Sociology Understanding a Diverse Society*. Fourth. USA: Thomson Learning. Inc.

Atkinson (1983) *Pengantar Psikologi*. Jakarta: Erlangga.

Bègue, L. *et al.* (2017) 'Values and indirect noncompliance in a Milgram-like paradigm', *Social Influence*. Routledge, 12(1), pp. 29–40. doi: 10.1080/15534510.2017.1314980.

Cialdini, R. B. and Martin, S. J. (2004) *The*

Science of Compliance. United States of America: Arizona State University.

Dolinski, D. and Grzyb, T. (2019) 'The (doubtful) role of financial reward in obedience to authority', *The Journal of Social Psychology*. Routledge, 159(4), pp. 490–496. doi: 10.1080/00224545.2018.1505708.

Ernawaty, E. *et al.* (2019) 'The behavior of specialist towards completeness of medical records', *International Journal of Healthcare Management*. Taylor & Francis, pp. 1–6. doi: 10.1080/20479700.2019.1658163.

Fattori, F. *et al.* (2015) 'Authority relationship from a societal perspective: Social representations of obedience and disobedience in Austrian young adults', *Europe's Journal of Psychology*. PsychOpen, a publishing service by Leibniz Institute for Psychology Information (ZPID), Trier, Germany (www.zpid.de)., 11(2), pp. 197–213. doi: 10.5964/ejop.v11i2.883.

Fernald, L. D. (2007) *Psychology: Six Perspectives 1st Edition*. Los Angeles: SAGE Publications.

Griggs, R. A. (2016) 'Milgram's Obedience Study: A Contentious Classic Reinterpreted', *Teaching of Psychology*, 44(1), pp. 32–37. doi: 10.1177/0098628316677644.

Haslam, N., Loughnan, S. and Perry, G. (2014) 'Meta-Milgram: An Empirical Synthesis of the Obedience Experiments', *PLOS ONE*. Public Library of Science, 9(4), pp. 1–9. doi: 10.1371/journal.pone.0093927.

Jeli, M. . (2014) 'Kepatuhan Perawat Dalam Melaksanakan Standar Prosedur Operasional Pemasangan Infus di Rumah Sakit PKU Muhammadiyah Gombong', *Mutiara Medika*, 14, pp. 51–62.

Karakostas, A. and Zizzo, D. J. (2016) 'Compliance and the power of authority', *Journal of Economic Behavior and Organization*. Elsevier B.V., 124, pp. 67–80. doi: 10.1016/j.jebo.2015.09.016.

Kosloff, S. *et al.* (2017) 'Assessing relationships between conformity and meta-traits in an Asch-like paradigm', *Social Influence*. Routledge, 12(2–3), pp. 90–100. doi: 10.1080/15534510.2017.1371639.

Kusumadewi, S., Hardjajani, T. and Priyatama, A. N. (2012) 'Hubungan antara Dukungan Sosial Peer Group dan Kontrol Diri dengan Kepatuhan terhadap Peraturan pada Remaja Putri di Pondok Pesantren Modern Islam Assalam Sukoharjo', *Jurnal Ilmiah Psikologi Candrajiwa*, 1(2).

Mahfudhoh, S. and Rohmah, T. N. (2015) 'Faktor Yang Mempengaruhi Kepatuhan Penulisan Resep Sesuai Formularium', *Jurnal Administrasi Kesehatan Indonesia*, 3, pp. 21–30. doi: 10.20473/jaki.v3i1.2015.21-30.

Milgram, S. (1963) 'Behavioral study of obedience', *Journal of Abnormal and Social Psychology*, (67), pp. 371–378.

Milgram, S. (1974) *Obedience to Authority: An Experimental View*. New York: Harper and Row.

Ministry of Health (2008) 'Peraturan Menteri Kesehatan Republik Indonesia Nomor : 129/Menkes/SK/II/2008 Tentang Standar Pelayanan Minimal Rumah Sakit', in.

Ministry of Health (2016) 'Peraturan Menteri Kesehatan RI No.43 Tahun 2016 tentang Standar Pelayanan Minimal Bidang Kesehatan', in *31 Agustus 2016*, p. 79.Myers, D. G. (2012) *Psikologi Sosial*. Jakarta: Salemba Humanika.

Myers, D. G. (2014) *Psikologi Sosial*. Jakarta: Salemba Humanika.

Natasia, N. and Kurniawati, J. (2014) 'Faktor yang Mempengaruhi Kepatuhan Pelaksanaan SOP Asuhan Keperawatan di ICU-ICCU RSUD Gambiran Kota Kediri Factors

Affecting Compliance on Nursing Care SOP Implementation in ICU - ICCU Gambiran Hospital Kediri', *Jurnal Kedokteran Brawijaya*, 28(1), pp. 21–25.

Passini, S. and Morselli, D. (2010) 'The obedience-disobedience dynamic and the role of responsibility', *Journal of Community and Applied Social Psychology*, 20(1), pp. 1–14. doi: 10.1002/casp.1000.

Puji, A. D., Kurniawan, B. and Jayanti, S. (2017) 'Faktor Faktor Yang Berhubungan Dengan Kepatuhan Penggunaan Alat Pelindung Diri Pada Pekerja Rekanan (PT. X) Di Pt Indonesia Power Up Semarang', *Jurnal Kesehatan Masyarakat (e-Journal)*, 5(5), pp. 20–31.

Putri, A. M. (2018) 'Gambaran Figur Otoritas Terhadap Kepatuhan Perawat Dalam Implementasi Standar Prosedur Operasional Kebersihan Tangan', *Jurnal Administrasi Kesehatan Indonesia*, 6(2), p. 164. doi: 10.20473/jaki.v6i2.2018.164-172.

Reicher, S. D., Haslam, S. A. and Miller, A. G. (2014) 'What makes a person a perpetrator? The intellectual, moral, and methodological arguments for revisiting Milgram's research on the influence of authority', *Journal of Social Issues*, 70(3), pp. 393–408. doi: 10.1111/josi.12067.

RSUD Haji Surabaya (2017) *Laporan Kinerja BLUD Rumah Sakit Umum Haji Surabaya Tahun 2017*, *RSUD Haji Surabaya*.

Russell, N. (2014) 'Stanley Milgram's obedience to authority "relationship" condition: Some methodological and theoretical implications', *Social Sciences*, 3(2), pp. 194–214. doi: 10.3390/socsci3020194.

Sarafino, E. P. and Smith, T. W. (2012) *Health Psychology: Biopsychosocial Interactions*. 7th edn. New York: John Wiley & Sons, Inc.

Sarwono (1993) *Psikologi Sosial Suatu Pengantar*. Yogyakarta: Fakultas Psikologi UGM.

Shaw, M. E. (1979) *The Psychology of Small Group Behaviour*. New Delhi: The McGraw-Hill Publising Company Ltd.

Ulum, M. M. and Wulandari, R. D. (2016) 'Faktor Yang Mempengaruhi Kepatuhan Pendokumentasian Asuhan Keperawatan Berdasarkan', *Dolor*, 31(2), pp. 70–76. doi: 10.1017/CBO9781107415324.004.

Wijaya, H. (2012) *Analisis Pelaksanaan Standar Pelayanan Minimal Rumah Sakit Bidang Farmasi Di Instalasi Farmasi Rumah Sakit Tugu Ibu Tahun 2012*. Universitas Indonesia.

Wirawan (2007) *Evaluasi Kinerja Sumber Daya Manusia*. Jakarta: Salemba Empat.

Yulk and Gary (2005) *Kepemimpinan dalam Organisasi*. Jakarta: PT. Indeks.

HUSBAND INVOLVEMENT IN DISCONTINUING IMPLANT CONTRACEPTIVE USE AMONG MARRIED WOMEN IN INDONESIA

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ABSTRACT

Introduction: Efforts to control population growth in Indonesia by increasing the use of contraceptives continue to be improved so that the TFR of 2.1 in 2024 can be achieved. However, in practice, there is still discontinuation of the use of contraceptive methods. One of them is the implant method. This research aims to analyze husband involvement of implant discontinuation in Indonesia. **Method**: This study used a cross-sectional study design. Data of this study were based on the results of IDHS 2017, with 1153 samples. This research was analyzed using Chi-square test Logistic Regression test with significance level α=0.05. **Result:** Characteristics of respondents, husband's employment, decision to use, consent to use, preferences of husbands for the number of children, determination of income for FP device and categories of husband involvement are not related significantly while the husband's education level and discussions about FP were significant with implant discontinuation. Variables that become risk factors for implant discontinuation are respondents who do not work, wealth index (very poor, poor, middle and rich), education level of respondents who do not attend school and academy level; husband not involved in the decision to use the FP device, does not give consent to the use the FP device; preference of husbands for the number of children is the same/more than the respondent; and husband not involved in determining the income for the FP device. **Conclusion**: To reduce the drop-out rate for implants, it is necessary to increase the husband's education and involvement in discussing family planning

Keywords: Husband's involvement, discontinuation, implant contraception

INTRODUCTION

Population growth in balance is one of the prerequisites for improving the quality of human life which can be realized by controlling the population, improving the quality of the population and directing population mobility. A balanced population growth will have an impact on the carrying capacity and environmental support that is maintained through the achievement of the national average total fertility rate (TFR) up to a replacement rate of 2.1 (Indonesian Ministry of National Development Planning, 2019). The Indonesian Demographic Health Survey (IDHS) in 2017 reported that Indonesia's TFR is still quite high at 2.4 children per woman, which means that a woman in Indonesia gives birth to an average of 2.4 children during her lifetime (Indonesian Ministry of Health, 2017). This makes the target to reduce TFR still not achieved (Indonesian Ministry of National Development Planning, 2019).

One of the efforts to control the rate of population growth is to increase the use of contraception. In 2020, Indonesia launched the Bangga Kencana program (Development of Family Population and Family Planning) as an effort to brand its previous programs, namely the population, family planning and family development programs. This branding effort aims to bring the program closer to millennials. This program focuses on controlling population growth in order to achieve a TFR of 2.1 in 2024 (The Indonesian National Population and Family Planning Board, 2020). One method of contraception that can be used to achieve this target is the long-term contraceptive method (LTCM). LTCM includes IUD (Intra Uterine Device), implants, tubectomy (Female Operation Method) and vasectomy (Male Operation Method). Contraceptive implants are hormonal contraceptives that are inserted just under the skin on the inside of the upper arm through a single incision in the form of a fan (Setiyaningrum, 2016).

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According to the Indonesian Demographic and Health Survey (IDHS) in 2017, the trend in the use of contraceptives methods is dominated by injections (32%), pills (14%), IUDs (4%), and implants (3%). Meanwhile, the number of unmet needs or couples of childbearing age who should have contraceptives but have not been served or have not participated in family planning for various reasons is quite high, namely 10.6% of the total couples of childbearing age. In practice, the use of contraceptive methods cannot always be ensured for their continued use. According to the 2017 IDHS data, there were 22,305 (34%) women who stopped using contraceptive methods/methods in Indonesia, who started using family planning methods/methods in the five years prior to the survey and then stopped using the devices/methods within 12 months after starting to use them. (Indonesian Ministry of Health, 2017). Among the discontinuation of the use of family planning tools/methods in the 2017 IDHS report, there was 8.24% discontinuation of the use of LTCM, namely implants at 4.88% and IUDs at 3.36% from 22,305 discontinuation of use. Discontinuation of the use of the implant contraceptive method by 1,090 users was with the reasons for stopping side effects/health problems (40.1%), wanting to get pregnant (21.3%), wanting a more effective way (8.1%) and several other reasons including: depth related to husband's disapproval (0.6%) and rarely meeting with husband/distant husband (2.2%) (Indonesian Ministry of Healt, 2017). In Indonesia, patriarchal culture and ideology are still very thick in coloring all aspects of social, cultural and economic life, such as in the aspect of decision-making related to family planning (Prasetyo, 2015).

Azuike et al. (2017:175) stated that the predictors of discontinuation of contraception were women's age, women's place of residence (urban/rural), education, number of children <5 years old, length of marriage, women's occupation, men's occupation and wealth index. One of the main reasons associated with discontinuing the use of contraceptive methods is the partner's decision to use and the wife's perception that their partner supports the use of the contraceptive method she has chosen (Alem Gebremariam, 2015). Gicheru (2016) stated that the husband's involvement in the form of husband and wife discussions regarding family planning had a significant effect on implant termination. Nageso and Gebretsadik (2018) also showed that women who did not choose their own method were 1.83 times more likely to have their implants discontinued compared to those who chose their own method, it is possible that those who chose the method themselves had sufficient information about the method and the side effects that it caused and had considered it by themselves. alone. Zerihun et al. (2015) revealed various other reasons that led to discontinuation of implant use namely concerns about side effects, health problems and pressure from partners and peers. Spouse disapproval can also be an indication of discontinuing implant use (Mutihir and Nyango, 2010). The purpose of this study was to analyze the relationship between husband's involvement and discontinuation of the use of family planning implants/implants in Indonesia based on the respondent's characteristics, husband's characteristics, husband's involvement factor and husband's involvement category.

METHOD

This research is an observational study with a cross-sectional design. We used secondary data from the IDHS 2017. Further analysis by the researcher was conducted from March 2020 to October 2020. The survey interviewed 49,627 respondents. This figure was selected from 1,970 census blocks, where, for each province, the selection of census blocks in urban and rural areas was carried out using multistage stratified sampling.

The data selection process was carried out in three stages, first selecting female respondents aged 15-49 years who were married, amounting to 34,086 respondents.

Second, selecting women who have used/currently use contraception by 23,222 respondents. Finally, selecting women who have used/currently use implant contraception by excluding women who have never used implant contraception were 21,637 respondents, resulting in a research sample of 1585 respondents. As many as 432 of 1585 women are incomplete data (missing) and there are answers that do not know, so that the final number analyzed is 1153 respondents.

The dependent variable of this research was discontinuation of the use of contraceptive implants. The independent variables were the characteristics of the respondents (age, place of residence, employment status, education, index wealth and number of children), husband's characteristics (husband's education and occupation) and husband's involvement factors (decision on the use of family planning devices, approval of the use of family planning devices, discussions with husbands regarding family planning devices, husband's preference for number of children and determination of income for using family planning devices) and category of husband's involvement.

The data were analyzed using Chi-square test, and Logistics Regression test with significance level of =0.05. This study uses secondary data and has obtained permission to access data from The Demographic and Health Surveys (DHS) Program dated October 15, 2019 with the letter name AuthLetter_134378 sent to the author's email address.

RESULT

Socio-demographic characteristics

Most of the respondents were <35 years old (51.6%), working status (55.2%) and the number of children they had was 2 (59.4%). The education level of most respondents was primary school (34.9%), with very poor economic status (27.8%). Most of the respondents live in rural areas (66%). Less than half of them stopped using implant contraceptives, namely 515 respondents (44.7%). The characteristics of the husbands of respondents are the majority work (99.3%) and the highest education level of husbands is high school (54.6%), in fact there are still 1.4% of respondents' husbands who have never attended school.

Table 1. Socio-demographic characteristics

Socio-demographic characteristics	n	%
Age		
< 35	595	51,6
≥ 35	558	48,4
Total	1153	100
Parity		
≤ 2	685	59,4
>2	468	40,6
Total	1153	100
Education		
No Education	13	1,1
Primary School	402	34,9
Junior High School	398	25,8
Senior High School	313	27,1
Academy	38	3,3
University	89	7,7
Total	1153	100
Occupation		
No	517	44,8
Yes	636	55,2
Total	1153	100
Wealth Index		
Lowest	320	27,8
Low	267	23,2
Middle	254	22,0
High	199	17,3
Highest	113	9,8
Total	1153	100
Residence		
Urban	392	34,0
Rural	761	66,0
Total	1153	100

Source: IDHS 2017

Husband involvement in family planning

The description of the husband's involvement in the use of contraception is that most husbands (65.3%), in making decisions on the use of family planning

devices, give approval for the use of family planning devices (98.6%), most (60.4%) wives have/often discuss with their husbands regarding family planning, the husband's preference for the number of children is 70.8% the same as his wife's and 56.8% of husbands are involved in determining income for family planning devices. In detail, the results are presented in Table 1.

Table 1. Husband involvement in discontinuing implant contraceptive use

Husband involvement	n	%
Involvement in the decision to use contraception		
No	400	34.7
Yes	753	65.3
Consent in contraceptive use		
No	16	1.4
Yes	1.137	98.6
Discussion with husband regarding family planning		
Never	457	39.6
Ever/Often	696	60.4
Husband's preference on number of children		
Same	816	70.8
More	268	23.2
Fewer	69	6,0
Involvement in the determination of income for family planning services		
No	498	43.2
Yes	655	56.8
N	1.153	100.0

Source: IDHS 2017

Relationship of Respondents' Characteristics with Discontinuation of Implant Contraceptives

The following is the result of the analysis of the relationship between the characteristics of the respondents consisting of age, number of children, education level, employment status, wealth index and place of residence with discontinuation of implant contraceptive use in Indonesia. The results of the bivariate analysis showed that the respondents' characteristics consisting of age, number of children, education level, employment status, wealth index and place of residence were not significantly related to discontinuation of implant contraceptive use because they had a p-value > 0.05. The results are presented in Table 2.

Table 2. Relationship of Respondents' Characteristics with Discontinuation of Implant Contraceptives

Socio-demographic characteristics	Discontinuing Implant Contraceptive Use				*p-value*	OR (95% CI)
	Continue		Discontinue			
	n	%	n	%		
Age						
< 35	329	55.3	266	44.7	0.978	1.0 (0.79-1.26)
≥ 35	309	55.4	249	44.6		1
Parity						
≤ 2	382	55.8	303	44.2	0.721	1.0 (0.82-1.32)

Socio-demographic characteristics	Discontinuing Implant Contraceptive Use				*p-value*	OR (95% CI)
	Continue		Discontinue			
	n	%	n	%		
>2	256	54.7	212	45.3		1
Education						
No Education	4	30.8	9	69.2	0.057	2.1 (0.60-7.33)
Primary School	233	58.0	169	42.0		0.7 (0.43-1.08)
Junior High School	161	54.0	137	46.0		0.8 (0.50-1.28)
Senior High School	182	58.1	131	41.9		0.7 (0.42-1.08)
Academy	15	39.5	23	60.5		1.4 (0.88-3.10)
University	43	48.3	46	51.7		1
Occupation						
No	287	55.5	230	44.5	0.912	1.0 (0.80-1.28)
Yes	351	55.2	285	44.8		1
Wealth Index						
Lowest	180	56.3	140	43.7	0.919	1.1 (0.69-1.63)
Low	146	54.7	121	45.3		1.1 (0.72-1.75)
Middle	135	53.1	119	46.9		1.2 (0.76-1.87)
High	112	56.3	87	43.7		1.2 (0.66-1.68)
Highest	65	5.6	48	4.2		1
Residence						
Urban	222	56.6	170	43.6	0.524	1.0 (0.85-1.10)
Rural	416	54.7	345	45.3		1

Source: IDHS 2017

Relationship of Husband's Characteristics with Discontinuation of Implant Contraceptive Use

Table 3 provides information the results of the bivariate analysis showed that the husband's characteristics on employment status were not significantly related to discontinuation of implant contraceptive use because it had a p-value > 0.05 while education level was significantly associated with discontinuation of implant contraceptive use. In detail, the results are presented in Table 3.

Table 3. Relationship of Husband's Characteristics with Discontinuation of Implant Contraceptive Use

Husband Characteristics	Discontinuing Implant Contraceptive Use				*p-value*	OR (95% CI)
	Continue		Discontinue			
	n	%	n	%		
Education						
No Education	10	62.5	6	37.5	0.038*	0.5 (0.15-1.36)
Primary School	243	59.1	168	41.1		0.5 (0.34-0.83)
Middle School	343	56.1	286	43.9		0.6 (0.41-0.98)
High School	42	43.3	55	56.7		1
Occupation						
No	4	50.0	4	50.0	0.761	0.8 (0.20-3.24)

Husband Characteristics	Discontinuing Implant Contraceptive Use				*p-value*	OR (95% CI)
	Continue		Discontinue			
	n	%	n	%		
Yes	634	55.4	511	44.6		1

Note: *Significant at p-value ≤ α (0.05)
Source: IDHS 2017

Relationship of Husband's Involvement with Discontinuation of Implant Contraceptive Method

The following are the results of the analysis of the relationship between husband's involvement which consists of decisions to use family planning devices, approval of the use of family planning devices, discussions with husbands regarding family planning, husband's preference for the number of children and determination of income for family planning devices with cessation of use of contraceptive implants in Indonesia as well as analysis of categories of husband involvement who consists of low, moderate and high husband involvement with discontinuation of implant contraceptive use in Indonesia. The results of the bivariate analysis showed that only the discussion factor with the husband regarding family planning was significantly associated with discontinuing the use of implant contraceptives because it had a p-value <0.05. This means that respondents who have never had discussions with their husbands regarding family planning are 1.3 times more likely to stop using implant contraceptives than respondents who have/often discussed with their husbands regarding family planning. The results are presented in Table 4.

DISCUSSION

The Relationship between Socio-demographic Characteristics and Discontinuation of Implant Contraceptive se

In this study, socio-demographic characteristics were not associated with discontinuation of implant contraceptive use among married women in Indonesia. In contrast to previous studies which stated that age was significantly associated with discontinuation of implant contraceptive use ; it tends to occur in women with the age category <20 years compared to those in the age category >35 years (Permatasari et al., 2013; Indrawati, 2014; Tadesse et al., 2017; Samosir et al, 2019). Young women have a high desire to have children so they stop using implanted contraception. The rate of discontinuation of contraceptive methods generally decreases with increasing age (Rajaram et al., 2017).

Various previous studies have stated that parity contributes to discontinuation of the use of implant contraceptive methods. Implant discontinuation was twice as high in women who had <4 living children as compared to women who had >4 children, all of whom had surviving children. (Rizvi and Irfan, 2012 ;Tadesse et al., 2017).

Women's education has been shown to be a determinant of discontinuation of implant contraceptive use in several previous studies. The higher the level of education of the acceptors, the less likely they are to stop using the method (Permatasari et al., 2013). The rate of discontinuation of contraceptive methods among acceptors is lower in women with 12 years of education or more (Rajaram et al., 2017). In this study, education level was not associated with discontinuation of implant contraceptive use because discontinuation of contraceptive methods could be influenced by other factors such as rumors, culture, environment and also the support of health workers. The level of education alone is considered insufficient to move people's mindsets to continue to participate in the use of contraceptive methods.

Statistically, the respondent's employment status was not related to the

discontinuation of implant contraceptive use. This is different from the research results of Nwe Tin et al. (2019) which shows that respondents who work are more likely to discontinue the use of implant contraceptives than respondents who are not working. Meanwhile, women who do not work are women who are financially powerless to access other methods so that they survive with implant contraceptives.

The results of this study indicate that the poorer the economic status of the respondents, the more they discontinue the use of implant contraceptives. However, statistically, economic status was not associated with discontinuation of implant contraceptive use. Discontinuation of the use of contraceptive implants is more influenced by factors other than the wealth index, namely health problems, uncomfortable use, husbands disagree, problems related to access, husbands who are far away so they rarely have sex and want to get pregnant.

Table 4. Relationship of Husband's Involvement with Discontinuation of Implant Contraceptive Method

Husband Involvement	Discontinuing Implant Contraceptive Use				*p-value*	OR (95% CI)
	Continue		Discontinue			
	n	%	n	%		
Involvement in the decision to use contraception						
No	217	54.2	183	45.8	0.589	0.9 (0.73-1.20)
Yes	421	55.9	332	44.1		1
Consent in contraceptive use						
No	7	43.8	9	56.2	0.348	0.6 (0.23-1.67)
Yes	631	55.5	506	44.5		1
Discussion with husband regarding family planning						
Never	270	59.0	187	41.0	0.038*	1.3 (1.01-1.63)
Ever/Often	368	52.9	328	47.1		1
Husband's preference on number of children						
Same	445	54.5	371	45.5		1.1 (0.66-1.80)
More	154	57.5	114	42.5	0.690	1.0 (0.56-1.64)
Fewer	39	56.5	30	43.5		1
Involvement in the determination of income for family planning services						
No	268	53.8	230	46.2	0.366	0.9 (0.71-1.14)
Yes	370	48.6	285	51.4		1

Note: *Significant at p-value ≤ α (0.05)
Source: IDHS 2017

Most of the respondents live in rural areas (66%). Utilization of health services is often related to geographic access. Geographic access connects the area that is the location of supply and the location of the client who will use health services and can usually be measured by distance, travel time and travel costs. This has an impact on the use and utilization of family planning services. Family planning acceptors who live in urban areas tend to continue their contraceptive use more than family planning acceptors who live in rural areas (Permatasari et al., 2013).

The results of this study indicate that the distribution of respondents who discontinued the use of implant contraceptives on the characteristics of their residence is dominated by respondents who live in rural areas, which is 29.9%, so it is

possible that they lack access to utilize health services. However, statistically, the characteristics of the respondent's residence were not significantly related to the discontinuation of implant contraceptive use. The family planning program in Indonesia has spread to all areas, both in urban and rural areas so that every family can have good access to family planning services, especially family planning counseling services to support and maintain the use of their contraceptive method. Research that supports the results of this study is by Nwe Tin (2019) Melkamu Asaye, Syoum Nigussie and Mequannt Ambaw (2018) showing that the respondent's place of residence is not related to the cessation of contraceptive use. Research by Permatasari, Wati and Ramani (2013) also showed no significant relationship between residence and cessation of contraceptive use.

Relationship of Husband's Characteristics with Discontinuation of Implant Contraceptive Use

Husband's education was significantly related to discontinuation of implant contraceptive use. However, uneducated husbands were not significantly associated with discontinuing the use of implant contraceptives in their wives. Education level is related to the level of knowledge. In general, someone who has low education tends to have less knowledge. Someone who has an upper secondary education level will have better knowledge and awareness of the use of contraceptive methods. The results of this study are in line with research from Indrawati (2014) that the factors for stopping the contraceptive method were the wife's age and ownership of the number of children by the fertile age couple after controlling for the husband and wife's education, area of residence, household expenditure per capita, wife's menstrual history and knowledge of husband and wife's health.

Based on the results of the 2017 IDHS, almost all currently married men (99%) worked in the last 12 months prior to the survey and 92% of men worked for money (Indonesian Ministry of Health, 2017). Discontinuation of implant contraceptive use based on employment status was dominated by respondents with the characteristics of a working husband (44.3%). Statistically, the results of this study indicate that the husband's employment status is not associated with discontinuation of implant contraceptive use. This is because the discontinuation of contraceptive methods is more strongly influenced by other factors such as rumors, culture, environment and also includes the support of health workers.

Relationship of Husband's Involvement with Discontinuation of Implant Contraceptive Use

Husband's involvement in the use of family planning according to Chekole et al. (2019) are discussions about family planning with partners, discussions about setting birth spacing, discussions about limiting births, accompanying family planning services, participating in making choices of types of family planning, allowing the use of family planning methods/tools, reminding family planning schedules and providing financial support. Adelekan, Omoregie and Edoni (2014) added that the form of involvement of men in the household in the aspect of decision-making related to family planning is by providing money to get family planning services, accompanying the wife to the family planning clinic and discussing with the wife about family planning. The involvement of men in providing information about various contraceptive methods is an important element in forming an environment that supports wives/partners in making decisions to use contraception and continuing their use (Indonesian Ministry of Health, 2017).

The results showed that 65.3% of husbands were involved in the decision to use family planning devices. Respondents discontinuing the use of contraceptive implants are dominated by respondents with

husbands who are involved in the decision to use family planning devices (28.8%). In Indonesia, the husband's decision to allow his wife in all aspects of life is an important guideline for the wife, including the use of contraception. If the husband does not give permission or does not support it, only a few wives have the courage to continue to install the contraceptive device in carrying out family planning (Hidayah and Lubis ,2019).

Husband's involvement in the decision to use family planning was not significantly related to discontinuation of implant contraceptive use. This is because of health problems or feeling uncomfortable when using implant contraception so that the husband feels responsible for his wife's health and then the husband decides to support his wife to stop family planning / drop out of family plannin. Gicheru (2016) states that husband/spouse has decision-making power and plays an important role in the making and continuation of family planning

In the aspect of approval for the use of family planning, the majority of husbands gave their approval, which was 98.6%. Consent to the use of family planning is the respondent's perception of whether the respondent's husband/partner agrees or disagrees if he uses family planning tools/methods to prevent pregnancy. Globally, some women stop certain birth control methods because they are difficult to use or because their use is not acceptable to their partners and then switch to other, more suitable methods (New Tin, 2019).

Forty-four percent of respondents who stopped using implants stated that their husbands gave their consent for family planning. Statistically, husband's involvement in consenting to use of family planning was not associated with discontinuation of implant contraceptive use. Discontinuation of contraceptive use more often due to complaints / side effects felt by the wife later in life so that she decided not to continue using implanted contraceptives. The 2017 IDHS noted that the reasons for discontinuing the use of the implant contraceptive method were health problems, uncomfortable use, husbands disagreed, problems related to access, husbands who were far away so they rarely had sex and wanted to get pregnant

Discussion with husbands regarding family planning is the intensity of communication between husband and wife in discussing family planning or contraceptive methods. Most of the respondents (60.4%) stated that they had or often had discussions with their husbands regarding family planning. The influence of husband and wife discussions on discontinuing contraceptive use can occur because husbands tend to play a vital role in making decisions to add children or not (Oktabriani and Riono, 2012). Men also need to have enough material on family planning to increase their involvement in making decisions for their wives regarding contraceptive use when discussing with their husbands (The Indonesian National Population and Family Planning Board, 2013).

Twenty-eight percent of respondents who stopped using implant contraceptives stated that they had/often had discussions with their husbands regarding family planning. Statistically it showed that husband's involvement in family planning-related discussions was significantly associated with discontinuation of implant contraceptive use. This is supported by the results of previous studies that the involvement of men in family planning can be in the form of communication between husband and wife, including interpersonal communication as a form of communication that builds, maintains and sometimes can destroy a relationship. This communication can be in the form of communication in terms of planning the number of children desired by couples of childbearing age (Muniroh, Luthviatin and Istiaji, 2014). Penelitian et al. (2013) The results showed that the discussion about family planning between husband and wife was related to the discontinuation of the long-term IUD contraceptive use. The influence of husband

and wife discussions on the use or discontinuation of contraceptive use can occur in society because husbands tend to play a vital role in decision-making regarding the attitude of wanting to add children or not and to use or not use one method of contraception as well as the decision to stop using the method. contraceptives that have been used (Oktabriani and Riono, 2012).

Most respondents (70.8%) have a preference for the same number of children as their husbands, 23.2% have a preference for more children than their wives and the other (6.0%) husbands have a preference for fewer children. compared to the wife. Based on the results of the 2017 IDHS, the average ideal number of children for women is 2.6 and the average ideal number of children for married men is 2.9 children. Among women and men with the same number of children, men consistently mention a slightly higher ideal number of children than women (Kemenkes RI, 2017).

The husband's involvement in discontinuing the use of implant contraceptives is dominated by respondents with husbands who have the same preference for the number of children as respondents (32.2%) followed by husbands who have a preference for more children than respondents (9.9%) and husbands who have preference for fewer children than respondents (2.6%). Statistically, husband's involvement in preference for number of children was not significantly related to discontinuation of implant contraceptive use. In this study, 32.2% of husbands had the same preference for the number of children as their wives, but it was possible that, over time, they wanted to have children again, thus encouraging their wives to give up contraceptive use

In terms of determining income for family planning, husband's involvement was statistically not significantly associated with discontinuation of implant contraceptive use. The reason for stopping contraceptive implants is more dominant because of health problems or feeling uncomfortable when using implant contraceptives so that the husband feels responsible for his wife's health and then the husband decides to support his wife to stop family planning / drop out of family planning.

CONCLUSION

Discontinuation of the use of contraceptive implants has nothing to do with the respondent's characteristics, namely age, number of children owned, education, employment status, wealth index and area of residence. Meanwhile, husband's education is significantly related to discontinuing the use of implants by his wife.

Of the various kinds of involvement of husbands in the use of contraception, only discussions between husbands and wives about family planning were significantly related to discontinuing the use of implant contraceptives. To reduce the drop-out rate of implants, it is necessary to strengthen the implementation of programs to increase male participation in family planning.

REFERENCE

Adelekan, A., Omoregie, P. and Edoni, E. (2014) 'Male Involvement in Family Planning: Challenges and Way Forward', *International Journal of Population Research*, 2014, pp. 1–9. doi: 10.1155/2014/416457.

Alem Gebremariam, T. B. (2015) 'Factors Associated with Contraceptive Discontinuation in Agarfa District, Bale Zone, South East Ethiopia', *Epidemiology: Open Access*, 05(01), pp. 1–9. doi: 10.4172/2161-1165.1000179.

Azuike E, Ikeako L, Ezebialu, Umeobika J, Obi K *et al.* (2017) 'Predictors of discontinuation of contraceptive use among Nigerian women: Results of 2013 Nigeria Demographic and Health Surveys', *Journal of Scientific Research and Studies*, 4(7), pp. 171–176.

Azwar, S. (2012) *Penyusunan Skala Psikologi Edisi 2*. Yogyakarta: Pustaka Pelajar.

Chekole, M. K. *et al.* (2019) 'Husbands' involvement in family planning use and its associated factors in pastoralist communities of Afar, Ethiopia', *Reproductive Health*. Reproductive Health, 16(1), pp. 1–7. doi: 10.1186/s12978-019-0697-6.

Community and village empowerment office Kulon Progo District (2020) *Memahami Arah Kebijakan Strategi Bangga Kencana 2020 - 2024*.

Gicheru, F. N. 2016. Discontinuation Of The Five-Year Implant Amongst Women Of Reproductive Age In Selected Health Facilities Of Nairobi County, Kenya. *Thesis*. Kenya: Faculty Of Public Health Kenyatta University.

Hidayah, N. and Lubis, N. (2019) 'Hubungan Pengetahuan dan Dukungan Suami Terhadap Pemilihan Kontrasepsi Tubektomi', *Jurnal Endurance*, 4(2), p. 421. doi: 10.22216/jen.v4i2.2989.

Indonesian Ministry of National Development Planning (2019) 'Rancangan Teknokratik Rencana Pembangunan Jangka Menengah Nasional 2020 - 2024 : Indonesia Berpenghasilan Menengah - Tinggi Yang Sejahtera, Adil, dan Berkesinambungan', *Kementerian PPN/ Bappenas*, p. 313. doi: 10.1017/CBO9781107415324.004

Indonesian Ministry of Health (2017) *Survey Demografi dan Kesehatan Indonesia, Survei Demografi dan Kesehatan Indonesia 2017*.

Indrawati, L. (2015) 'Determinan Kejadian Berhenti Pakai (drop out) Kontrasepsi di Indonesia (analisa sekunder data RISKESDAS 2010)', *Buletin Penelitian Sistem Kesehatan*, 17(1), pp. 55–62.

Melkamu Asaye, M., Syoum Nigussie, T. and Mequannt Ambaw, W. (2018) 'Early Implanon Discontinuation and Associated Factors among Implanon User Women in Debre Tabor Town, Public Health Facilities, Northwest Ethiopia, 2016', *International Journal of Reproductive Medicine*, 2018, pp. 1–10. doi: 10.1155/2018/3597487.

Muniroh, I. D., Luthviatin, N. and Istiaji, E. (2014) 'Dukungan Sosial Suami Terhadap Istri untuk Menggunakan Alat Kontrasepsi Medis Operasi Wanita (MOW) (Studi Kualitatif pada Pasangan Usia Subur Unmet Need di Kecamatan Puger Kabupaten Jember) Husband ' s Social Support on Their Wive to Use Contraception', *Jurnal Pustaka Kesehatan*, 2(1), pp. 66–71.

Mutihir, J. T. and Nyango, D. D. (2010) 'Indications for removal of Etonogestrel implant within two years of use in Jos, Nigeria', *East African Medical Journal*, 87(11), pp. 461–464. doi: 10.1136/jfprhc-2012-100554.

Nageso, A. and Gebretsadik, A. (2018) 'Discontinuation rate of Implanon and its associated factors among women who ever used Implanon in Dale District, Southern Ethiopia', *BMC Women's Health*. BMC Women's Health, 18(1), pp. 1–9. doi: 10.1186/s12905-018-0678-x.

Nwe Tin, Khaing, Maung Maung, Thae & Win, Thiri. (2019) 'Dhs working papers', (May).

Oktabriani, I. F. and Riono, P. (2012) 'Peran Diskusi Suami Istri Dalam Pemakaian Kontrasepsi Modern Untuk Menjarangkan Kehamilan (Analisis SDKI 2012) Abstrak The Influence of Couple Discussion on Modern Contraceptive Use for Spacing Pregnancy (Analysis of IDHS 2012) Abstract Pendahuluan Pa'.

Permatasari, N. E., Wati, D. M. and Ramani, A. (2013) 'Determinan penghentian penggunaan IUD di Indonesia', *Jurnal Pustaka Kesehatan*, 1(1), pp. 1–6.

Prasetyo, E. S. (2015) *Analisis Faktor Yang Berhubungan Dengan Kejadian Drop Out Akseptor Kb Kecamatan Gunungpati Kota Semarang*.

Setiyaningrum (2016) *Pelayanan Keluarga Berencana*. Jakarta: CV Trans Info Media.

The Indonesian National Population and Family Planning Board (2020) 'Strategi Pelaksanaan Program Keluarga Berencana Berbasis Hak untuk Percepatan Akses terhadap Pelayanan Keluarga Berencana dan Kesehatan Reproduksi yang Terintegrasi dalam Mencapai Tujuan Pembangunan Indonesia', pp. 1–110.

Zerihun, H. *et al.* (2015) 'Original article Implanon removal experiences of women in Butajira ', *Ethiopian Journal of Health Development*, 29(3), pp. 176–182.