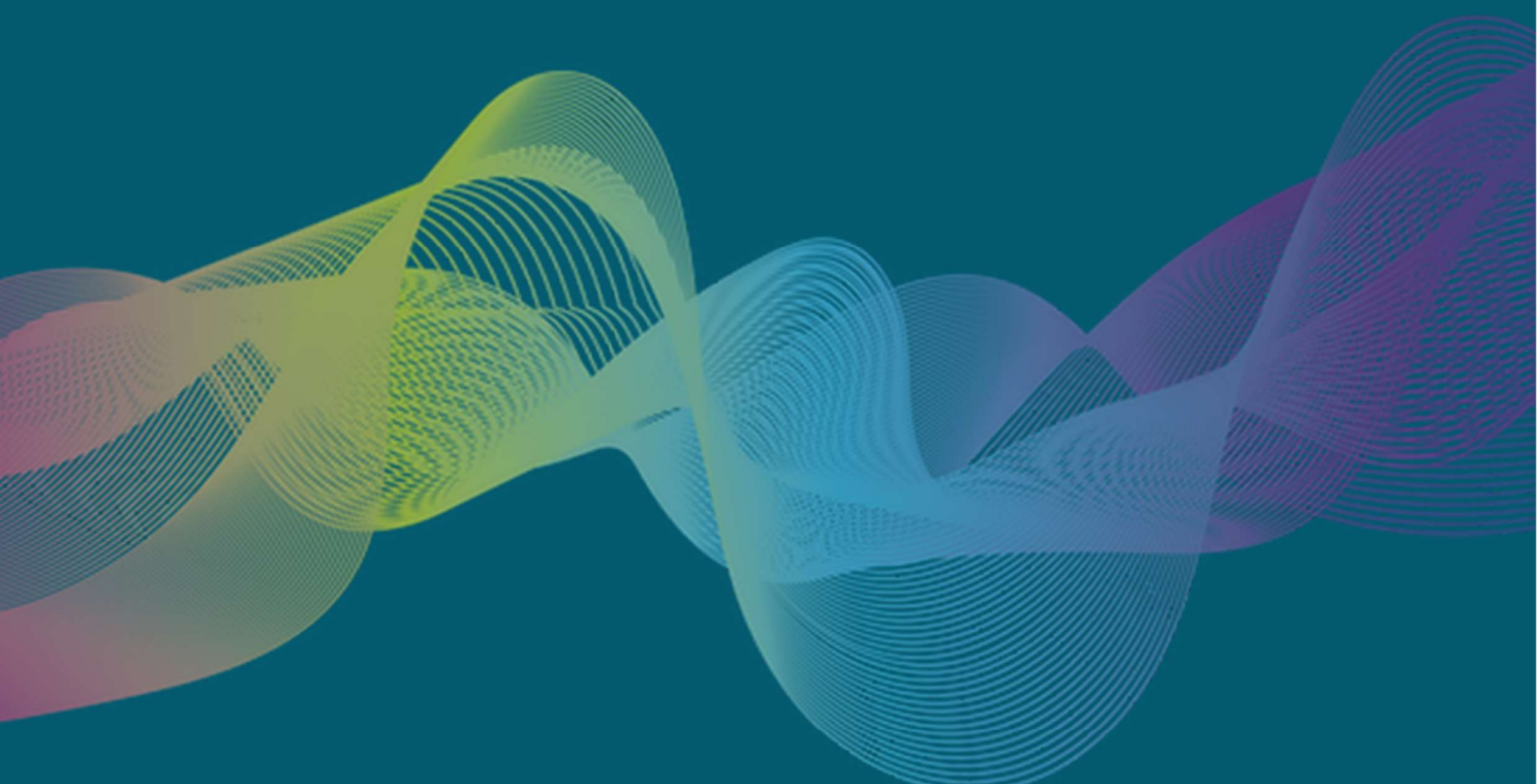




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Original Research

Digital marketing model that can be used to guide hospitals to attract more customers.

See Page 23-30

Original Research

How the COVID-19 pandemic had increased the number of maternal deaths.

See Page 70-78

Literature Review

Improving the quality of services during the pandemic also needs to consider how to fulfill basic medical needs.

See Page 133-142

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MATERNAL DEATH, QUALITY SERVICES, AND MENTAL HEALTH: A CYCLE OR REPEATED EPISODE ?

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During the pandemic, the utilization of health services was recorded to have decreased, especially in outpatient services at the Puskesmas. Guidelines for implementing Public Health Efforts during the pandemic are also directed to be minimized. This restriction impacts several mandatory health services such as Measles-Rubella immunization for toddlers. Research conducted by Pradini *et al.* (2022) shows that the patient's expectations have not been matched with the quality of health services obtained. Nonetheless, the gap between expectations and reality does not stand alone in indicators of quality health services. Primary health facilities such as stunting eradication programs also need attention. Zaleha and Idris (2022) shows the need to ensure that health workers are prepared in quantity and quality following established program standards.

Meanwhile, the measurement of patient satisfaction in advanced health services during the pandemic showed different results. Hartanti and Antonio (2022) identified that physical conditions such as facilities and service organization and supply and quality of drugs affect patient satisfaction. This condition is quite different from what was stated (Pradini *et al.*, 2022). Hastuti *et al.* (2022) use phenomenological studies to reveal patient complaints in government-run hospitals. So far, measurements for health care facilities have been carried out routinely through customer satisfaction surveys. Unfortunately, with the instrument's limitations that it only measures specific dimensions and is measured on a scale, the main complaints of patients who are not included in these measurements will be ignored. Improving the quality of services during the pandemic also needs to consider

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HEALTH EXPENDITURE ANALYSIS IN PATIENTS WITH PREGNANCY-LABOR COMPLICATIONS IN SURABAYA

Analisis Pengeluaran Biaya Kesehatan Pada Penderita Komplikasi Kehamilan-Persalinan di Kota Surabaya

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Abstract

Background: Healthcare spending has serious social and economic consequences for families, such as financial constraints and psychological distress. Expenditure caused by obstetrics complications has an impact on total household spending. One person's health expenditure can influence their family members' welfare.

Aims: This study analyzed health expenditure of patients experiencing preeclampsia, eclampsia, and postpartum hemorrhages.

Methods: This study utilized a descriptive observational research design with a cross-sectional approach. The research sample consisted of 135 women who gave birth in November to December 2018. Multistage random sampling was used since the respondents were selected from regions of Surabaya.

Results: Respondents of pregnancy and delivery complication with catastrophic health expenditure was eclampsia suffered by 40 respondents, 71 respondents with medium income financing Rp3,800,000.00, 64 respondents with medium household expenditure (monthly income of Rp2,001,000.00 - Rp3,000,000.00). As many as 62 respondents had social security agency for health without contribution beneficiaries, 62 respondents had one employed family member, and 66 respondents had 5-7 family members.

Conclusions: The majority of respondents in Surabaya in 2019 experienced a 10% increase of total household expenditure while undergoing treatment. The government continues to increase subsidies for health service facilities that mostly serve the indigenous population.

Keywords: eclampsia, hemorrhagic, health expenditure, preeclampsia

Abstrak

Latar Belakang: Pengeluaran kesehatan memiliki konsekuensi sosial dan ekonomi yang serius bagi keluarga seperti kesulitan keuangan dan tekanan psikologis. Pengeluaran akibat kesehatan untuk satu anggota keluarga dapat mempengaruhi kesejahteraan anggota keluarga lainnya.

Tujuan: Tujuan penelitian ini adalah menganalisis pengeluaran biaya kesehatan pada penderita komplikasi kehamilan-persalinan.

Metode: Desain penelitian ini adalah observasional deskriptif dengan pendekatan studi potong-lintang. Sampel penelitian yaitu 135 ibu yang melahirkan pada bulan November-Desember 2018. Pengambilan sampel secara sampling acak bertingkat di kota Surabaya.

Hasil: Penderita komplikasi kehamilan-persalinan yang mengalami pengeluaran biaya kesehatan luar biasa adalah sebagian besar penderita yang mengalami eklampsia sebanyak 40 responden, penderita dengan pendapatan sedang (Rp3.800.000,00) yaitu sebanyak 71 responden, penderita dengan pengeluaran rumah tangga dalam kategori sedang (Rp2.001.000,00 – Rp3.000.000,00) yaitu sebanyak 64 responden, penderita dengan jenis pembiayaan non PBI sebanyak 62 responden, penderita dengan jumlah anggota keluarga yang bekerja sebanyak 1 orang yaitu sebanyak 62 responden, dan penderita dengan besar anggota keluarga sebanyak 5-7 orang yaitu sebanyak 66 responden.

Kesimpulan: Sebagian besar responden di Kota Surabaya tahun 2019 mengalami peningkatan biaya pengeluaran kesehatan >10% dari total pengeluaran rumah tangga selama menjalani masa perawatan. Pemerintah hendaknya meningkatkan subsidi untuk sarana pelayanan kesehatan yang banyak melayani penduduk miskin.

Kata Kunci: , eklampsia, pengeluaran biaya kesehatan, preeklampsia



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Introduction

According to the World Health Organization, global maternal mortality rates have still been very high. Every day, about 810 women die from complications during pregnancy or childbirth worldwide (WHO, 2019). It has been estimated that about 295.000 women died in 2017 during pregnancy and childbirth, even though maternal mortality rates worldwide fell by 38% between 2000 and 2017. Almost all maternal deaths (94%) occur in developing countries. The maternal mortality rate in developing countries in 2017 was 462 per 100,000 live births, while, in developed countries there were 11 deaths per 100,000 live births. The pregnancy or childbirth complications that cause almost 75% of all maternal deaths in the world are heavy bleeding (mostly postpartum), infections (usually postpartum), high blood pressure during pregnancy (pre-eclampsia and eclampsia), and complications of labor (WHO, 2019). Indonesia is a developing country with a high maternal mortality rate. In 2015, the maternal mortality rate in Indonesia was 305 per 100,000 live births. Indonesia is still far from reaching the Millennium Development Goals (MDGs) target which aims to reduce maternal mortality to 102 per 100,000 live births.

The Indonesian Health Profile data (2017) has shown several provinces and districts with high maternal mortality rates, namely North Sumatra, Banten, West Java, Central Java, East Java, and South Sulawesi. East Java province is one of the provinces with the highest maternal mortality rate in Indonesia. One of the regions in East Java with the highest maternal mortality rate is Surabaya. In 2017, the number of maternal deaths reported in Surabaya was 34 cases. This was the highest number of cases compared to other districts and cities in East Java (Indonesian Ministry of Health, 2017).

The maternal mortality rate in Surabaya in 2016 and 2017 did not reach the Sustainable Development Goals (SDGs) target of 70 per 100,000 live births. In Surabaya, most maternal mortality rates are caused by complications during

pregnancy and childbirth. Data from the Surabaya District Health Office in 2016 and 2017 have shown the causes of maternal deaths in Surabaya were bleeding, preeclampsia / eclampsia, infection, heart disease, HIV, pulmonary TB, and hepatitis among others. It is consistent with World Health Organization's states that the maternal mortality rate is mostly caused by complications during pregnancy and childbirth.

Maternal death in Surabaya is mostly caused by preeclampsia / eclampsia. Data from the Surabaya City Health Office have shown the number of preeclampsia cases in pregnant women in Surabaya for the last three years has increased consecutively. The number of cases of preeclampsia increased significantly from 1.145 cases in 2015 to 1.658 in 2016. The highest number of cases in 2017 occurred in the Krembangan Sel Primary Health Center with 298 preeclampsia patients followed by the Pucang Sewu Primary Health Center with 294 preeclampsia patients.

According to Kes *et al.* (2015) the cost for health care services that deal with complications and maternal mortality is significantly higher. This is caused by high-cost health care services incurred for antenatal care. Additionally, there is an increase of expenditure during the postpartum stage and referral to health services with higher cost. Families whose family members experienced complications or passed away spent about a third of their annual consumption per capita on health expenditure. Expenditure for easy access to health services consumed about 12% of household expenditure.

To overcome pregnancy complications and reduce the maternal mortality rate, mostly caused by complications of pregnancy or childbirth, the government has provided health protection, including labor insurance to minimize health expenditure. In 2014, the government implemented national health insurance with the principle of social insurance which aimed to guarantee comprehensive health services for Indonesians in accordance with their health needs, and achieve universal health coverage in 2019 (Laksono *et al.*, 2017).

The Indonesian Ministry of Health states that health expenditure is the amount of funding required to obtain various health services for individuals or families. Cost is always an important consideration due to the lack of funds. Generally, costs related to health care are categorized into four types: 1. Direct medical cost which is the cost used directly for health services including the cost of drug, physician visits, laboratory tests, and informal services. 2. Direct non-medical cost which is the cost not directly associated with medical care, such as transportation and accommodation. 3. Indirect cost which is the cost incurred from the decrease of productivity, for example, patients or other family members who cannot go to work. 4. Intangible cost; the costs that are difficult to measure in monetary units, but are seen in measurements of quality of life such as pain and anxiety suffered by patients or their families (Laksono *et al.*, 2017).

According to Hoque *et al.* (2012), the economic consequences of maternal complications can be felt in several ways including an increase in indirect expenses for medical care, which can increase planned household expenditure. Furthermore, poor health can lead to loss of labor and, as a result, reduced household income. Any expenditure due to maternal complications has an impact on the total household expenditure. This is consistent with the results of a study conducted by Dalaba *et al.* (2015) which states that several factors, including costs, constrained the utilization of health facility services for pregnant women. This study has shown that even mothers with pregnancy complications who do not incur medical care costs, bear other expenses that even exceed medical expenses, such as transportation, food and drink, and lodging. These expenses affect the circulation of family financial arrangements which can become an economic burden and affect the welfare of other family members.

According to Aregbeshola and Khan (2018), catastrophic health expenditure must be handled by state policies concerning the health system. Catastrophic expenditure is used as an indicator to

assess the performance of a health system of health funding. Families living in or around low-income areas are impoverished when the government does not pay attention to catastrophic health expenditure. The Law of the Republic of Indonesia Number 44 of 2009 Chapter IV Article 6 Verse 1 Point B states that the government and local government are responsible for guaranteeing financing of health services at hospitals for the destitute or needy people (Laksono *et al.*, 2017).

According to Cylus, Papanicolas and Smith (2017), if a household member gets sick, out of pocket medical care payment will disrupt standard domestic life material. If health care costs are relatively larger than the available household resources, then it will disrupt the standard of living which can be regarded as a catastrophe. One of the concepts of justice in health financing is every household must be protected against catastrophic medical expenses.

According to Nastiti (2011), there are prospective socioeconomic impacts because of the high treatment cost and the effect of disability inflicted on patients after treatment. Patients have experienced depression or incredible pressure because of mobility limitations which can deeply affect the psychological functions of the sufferers (Nastiti, 2011). Cost distribution is important to analyze because, in any incident, direct and indirect costs incurred will have long-term significance in terms of the economic burden. Patients generally understand that direct costs will be covered by the Social Security Agency for Health (BPJS Kesehatan) or insurance and indirect costs will be covered by patients. However, there has been no analysis of indirect costs. Knowledge about indirect costs matters because losses will be endured by patients, and costs may not immediately present nor can they be predicted, and tend to be more expensive than direct cost.

Based on the description above, an increase in the number of preeclampsia / eclampsia cases from 2015 to 2017 in Surabaya with an average annual increase of 16.82% were analyzed in this present study, especially in regards to direct and indirect costs which hold long-term

significance to economic burdens of households.

Method

The current research was an observational descriptive study because there were no interventions affecting the subjects of the study. The design of this research was cross-sectional, meaning that data collection of the disease and exposure disease of the population was carried out at a specified time. The research took place at respondents' homes in Surabaya. The study was done from November 2018 to October 2019.

The population in this study consisted of preeclampsia, eclampsia, and hemorrhage patients in Surabaya. The patients selected had given birth between October 2018 and December 2018. The sampling process was done through multistage random sampling, meaning that the research subjects were divided into groups or clusters. Then, research samples were chosen randomly. This sampling method made it possible to determine random sub-sampling from the clusters.

This study consisted of 473 individuals, divided into 5 regions: North Surabaya, Central Surabaya, West Surabaya, South Surabaya, and East Surabaya. The samples in stage I were the chosen local primary healthcare centers, determined randomly in each region. The next step was determining samples for stage II, which consisted of selected households from the local primary healthcare centers chosen in stage I. The number of chosen households in each primary healthcare center was determined based on the prevalence of every region and distributed in accordance with the criteria of samples required. If the area did not meet the number of samples required, then the samples were taken from other local primary healthcare centers.

The number of samples in each category (pre-eclampsia, eclampsia, and postpartum hemorrhage) was divided proportionally with 45 for each category. The samples in each category were then chosen randomly.

Table 1. Frequency Distribution of respondents' Characteristics in Surabaya in 2019.

Category	n	%
Age		
Early Adolescent (12-16)	0	0
Late Adolescent (17-25)	15	11.1
Early Adulthood (26-35)	111	82.2
Late Adulthood (36 > 45)	9	6.7
Education		
Elementary school	12	8.9
Junior high school	22	16.3
Senior high school	76	56.3
Diploma/ Bachelor	25	18.5
Job		
Unemployed	58	43
Civil Servant	7	5.2
Private Employee	45	33.3
Self-employed	25	18.5
Number of Working Family Members		
1 Person	65	48.2
2 People	62	45.9
3-4 People	8	5.9
Family Members		
2-4 People	51	37.8
5-7 People	82	60.7
8-9 People	2	1.5
Type of Payment		
Social Security Agency for Health with Contribution Beneficiaries	55	40.7
Social Security Agency for Health without Contribution Beneficiaries	77	57
Other insurance	3	2.3
Income		
Low (Rp2,500,000–Rp3,799,000)	13	9.6
Medium (Rp3,800,000)	75	55.6
High (Rp3,800,001–Rp7,000,000)	47	34.8
Household expenditure		
Low (Rp1,000,000–Rp2,000,000)	35	25.9
Medium (Rp2,001,000–Rp3,000,000)	68	50.4
High (Rp3,000,001–Rp5,750,000)	32	23.7
Total	135	100

Result and Discussion

Characteristics of respondents

Respondents' characteristics in this study include age, education, job, number of family members, number of working family members, type of payment, family income, and household expenditure can be seen in Table 1.

Table 1 shows that 111 respondents (82.2%) in this study were classified as in early adulthood (26-35 years). In terms of education, it can be seen that 76 respondents (56.3%) graduated from high school. In terms of occupations, it can be seen that 58 respondents (43%) were

unemployed (house wives). Moreover, the respondents mostly had one working family member (65 respondents or 48.2%).

In terms of the number of individuals in respondents' households, it can be seen that the number of family members was around 5-7 members (82 respondents or 60.7%). The payment mostly used was insurance. Most of the respondents were enrolled in non-contribution beneficiaries' programs set by the Social Security Agency (BPJS) (77 respondents or 57%), while the rest were enrolled in private insurance.

The respondents' income was calculated from monthly income. Based on income, it shows that the respondents mostly had the medium income equal to Surabaya's minimum wage of Rp3,800,000.00. The highest income reported from the respondents was Rp7,000,000.00 and the lowest income reported was Rp2,500,000.00.

The expenditure mentioned in this study was monthly expenditure. The results show that family expenditure fell mostly in the category (Rp2,001,000.00 – Rp3,000,000.00). The smallest expenditure was Rp1,050,000.00 and the largest was Rp5,750,000.00.

Direct and Indirect Cost of Health Care

Direct costs of health care incurred were seen in the payment of health insurance that paid every month with category \leq Rp100,000.00 and $>$ Rp100,000.00. Indirect costs were expenditure for health care costs for consumption, transportation, and productivity-loss costs.

This study shows that the direct costs incurred for health care services were mostly in the category of \leq Rp100,000.00 (118 respondents or 87.4%). The remaining 17 respondents (12.6%) got paid for direct costs in the category of $>$ Rp100,000.00. The smallest amount of direct costs incurred was Rp25,000.00 while the largest amount was Rp750,000.00.

The cost of daily consumption (eating, drinking, etc.) during hospitalization incurred by 71.9% of the respondents (97 respondents) was around Rp15,000–Rp50,000, while 28.1% of

respondents incurred Rp50,001–Rp100,000. The largest expenditure incurred was about Rp90,000, while the smallest expenditure incurred was Rp15,000. Transportation costs are indirect costs incurred for vehicle rentals and gasoline purchases. It was found that the transportation cost spent by 85% of the respondents (115 respondents) was around Rp40,000.00–Rp100,000.00 while 14.8% (20 respondents) spent about Rp100,001.00–Rp165,000.00.

The largest expenditure incurred was Rp165,000.00 while the smallest expenditure incurred was Rp45,000.00. Productivity-loss costs are indirect costs incurred because of fulfilling treatment for sick family members. The costs were divided into Rp100,000.00–Rp200,000.00, Rp201,000 – Rp300,000, Rp301,000 – Rp400,000, and larger than Rp400,000. The productivity cost incurred by most respondents (63 respondents or 46.7%) was in the category of Rp301,000–Rp400,000. The least number of respondents had a productivity cost of Rp100,000 – Rp 200,000 (15 respondents or 11.1%). The largest expenditure incurred was Rp400,000, while the smallest expenditure incurred was Rp90,000. According to Hussey, Wertheimer and Mehrotra (2016), cost is always an important consideration because of limited funds. Costs are calculated to estimate the resources for a service. In general, costs are associated with health care. The types of health costs include direct costs and indirect costs. Direct costs are related to medical services and are used directly for health care expenditure, including drug costs. Indirect costs are caused by lost productivity due to illnesses experienced by patients, for example, decreased productivity at work and time loss to receive care, as well as companion costs (family members who took care of patients). Distribution of disease suffered based on direct and indirect costs Cross-tabulation between diseases of patients and types of costs can be seen in Table 2.

Table 2 shows that in the direct costs category, 100% of the respondents (45 respondents) with preeclampsia and eclampsia spent \leq Rp100.000. Meanwhile,

62.2% of the postpartum hemorrhage respondents (28 respondents) spent \leq Rp100.000, while the remaining 17 respondents spent $>$ Rp100.000.00 spent Rp460,001.00–Rp560,000.00 for indirect costs.

The results of this study indicate that the respondents not only had to pay direct treatment costs to receive medical services in accordance with the rates of Social Security Agency for Health or other insurances, but also had to incur additional costs such as transportation, daily life expense, the cost of decreased productivity, and companionship costs. The accumulated costs during the treatment period will generate a high cost burden for patients, especially for patients with lower incomes.

This is consistent with a study by Aulia, Ayu and Nefonafatrilova (2017) who have shown that the transportation costs incurred to bring patients to the hospital and back home was Rp 125,000 per patient. The total cost of purchasing daily necessities as family care costs was Rp 100,000 per day. This shows that indirect costs increase with time spent during the hospitalization. The increase in indirect costs is also related to the loss of income due to unemployment.

According to Dalaba *et al.*, (2015), most direct medical costs were incurred outside the hospital because of shortage/non-availability of prescribed drugs or non-availability of equipment. For instance, two years preceding the survey, the Navrongo Hospital operated without an

ultrasound scan available. As a result, women had to obtain their scans from private sources, which needed additional costs. The median transportation cost was \$13.48 (IQR = 16.05) per person (patient and person accompanying the patient) representing 32% of the total cost. The majority of respondents (37%) were transported to the hospital with official vehicles of the primary healthcare center. The respondents reported paying between \$11 and \$13 to fuel the vehicle to the referral point. The median expenditure made on food for both patients and caretakers was estimated at \$9.47 (IQR = 14.21) per person. In addition, the median indirect cost attributed to productivity losses was estimated at \$5.2 (IQR = 8.27) per person.

Catastrophic Health Expenditure

According to Wagstaff and Doorslaer (2002), threshold was inevitably a matter of choice, and a range of 2.5%-15% of total expenditure and 10%-40% of ability to pay can be chosen for use in defining catastrophic health expenditure. According to Doorslaer and O'Donnell, (2011), the concept of catastrophic payments has been put into operation by defining them as occurring once OOP payments cross some threshold share of total household expenditure. While it is acknowledged that the choice of threshold is arbitrary, 10% of total expenditure has been a common choice (Wagstaff and Doorslaer, 2001).

Table 2. Distribution of Disease Suffered Based on Direct and Indirect Costs in Surabaya in 2019

Cost (Rp)	Diseases Suffered					
	Preeclampsia		Eclampsia		Postpartum Hemorrhage	
	n	%	N	%	N	%
Direct Cost						
< 100.000	45	100	45	100	28	62.2
> 100.000	0	0	0	0	17	37.8
Indirect Cost						
160,000 – 260,000	4	8.9	0	0	0	0
260,001 – 360,000	7	16.6	1	2.2	1	2.2
360,001 – 460,000	17	37.8	5	11.1	8	17.8
460,001 - 560,000	17	37.8	39	86.7	36	80.0
Total	45	100	45	100	45	100

Table 3. Distribution of Catastrophic Health Expenditure in Surabaya in 2019.

Category	Catastrophic				Total	
	Catastrophic		Non-Catastrophic			
	n	%	n	%	n	%
Disease suffered						
Preeclampsia	38	84.4	7	15.6	45	100
Eclampsia	40	88.8	5	25.0	45	100
Postpartum Hemorrhage	37	82.2	8	17.8	45	100
Income						
Low (Rp2,500,000 – Rp3,799,000)	13	100	0	0	13	100
Medium (Rp3,800,000)	71	94.7	4	5.3	75	100
High (Rp3,800,001 – Rp7,000,000)	31	66	16	34	47	100
Household Expenditure						
Low (Rp1,000,000 – Rp2,000,000)	35	100	0	0	35	100
Medium (Rp2,001,000 – Rp3,000,000)	64	94.1	4	5.9	68	100
High (Rp3,000,001 – Rp5,750,000)	16	50	16	50	32	100
Payment						
Social Security Agency for Health with Contribution Beneficiaries	50	90.9	5	9.1	55	100
Social Security Agency for Health without Contribution Beneficiaries	62	80.5	15	19.5	77	100
Other Insurance	3	1.0	0	0	3	100
Number of working family members						
1	62	95.4	3	4.6	65	100
2	51	82.3	11	17.7	62	100
3-4	2	25	6	75	8	100
Number of family members						
2-4	48	94.1	3	5.9	51	100
5-7	66	80.5	16	19.5	82	100
8-9	1	50	1	50	2	100

Some analysts assume that a cost burden greater than 10% is likely to be catastrophic for the household economy indicating household members will likely need to cut consumption of other basic needs, trigger productive asset sales or high levels of debt that lead to impoverishment (Russells, 2004). This study refers to the study conducted by Russells (2004) using catastrophic thresholds, i.e. 10% of the total household spending categorized as catastrophic health expenditure (CHE). CHE can be seen from the expenditure of direct and indirect health costs compared to household expenditure. This study shows that almost all respondents (115 respondents or 85.2%) experienced an increase in household expenditure of more than 10% during the treatment period.

Distribution of catastrophic health expenditure

Cross tabulation of CHE based on disease suffered, family income, household expenditure, types of payment, number of

working family members, and number of family members can be seen in Table 3.

Table 3 shows that catastrophic health expenditure was experienced the most by 40 eclampsia respondents (88.8%), followed by preeclampsia and hemorrhage patients (84.4% and 82.2%). According to Wiseman et al., (2018), the population must be protected by the state from catastrophic health expenditure through the implementation of health system policies. This catastrophic expenditure is used as an indicator for assessing the performance of a health system in health funding in addition to equity (regressive or progressive) (Aregbeshola and Khan, 2018). The destitute or nearly destitute patients will be further impoverished or fall into poverty if the government does not address catastrophic health expenditure.

Overall, 115 respondents (85.2%) experienced catastrophic health expenditure. In the category of income, catastrophic health expenditure was experienced most by the respondents with medium income (Rp 3,800,000), as 71

respondents (94.7%) experienced catastrophic health expenditure. This was followed by high- and low-income respondents (31 and 13 respondents, respectively). The increase in maintenance costs in this study mostly occurred in the respondents with moderate income. This suggests that patient and family income will affect the family's ability to finance health care expenses associated with preeclampsia, eclampsia and postpartum hemorrhage. The higher the income, the more likely respondents can fulfill maintenance financing needs, and vice versa.

Aulia's research (2017) supports the current research, in which patients with long hospital stays will bear indirect expenses such as transportation costs and consumption costs. Respondents with low family income increase the burden on family expenses resulting in higher treatment costs during the treatment period. Respondents tend to spend additional expenses as an economic burden, namely treatment costs for family members suffering from preeclampsia, eclampsia, and postpartum hemorrhage (Aulia, Ayu and Nefonafratilova, 2017).

In the category of household expenditure (Table 3), catastrophic health expenditure was experienced most by respondents with medium household expenditure (94.1%), followed by respondents with low and high expenditure (35 and 16 respondents, respectively). This is consistent with the results of Sihombing's study (2013), which showed that the average medical expenses of patients was Rp236,278, while the highest medical expense was Rp904,000 and the smallest medical expense was Rp46,500. Medical expenses incurred by these patients include service registration fees (including doctor fees), drug costs, laboratory costs, x-ray costs, and electrocardiogram (ECG) costs. Meanwhile, the average non-medical expenditure per month was Rp1,696,069. The highest non-medical expenditure was Rp3,750,000, while the smallest non-medical expenditure was Rp690,000. The amount of non-medical expenditure was calculated based on the amount of costs incurred by households per month for food

needs and non-food needs, including costs for education, electricity, water, telephone, transportation, social gathering, and cigarettes (Sihombing and Rochmah, 2013).

The aforementioned research supports the results of this study, showing the respondents with moderate expenditure increased household expenses because the additional costs forced them to reduce other daily expenses such as education, electricity, telephone, and consumption costs. This emphasis may impact the pattern of expenditure. Respondents who could not manage their spending properly experienced higher family expenses, especially during the treatment period.

In the category of payment, catastrophic health expenditure was experienced most by respondents without contribution beneficiaries (80.5%) experiencing catastrophic health expenditure. The second most common payment was with contribution beneficiaries followed by other insurance (50 and 3 respondents, respectively). Out of the patients using non-contribution beneficiaries payment, 62 respondents (80.5%) experienced catastrophic health expenditure, and 15 respondents (19.5%) experienced non-catastrophic health expenditure.

Firmansyah, Andayani and Pinzon (2016) have found that the treatment class yielded different results ($p < 0.05$). There was an increase in the number of patients with class III, class II, and primary care. However, there was no increase in treatment class I. The present study indicates that the respondents with contribution beneficiary status did not significantly increase household expenses because they did not pay monthly medical expenses and respondents with non-contribution beneficiaries increased household expenses because they had to pay monthly insurance contributions.

According to Dalaba *et al.* (2015), although, officially, maternal health services are free in Ghana, women in need of emergency obstetric care in formal health care facilities incur substantial costs and face the risk of incurring catastrophic health expenditure. The current health

system which implements the free maternal health service policy is necessary, but not sufficient in reducing the economic burden of maternal complication treatment costs and providing adequate financial protection to households. Enacting a policy without providing a supportive environment to maximize the outcomes puts a dent on the health system.

Regarding working family members, catastrophic health expenditure was experienced most by respondents with one working family member (95.4%), followed by respondents with 2 and 3-4 working family members (51 and 2 respondents, respectively). The results of Sihombing's study (2013) show that while patients who did not experience catastrophic payments were family heads working as entrepreneurs and private employees (30.4%). Most of the families (69.6%) had high income. Wiseman *et al.*, (2018) states that middle-income groups have 10 times the risk of falling into poverty than high-income groups. Middle-income households do not experience excessive burden on household expenses. However, when a family member falls ill, the situation forces them to set aside non-medical expenses for medical purposes. Sihombing's research (2013) supports the results of this study that indicated unemployed respondents procured less family income than employed ones. Undergoing a period of treatment for diseases such as preeclampsia, eclampsia, and postpartum hemorrhage will increase the burden on household expenses. After the respondents got sick, the burden of household expenses was not bearable.

Observed from the number of family members, catastrophic health expenditure was experienced most by respondents with 5-7 family members (80.5%), followed by respondents with 2-4 and 8-9 family members (48 respondents and 1 respondent, respectively). The results of this study are relevant with Nugraheni and Hartono's research (2017) stating that households with many members were more likely to have high health spending.

Government efforts to reduce the economic burden of the healthcare cost will be able to handle the problem of poverty in the community. One of the efforts can be

carried out more intensively is health promotion activities through health centers, puskesmas or polindes so that it can provide additional information or insight to the community, especially for pregnant women and their families in maintaining maternal health.

Conclusion

The results of this study indicate that there was an increase in household expenses due to treatment costs of pregnancy, childbirth, or puerperium complications. The increase in household expenditure was more pronounced in respondents who had income equal to or below the regional minimum wage as household expenses increased during treatment. The most catastrophic health expenditure occurred in patients with moderate income (Rp 3,800,000) (94.7%). Only 4 respondents (5.3%) experienced non-catastrophic health expenditure. Moreover, if one family has more than 4 members, it will result in an increase in family expenses as shown in Table 5. The largest catastrophic health expenditure occurred in patients with 5-7 family members (80.5%), while 16 respondents (19.5%) with the same number of family members experienced non-catastrophic health expenditure.

Families experiencing eclampsia, preeclampsia and postpartum hemorrhage had their family welfare affected because of the additional household expenses, while family income did not increase. Increased economic burden of households affect the burden of living and social conditions of the community after the treatment process. Respondents who could afford the cost could continue with daily activities as usual, but those who could not afford the cost after undergoing treatment experienced higher expenses and family economic conditions.

Government efforts to reduce the economic burden of healthcare costs will be able to handle poverty in the community. One of the efforts that can be carried out more intensively is a health promotion agenda through healthcare centers, auxiliary primary healthcare centers, or village maternity clinics to provide

additional information of maternal health to the community, especially for pregnant women and their families.

Abbreviations

MDGs: Millennium Development Goals; WHO: World Health Organization; SDGs: Sustainable Development Goals; BPJS: Badan Penyelenggara Jaminan Sosial (Social Security Agency); CHE: Catastrophic Health Expenditure.

Declarations

Ethics Approval and Consent Participant

This study has been approved by the Commission on Research Ethics, Faculty of Dentistry Universitas Airlangga with No. 073/HRECC.FODM/III/2019.

Conflict of Interest

The authors declare that there are no personal interests that might have affected the performance.

Availability of Data and Materials

The availability of data and materials based on demand from journals and readers.

Authors' Contribution

E conceptualized the study; E created the methodology; E and DS wrote, reviewed, and edited the manuscript; E and DS wrote the original draft.

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HEALTH INSTITUTIONAL SUPPORT FOR HEALTH WORKERS AS ROLE MODELS FOR A HEALTHY LIFE

Dukungan Institusi Kesehatan Terhadap Tenaga Kesehatan Sebagai Panutan Hidup Sehat

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Abstract

Background: Health workers are considered to be credible people in the health field, they are often deemed as role models in healthy behavior. Primary healthcare centers (PHCs) and professional health organizations (PHOs) have to support health workers (HWs) in order that they perform their duty according to codes of work ethics.

Aims: This study aimed to investigate the support from PHCs and PHOs for HWs as health role models in the community.

Methods: This study is an exploratory qualitative study conducted in 2017. It involved three heads of PHCs, six clinical practitioners, three PHOs, and three community members from Pontianak.

Results: The health workers had responsibility, awareness, and commitment towards health workers themselves, the community, and colleagues, and thus they became health role models. Although the community never reprimanded HWs directly, they continued having a healthy lifestyle since they had acquired health education that impacts their behavior. Health institutions provided rules for mandatory daily physical activities and healthy diet; also, they established no-smoking areas, but many constraints were found during the execution.

Conclusion: The code of work ethics should be used as standards to support health workers' role.

Keywords: code of ethics, health institution, health role model, health worker

Abstrak

Latar Belakang: Tenaga kesehatan dianggap sebagai seseorang yang kredibel di bidang kesehatan. Profesi tersebut dijadikan panutan hidup sehat di masyarakat. Puskesmas dan organisasi profesi kesehatan harus mendukung tenaga kesehatan untuk menjalankan perannya sesuai dengan kode etik profesinya.

Tujuan: Penelitian ini bertujuan untuk mengetahui dukungan puskesmas dan organisasi kesehatan terhadap peran tenaga kesehatan sebagai panutan hidup sehat.

Metode: Penelitian ini merupakan penelitian kualitatif eksploratif yang dilakukan pada tahun 2017. Penelitian ini melibatkan tiga (3) kepala puskesmas, enam (6) praktisi klinis, tiga (3) pengurus organisasi kesehatan dan tiga (3) informan masyarakat di Pontianak.

Hasil: Tenaga kesehatan memiliki tanggung jawab, kesadaran, dan komitmen terhadap diri mereka sendiri, komunitas, dan rekan sejawat. Oleh karena itu mereka menjadi panutan hidup sehat. Meskipun masyarakat tidak pernah menegur tenaga kesehatan secara langsung, tetapi tuntutan penerapan hidup sehat tetap ada karena pendidikan kesehatan yang dimilikinya. Institusi kesehatan telah memberikan aturan tentang kewajiban aktivitas fisik setiap hari dan diet seimbang. Mereka telah menetapkan kawasan tanpa rokok meskipun banyak hambatan dalam pelaksanaannya.

Kesimpulan: Kode etik harus menjadi aturan yang kuat dalam menetapkan standar perilaku petugas kesehatan sehingga mereka dapat melakukan perilaku sehat sebagai panutan.

Kata kunci: kode etik, institusi kesehatan, tenaga kesehatan, panutan hidup sehat.



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Introduction

Role models are people whose behavior is imitated. There is an unwritten contract between patients and health workers (HWs) that requires the profession and working commitment to be a role model (Hoare, Mills and Francis, 2013). Being a role model for a healthy lifestyle is a professional matter, which eventually will affect patients' beliefs towards medical actions, patients' obedience to treatment, and patient satisfaction towards health services (Howe *et al.*, 2010; Mold and Forbes, 2013; Birden *et al.*, 2014). Furthermore, role models for healthy lifestyles will influence patients' confidence in therapy (Darch, Baillie and Gillison, 2017; Kelly, Wills and Sykes, 2017). Doctors with normal body mass index (BMI) have more confidence to deliver counseling on diet ($p = 0.002$) and physical activity ($p = 0.001$) (Bleich *et al.*, 2012). Strong desire comes up when role models show healthy lifestyles and provide better counseling and motivation to patients (Lobelo and de Quevedo, 2016). In spite of that, the level of patient trust towards doctors is still high regardless of their BMI condition (Bleich *et al.*, 2013).

In Indonesia, the codes of health work ethics explicitly state that doctors, nutritionists, and nurses should serve as role models and maintain a healthy lifestyle (IDI, 2012). Moreover, the president has given specific instructions to reduce non-communicable diseases by adjusting people's lives to healthy lifestyles as can be seen in the Healthy Community Movement or GERMAS (*Gerakan Masyarakat Sehat*). This policy needs high awareness and motivation of all individuals, families, and communities (President Instruction number 1 of 2017 concerning The Healthy Community Movement/ GERMAS). To support GERMAS, the Indonesian Ministry of Health has implemented gymnastics as a planned activity for all civil servants (blue-collar workers) to reduce muscular tension and relax the body from working. It also aims to allow workers to perform physical activities in between working hours and healthy lifestyles at work. Therefore, this initiative is expected to prevent

occupational-related diseases among the workers (Law No. 36 of 2009 Concerning Health).

The GERMAS is conducted in health facilities by encouraging health workers and communities to live healthy lifestyles. Health organizations have to support this initiative since it may reinforce healthy lifestyles in the community. Research about multidisciplinary views of healthy lifestyle programs in Indonesia is limited. Therefore, this study aimed to describe types of support from PHCs and PHOs in Indonesia for health workers regarding healthy lifestyles.

Method

This study which applied exploratory qualitative methods was conducted in May to December 2017. The data collection took place in three months. This study involved three heads of PHCs in Pontianak City, six clinical practitioners comprised of two doctors, nurses, and nutritionists from different PHCs, one member from the Indonesian Medical Association (IDI), one nurse from Indonesian National Nurses Association (PPNI), and one nutritionist from Indonesian Nutrition Association (PERSAGI), and three community members.

The informants were selected using a purposive sampling method. Informants involved were contacted via message or telephone to receive introductory explanations such as the research aims and procedures. Informants and interviewers had never met each other. The initial meeting was conducted to build interpersonal relationships and develop a more relaxed ambience.

Confidentiality of informants was secured in this study. Informants' names were coded as H1-H3 for head of PHCs, C1-C6 for clinical practitioners, O1-O3 for PHOs, and P1-P3 for community members. Five semi-structured questions were delivered to guide the discussions in the interview, which mostly lasted 60 minutes.

Verbal transcriptions from the interview were read twice to ensure data completeness and clarity. All analyses were

recorded and reported manually utilizing a computer after inductive content analysis was done. An expert in qualitative research rechecked the data to ensure codes and personal bias. Furthermore, to gain a deeper understanding of naturalistic results in this study, data were descriptively analyzed, and some informants' answers were quoted (Lambert and Lambert, 2012).

Result and Discussion

Participants had extensive experience in their related fields and at least three years of working experience.

HWs as role models of healthy lifestyles: responsibility, awareness, and commitment

All informants stated that HWs as role models are viewed as people able to give an example for the community, mainly in regards to healthy behavior since the function of HWs is as agents of change and channels of health information in the community. One of the informants stated that "role model meant person to follow" (O3), and they are assessed as the center of examples in the community. The most attention was paid to HWs' performance by informants from both HWs and the community, with good looks being second. HWs considered to have good performance are the ones who are energetic, vibrant, and rarely sick, accompanied with appealing physiques.

Based on the role as someone who can be imitated by the community, HWs felt responsible to live healthy lifestyles and share health information in accordance with their activities. Additionally, HWs' actions should also correspond with what they tell the community. Being responsible as role models is a part of HWs' conscience. Since they received health education, they should understand their own health. Part of the function of health workers is to promote health to the community. Moreover, the responsibility of HWs as role models is to give examples and remind each other as colleagues about the importance of having healthy lifestyles. HWs are supposed to have self-awareness and perform as role models. Maintaining personal health is one

of the forms of non-verbal communication and professional attitudes to patients (Cant and Aroni, 2008).

These valid expectations were also confirmed by the community that "examples came from the ones who knew more about health" (P2); therefore, HWs should demonstrate their commitment to give examples of appropriate behaviors in accordance with the knowledge they have. HWs, as agents of change, sources of health information, and health educators who have knowledge, skills, and work professionally in the health field, are obligated to show appropriate health behavior to develop community trust, mainly by adopting healthy lifestyles (Biernat, Poznańska and Gajewski, 2012).

According to the clinical practitioners, unhealthy behavior by HWs will breed pessimistic attitudes from the community. They will see the health promotional program as useless and it will be harder to educate patients who consider this irresponsible behavior. Eventually, the community will become skeptical towards health workers' behavior and feel unmotivated to follow health advice.

Community demands performance from HWs as healthy role models

According to several clinical practitioners, the community was considered to not yet demand HWs to be role models of healthy lifestyle behavior, rated from the number of complaints conveyed to HWs that had inappropriate healthy behavior or performance. These performances were indirectly linked with attractive physical appearance, which was similar with study results that showed HWs' performance was the first aspect judged by the community. Other behaviors such as having a clean and neat appearance, decent and healthy working place, and having excellent professional behavior were found to be more important than BMI or smoking behavior (Pistikou *et al.*, 2014). In addition, attractiveness and beauty from physical appearance had the ability to influence self-confidence and other people's judgment about someone's ability in working and socializing (O'Brien *et al.*, 2013).

This leniency is because the community only sees HWs' behavior in the working place and are not able to see what they do at home. Besides that, HWs felt that becoming role models requires more meeting time because of the short meeting time between community and HWs in the workplace. Thus, judgment and imitation of behavior cannot immediately happen. Moreover, it was stated that clinical practitioners still doubt themselves as role models because they never received reprimands from the community or saw the influence of their actions towards the community.

However, this opinion was opposed by the heads of the PHCs, and was strengthened by the answers from the community. Even though the people did not reprimand directly, they were very concerned about HWs' behavior.

Hence, sometimes it is important to be a role model, they are in our room, they see what we are doing, we forbid them to eat fried food, yet there are fried food in our table eventually it becomes reprimands for us, if we cannot give them examples, our education messages will not be accepted by them since they have seen that we do not do it ourselves (C2)

The reason for the demands from the community was the opinion that HWs are responsible to "practice what they preach" in both formal and informal conditions and they were considered as credible sources who had obtained more knowledge about health (Rush, Kee, and Rice, 2005).

Furthermore, the community assessed that daily performance of HWs has been healthy already; therefore, the community does not explicitly reprimand unhealthy behavior of HWs or reprimands them in the form of jokes. Interestingly, the first informant from the community chose to look past inappropriate health behavior from HWs and tried to understand those behaviors. Moreover, they contended that HWs are not only seen from their behavior but also their abilities in service.

Reprimands from the community towards HWs usually happen because of close relations with HWs, and are said in the form of satire jokes to lessen offence.

However, this has had extraordinary impacts on the attitude of HWs. Some changes happened in HWs' behaviors such as not smoking in public areas and providing fruits in every community meeting. Although the results showed the community is actually not pushing HWs to become role models of healthy lifestyles, it is still best for them to show proper behavior based on their knowledge, supported by their ability in service.

Many studies showed positive effects of healthy behaviors by HWs. They not only build patients' trust, empathy, and closeness, but also increase intensity, ability to give counseling, and willingness to promote health (Blake and Harrison, 2013; Fie, Norman, and While, 2013; Fraser, Leveritt, and Ball, 2013; Jochemsen-Van Der Leeuw *et al.*, 2013; Florindo *et al.*, 2015; Lobelo and de Quevedo, 2016).

Support from institutions for HWs to fulfill their function as role models of healthy lifestyles

The practice of healthy lifestyles in PHCs is performed through increasing physical activities, consuming fruits and vegetables, and forbidding smoking. Every health service place prohibits smoking assertively in the PHC environment, applying zero tolerance for anyone who still smokes in PHCs by not providing either ashtray nor smoking rooms, and by purposively banning smoking for patients, PHC visitors, and HWs whether working as health professionals or not.

Furthermore, one of the PHCs in this study has been distributing fruits every Friday for every staff member, visitor, and everyone in the area, while other places have made it mandatory to provide vegetables and fruits in every meeting at PHCs. Meanwhile, in order to increase physical activity, gymnastic activities are being performed every Friday and Saturday starting at 7 a.m. with additional stretching exercises. Stretching has been performed between service hours, every 10 a.m. (Monday-Saturday) for 10-15 minutes. In other PHCs, stretching has also been performed at 2 p.m. for almost 5 months.

All these activities were considered by the informants as indirect examples of a healthy lifestyle for the community by watching HWs doing physical activity, eating healthy food, and not smoking. One of the heads of a PHC hoped that “PHC is the center of community health education” (H2), further implementing healthy lifestyles would impact the PHC staff themselves. According to the head of the PHC, routine medical check-ups (blood pressure, blood glucose, and cholesterol levels) were already prepared free on every Saturday after morning exercises. Afterwards, staff receive medical check-up results as well as counseling and treatment if they are experiencing medical problems.

Although all these activities have been facilitated for PHC staff to live healthy lifestyles, a healthy canteen has not been facilitated in the PHCs yet. Recently, there has been no special food provision for staff, meaning they have to buy meals outside the PHC. High fat and low fiber food was still a favorite, because the nearest available food shop to PHC has limited offerings (menu and flavor), which is not ideal for healthy eating. Another limiting factor was the short one-hour breaks. This forces employees to divide their time for prayer and lunch, causing some informants to bring their meal from home or wait until they get home to eat.

According to one of the PHC heads, it has not been possible to provide a healthy canteen because there are no rules nor clarity about financing and income systems in community healthcare centers. Policy makers and management systems in the workplace were considered to play an important role in providing health facilities for staff, but to date they are still in the form of recommendations and demands on the awareness of each individual to apply healthy lifestyles.

Professional organizations have been giving suggestions to change behavior and adopt healthy lifestyles, but they have not been implemented yet. They put a bigger emphasis on the prohibition of smoking and consuming drugs for HWs. One of the informants explained that healthy menus were not implemented yet in

organization meetings. Buffet menus still did not list nutritional content and often served high protein and fattening food, meaning HWs need to be self-aware in choosing healthy food according to their nutritional needs. Character as role models of healthy lifestyles is affected by several factors such as credibility, responsibility, impact of health behaviors, professional duty, and social norms; hence, these should be part of the responsibility held by professional organizations (Kelly *et al.*, 2016).

Obstacles in implementing health lifestyle for HWs

Not all HWs had healthy lifestyles, even when equipped with sufficient facilities. From observations by the informants toward HWs' behavior in the workplace, it was observed there still was a smoking area despite the prohibition for smoking. Furthermore, smoking was considered as something commonly and secretly done. As mentioned in one study, smoking should not be done while wearing nurses' uniforms (68.6%) (Blake and Harrison, 2013). Smoking behavior is difficult to change because it has been normalized as an individual right. HWs' responsibility as healthy lifestyle role models was considered to not exist anymore while not wearing health attire and outside the PHC area, meanwhile this smoking behavior still biased their status as HWs.

There is no law that prohibit smoking, so that it is right for each person, they will say ‘this is my rights, my own money’ ... ‘many people that smoke but did not die’ as HWs, he/she (HWs) already knows the effect of smoking but he/she feels it's their rights (C3).

Several obstacles have been felt by HWs in doing physical activity. Daily stretching exercises in working hours was considered troublesome because they had to stop their work suddenly, stand up, and stretch, while morning exercises on Friday and Saturday were constrained by time. Early morning exercises are not ideal for women, since, as housewives, they have to prepare breakfast and escort their children

to school and arrive on time at work. Moreover, there is an intersection between exercise at 7 a.m. and the start of working hours at 7:30 a.m., leading to more of the staff not coming. "Only one quarter of 20 staff come for exercise" (C3), and this was confirmed by the head of the PHC (H1).

Another obstacle is the heavy workload, leaving no time for physical activities. Their main jobs as clinicians in hospitals and PHCs consume most of their time, and additional community service in the field is energy-consuming. Therefore, they assumed that this reason can be accepted by the community, which commented "HWs were too busy so they cannot do physical activity" (P1). Another opinion by the community was HWs were doing physical activities according to their habits, and this was also said by one informant that was an exercise activist in a PHC, that HWs were not doing morning exercise because it was not their hobby, even though there was obligation to do exercise without force by the head of the PHC.

One consequence of the heavy workload was forcing HWs to work overtime, with lots of meetings. Factors that inhibited doing a healthy lifestyle were overloaded work, improper work schedule, and shift work, which are considered job problems (Amani and Gill, 2013; Kim *et al.*, 2013; Phiri *et al.*, 2014; Patra *et al.*, 2015). Others explained lack of time, lack of motivation, lack of facilities, and feeling tired are personal barriers for physical activities and healthy food patterns (Gupta and Fan, 2009; Patra *et al.*, 2015). On the other hand, age and sex also influenced becoming role models of healthy lifestyles. The older they were, the lower their willingness, and women were more concerned about their roles and more often implemented healthy lifestyles (Hurley *et al.*, 2018).

Furthermore, food was served in every meeting, in the form of a snack or main meal without adjusting for balanced nutritional principles. This has caused health problems in HWs as stated by one of the clinician informants, "when there were so many meetings ... it will cause 'tingling'

(blood glucose rise) when I go home ..." (C2). Moreover, healthy food in the workplace was also lacking, especially at night, and the most interesting aspect observed was the habit of unhealthy food consumption in the workplace and abandonment of health (Tyduk, 2012; Phiri *et al.*, 2014). Another obstacle was taste, even with high education about healthy food, HWs selected their food based on taste and flavor without looking for the nutritional content and health effects, and they were easily tempted into unhealthy choices. In the end, it was stated that "we already know the theory but for implementing that was difficult" (C2), "reality was not the same as what we say" (C3). Becoming role models of healthy lifestyles was considered a burden for HWs and the community.

Ethical code as a binding rule, not just a word

As health professionals, they are expected to not break the social norms and moral principles stated in the medical ethics code. According to some informants, the ethics code is defined as standard rules that control behavior, and clearly act as provision for HWs as role models of healthy lifestyles. Furthermore, it was explained that the ethical code should motivate HWs to implement healthy lifestyles and indirectly form a culture of healthy lifestyle. One clinician at a PHC suggested that the ethics code should not just be treated as important words, but a strong doctrine with clear punishment for violating rules.

The above opinion was rejected by one PHO informant, explaining that implementing healthy lifestyles was supposed to be personal. The ethical code is a set of written rules, and not all the implementers agree with its content or want to implement it. It was further explained that if the purpose of stating a role model of healthy lifestyle as part of developing lifestyle behavior was considered not incriminating, even then there should be a consequence. In fact, the community was questioning HWs' ability to maintain a healthy lifestyle perfectly although it was stated in the ethics code, because they are

just human and not perfect people as indicated by one informant who said the following: “healthy lifestyle in ethics code was heavy for them” (P1).

As stated in this study, support from the workplace was sufficient. Implementing healthy lifestyle programs has not only physical benefits, but also in self-confidence for giving counseling and to become role models (Shahar *et al.*, 2009). Moreover, attending exercising and eating programs will raise self-efficacy and self-motivation to achieve weight goal setting and continue the program. At the end, the results will increase effectiveness and productivity in work (Simfukwe, Van Wyk, and Swart, 2017). Workplace-based health promotion intervention was considered more feasible and beneficial as a method of implementing healthy lifestyles for HWs because it was more possible to maintain sustainability and motivation of doing the daily activities of a healthy lifestyle (Chan and Perry, 2012).

The respondents in this study were limited only to doctors, nurses, and nutritionists, and thus the results could not be generalized to other health workers. This study gave ideas about health institutional support for health workers, and it could be used to evaluate the impact of health programs on community's health behavior.

Conclusion

Healthcare institutions have provided rules and given suggestions and motivation to change health workers' behavior. Healthy behavior such as physical activities, eating a healthy diet, as well as forbidding smoking have been implemented.

Health workers' responsibility, awareness, and commitment towards themselves, the community, and their colleagues should be emphasized and realized to perform as healthy role models.

Abbreviations

PHC: primary healthcare; PHO: professional health organizations; HWs: health workers.

Declarations

Ethics Approval and Consent Participant

This research had received ethical approval from the Medical and Health Research Ethics Committee Faculty of Medicine, Public Health and Nursing Universitas Gadjah Mada number KE/FK/0528/EC/2017 and all respondents were addressed before and taken verbal consent.

Conflict of Interest

The authors declare that there is no conflict of interest that may have influenced them in writing this article.

Author Contribution

AATT contributed to the conception, design of the study, collected, organized and conceived the initial manuscript draft.

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DESIGN OF MARKETING PLAN FOR DENTAL HOSPITALS IN THE DIGITAL ERA

Rancangan Rencana Pemasaran untuk Rumah Sakit Gigi dan Mulut di Era Digital

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Abstract

Background: The development of the digital world has snowballed since the 2000s and has accelerated since the 2010s. Social media is a part of everyday life, and the COVID-19 pandemic has been a significant catalyst for digital life. Despite this, the healthcare industry is lagging compared to other industries in terms of digital marketing.

Aims: The output of this research is a design of a digital marketing plan for a dental hospital based on a robust theoretical foundation and ongoing practical research in dental hospitals.

Methods: This study utilized a qualitative approach and descriptive method to describe the existing condition related to the challenges and the use of digital marketing in dental hospitals. The focus of this study was the development of a digital marketing plan for a dental hospital.

Results: The study obtained several data related to digital marketing activities that have been carried out, challenges in digital marketing, and the preparation of digital marketing development plans at dental hospitals.

Conclusion: The proposed model includes situation analysis, goal analysis, strategy planning, action, and control based on the existing marketing plan. A novelty in this model emphasizes technology components including technoware, hardware, software, infoware, humanware, and organiware.

Keywords: dental hospital, digital era, digital marketing

Abstrak

Latar Belakang: Perkembangan dunia digital telah bergulir sejak tahun 2000-an dan mengalami percepatan sejak tahun 2010-an. Media sosial adalah bagian dari kehidupan sehari-hari, dan pandemi COVID-19 menjadi katalis yang signifikan bagi kehidupan digital. Terlepas dari tantangan tersebut, industri kesehatan tertinggal dibandingkan dengan industri lain dalam hal pemasaran digital.

Tujuan: Luaran dari penelitian ini adalah desain rencana pemasaran digital untuk rumah sakit gigi dan mulut berdasarkan landasan teoritis yang kuat dan penelitian praktis yang terus berkembang di rumah sakit gigi dan mulut.

Metode: Penelitian ini menggunakan pendekatan kualitatif dan metode deskriptif untuk menggambarkan kondisi eksisting terkait tantangan dan pemanfaatan pemasaran digital di rumah sakit gigi dan mulut. Fokus penelitian ini adalah pengembangan rencana pemasaran digital untuk rumah sakit gigi dan mulut.

Hasil: Pada penelitian ini diperoleh beberapa hal terkait kegiatan pemasaran digital yang telah dilakukan, tantangan dalam pemasaran digital, dan penyusunan rencana pengembangan pemasaran digital di rumah sakit gigi dan mulut.

Kesimpulan: Model yang diusulkan meliputi analisis situasi, analisis tujuan, perencanaan strategi, tindakan dan pengendalian berdasarkan rencana pemasaran yang ada. Kebaruan dalam model ini menekankan pada komponen teknologi yang meliputi technoware, hardware, software, infoware, humanware, dan organiware.

Kata kunci: era digital, pemasaran digital, rumah sakit gigi



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Introduction

The development of the digital world has snowballed since the 2000s and has accelerated since the 2010s. Social media is a part of everyday life, and the COVID-19 pandemic has been a significant catalyst for digital life. The health industry cannot be separated from the impact of the disruption of the digital era, especially during the COVID-19 pandemic. Social media with its benefits and risks is always interconnected with human life where dentistry is no longer exceptional (Mary *et al.*, 2020). Despite those challenges, the healthcare industry is lagging compared to other industries in terms of digital marketing (Lindgren, 2020).

Based on the data from the Indonesian Ministry of Health, the number of hospitals in Indonesia registered as of 2019 was 2,877 hospitals, and those certified by national accreditation amounted to 2,465 hospitals. There are 32 hospitals spread throughout the city of Bandung. Four of these hospitals specialize in oral and dental health, namely Maranatha Dental Hospital, Bandung Dental Hospital, Padjadjaran University Dental Hospital, and Jendral Achmad Yani University Dental Hospital.

The continually-increasing number of hospitals has allowed patients the massive opportunity to choose and determine the desired hospital for their treatment. As institutions that provide services, hospitals must carry out business functions because many hospitals have similar services to one another. Each hospital must compete to produce a high-quality service product blended with an excellent marketing strategy.

Based on government regulations, health service facilities in organizing advertisements and publications must provide data and/or facts that are accurate, evidence-based, informative, educative, and responsible. Based on the Hospital Promotion Ethics Guidelines, the promotion must be honest, responsible, and comply with regulations. The promotion must not offend or demean the country, religions, morals, customs, cultures, ethnicities, and sectional groups. The principle of fair competition must inspire promotion, it has

to remain socially responsible, and the services offered must be professional and high-quality.

A digital marketing plan is a strategic document that takes the current situation of a particular organisation to set some midterm goals and determine the strategy and means to accomplish them (Piñeiro-Otero and Martínez-Rolán, 2016). A study related to digital marketing in dental services showed the need for digital methods of promoting medical care services. This is intended to expand a business by offering them quality healthcare services which ensured their satisfaction and increased the probability of their recommending the health facility further (Radu *et al.*, 2017). Another study also showed that emerging technologies could be combined with insights from marketing science to develop successful value-centered marketing in healthcare (Agarwal *et al.*, 2020). From a broader perspective, healthcare IT systems are complex in the implementation process. They aim to support safe and high-quality patient care (Marcu and Popescu, 2020).

Over the past decade, healthcare has experienced fundamentally altered marketing trends. These include developing a more specific marketing approach, service marketing, personalisation, long-lasting relationship with clients, market intelligence, and utilisation of high-tech channels (Purcarea, 2019). In contrast to that fundamental change, there has not been enough research on marketing for healthcare companies (Lindgren, 2020).

The internet/social media is one of the new media widely used as a marketing platform. In the business world, social media is used as a practical liaison and communication tool between companies and customers that can eliminate time and location barriers. Some hospitals in Bandung have seriously taken advantage of digital marketing. This includes websites and social media such as Facebook, Instagram, YouTube, Twitter, and TikTok with more content about health promotions and special events. A recent study showed that internet marketing and current marketing approaches have unquestionably assisted the growth curve.

Meanwhile, conventional marketing tactics are gradually losing their influence among the youth (Gaur and Tonk, 2021). More specific research for dental hospitals in Saudi Arabia showed that social media had become a commonly used marketing strategy in dental practice. It was especially useful for sharing and getting information, as well as to attract new patients (Ajwa *et al.*, 2018).

Digital media have an important role in hospital marketing nowadays. Currently, dental hospitals do not have an integrated digital marketing model. This study looked at the opportunities for a dental hospital to market themselves digitally. This study aimed to answer the challenges in the field of digital marketing and formulate a digital marketing plan for a dental hospital based on a robust theoretical foundation and existing research.

Method

This study used a general qualitative approach related to professional services in marketing research. The qualitative approach for professional services is defined as qualitative dominant. Healthcare topics in marketing research are often balanced with the quantitative approach (Valtakoski, 2020). This study used a descriptive method to describe the challenges and use of digital marketing in dental hospitals.

This study is a single case study which was conducted in a private dental teaching hospital in Bandung. The purpose of selecting a single locus in this study is to get the depth of findings related to digital marketing for dental hospital. However, research conducted at the hospital is expected to produce a role model for other dental hospitals. The selection of a private dental hospital is considered from the flexibility in funds allocation and management compared to that of a government-owned dental hospital.

There is currently a lack of scientific publications on digital marketing plans for dental hospitals. This encourages a phenomenological approach to identify unstructured problems. The key informant of this study was an expert in marketing

responsible for media promotion at one of the dental hospitals in Bandung. Other informants were policy makers or hospital leaders, as well as customers or patient representatives. Data collection was done through an in-depth semi-structured interview, observation, documentation, and panel consultation with two experts of information systems and two experts of marketing. The interpretation of findings was classified according to the context of the problem. Triangulation was carried out through different data collection methods (interviews, observations, and document searches). The interview during the triangulation process was conducted to informants with different backgrounds, and thus it could cross-checked the information from each informant.

The focus of this study was the development of a digital marketing plan for dental hospitals. The validity of the digital marketing plan was ensured through discussions with experts representing academics and practitioners. In-depth discussions were conducted to analyze each of the variables proposed in the model. These variables were to be adapted for practical conditions, the experience of experts, and supporting academic theories. This was done to ensure that the digital marketing plan was suitable for the needs of the dental hospital market. Recommendations from experts were considered for the refinement of the final digital marketing plan. In the final phase, the marketing plan was applied to the dental hospital business plan. A continuous marketing performance evaluation will be carried out to increase the efficiency of digital marketing (Qian *et al.*, 2018).

Result and Discussion

This study was conducted in a dental teaching hospital in Bandung, West Java. It is a hospital that organises dental and oral health services. It is also used as a means of learning, education, and research processes for dental health professionals and other health workers through collaboration with the faculty of dentistry. The facilities and infrastructure available in

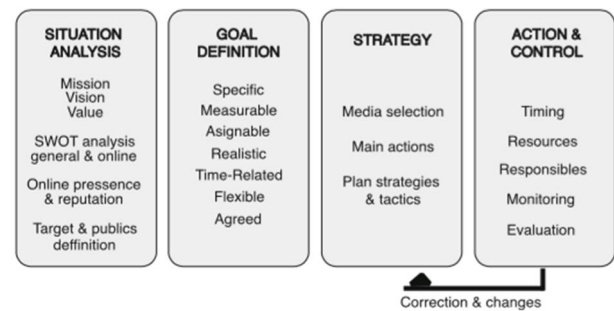
this hospital included clinical laboratories, radiology (panoramic, dental, cone beam computed tomography), pharmacy, ambulances, educational facilities, general dentistry, oral surgery, orthodontics, oral diseases specialist, pedodontics, dental conservation specialist, prosthodontics, periodontists, general practitioners, anesthesiologists, pediatricians, internal medicine, inpatients, operating rooms, and emergency rooms.

In the current era of digital marketing, management and marketing can easily take advantage of various existing facilities. This hospital itself had a marketing method to gradually improve service, patient loyalty, and the number of patient visits every year. Some used internet-based media to support digital marketing. This included Instagram, Facebook, Twitter, YouTube, websites (designated for registration and information), e-mail, and cooperation with one of the city's radio stations.

This study found several challenges for dental hospitals related to digital marketing: (1) there is no specific unit in charge of digital marketing (currently under the public relations and marketing department); (2) minimal digital marketing support facilities (no dedicated room, ordinary camera, and lack of digital editing facility); (3) slow responses to take advantage of the momentum in a fast-changing situation; (4) limited content and lack of creativity; and (5) unstructured publication times.

In initiating this research, the marketing plan's basic framework was used to analyse the existing condition, set up goal definition, and plan the digital marketing strategy, action, and control plan (Figure 1).

Based on this framework, the results of this study produced a specific digital marketing framework for the dental hospital (Figure 2.). The main phases of the basic marketing framework were still followed by deepening of each component in each phase.



Source: Piñeiro-Otero and Martínez-Rolán, 2016

Figure 1. Marketing Plan in general



Source: prepared by the authors

Figure 2. Digital marketing plan for dental hospital

In the context of SWOT analysis, it is essential to highlight the advertising and online marketing components as the primary focus in designing a digital marketing plan. These also can be described as the following: setting the objectives of advertising (mission); information objective (providing information to the patients about the latest products or medical services); persuasive objective (to influence patients' perspective); reminder objective (to remind patients of existing medical services which are already well-known); value-added objective (increasing the value of a medical services or hospital brand); and activity assistance objective (facilitating other services in the marketing process). It is important to highlight that all the steps in this phase needed to align with the primary vision and mission of the dental hospital. The use of the SWOT analysis in

developing marketing strategies has been conducted in previous studies on dental hospitals, but those studies did not focus on digital marketing (Pertiwi, Hariyanto, and Aprilia, 2017).

The next critical step in developing a solid foundation for digital marketing is determining the budget. This can be done by considering several things such as the hospital's capability, percentage of sales budget, competitors' budget, targets and function (if there are specific targets), and market share. The dental hospital needs to set priorities in setting up a solid digital marketing plan. It should invest in supporting facilities for digital marketing before allocating more of the budget towards marketing programs.

Furthermore, it is also necessary to determine message decisions in this phase. This usually starts with data searches, problems, studies, data analysis, and predetermined advertising objectives. In dental health, it is necessary to be familiar with the problems that commonly occur in the community related to dental health. This includes both the most common problems and emergency problems that require immediate treatment. The purpose of determining the message to be delivered is to build a close relationship with prospective patients. Selected messages encourage the use of the dental hospital when needed.

Another important component to consider in conducting a situation analysis for digital marketing is media determination. The steps in selecting advertising media include determining reach, frequency, and impact, as well as selecting the primary media type and service time. An example of choosing the right time for dental hospital advertisement could relate to the time people carry out activities related to dental health. This means targeting promotional material to appear before or after having meals and before going to bed. The selected media will be based on the growing popularity of the media in the community.

The last step in situation analysis is the measurement. This means determining the hospital's reputation online and the potential of followers that can be considered targeted patients (prospective patients). During the study period, the number of primary social media followers of this dental hospital was 3,189 Instagram followers. They had an average of 400 participants during a live question and answer session. It was determined that the content created was lacking variation, and prospective patients were not interested. Suggestions for this problem were improvement of the design using the latest creative technology. This content development also needs to address the target patients and segments in online media.

In the goal analysis phase, a measurement should be made to measure patients' satisfaction related to several variables: (1) the relationship between hospital services and patients; the digital marketing program must accommodate hospital services with the care needs of prospective patients; (2) convenience of service; this can involve staff friendliness, hospital cleanliness, and short waiting time; (3) patients' autonomy to choose their treatments; (4) knowledge and technical competence offered through digital media; this will benefit the prospective patients in prevention and early care of their conditions; (5) service effectiveness; speed up services provided with an appointment before coming to the hospital; and (6) patient safety.

The third phase of the digital marketing plan is planning a strategy. This can be done by utilizing online media such as Facebook, Instagram, YouTube, websites, Twitter, and TikTok. Additionally, paid media and earned media could be used. Paid media refers to paid promotion. Earned media includes online word of mouth with mentions, reposts, reviews, and review recommendations by outsiders. After determining the media selection, an action should follow accordingly. This

action should be specific, such as creating exciting content tailored to the majority of the prospective patients. Suitable content must consider factors affecting patient satisfaction and loyalty. This may include patients' perceptions of dentist services assurance and reliability, staff services, responsiveness, empathy, prices, and facilities or tangibility (Asih *et al.*, 2018; Akbar, Pasinringi, and Awang, 2019; Santosa and Azam, 2020; Siripipatthanakul and Bhandar, 2021). The content developed can be directly related to dental health, such as educational information about dental health and oral hygiene. It can be delivered through media feeds or webinars from experts. However, this content can also be combined with indirect messages related to dental and oral health, such as quizzes, competitions, dances, and viral media that develop in the community.

This phase also includes planning strategies and tactics which involve technoware and supporting facilities. Technoware consists of hardware, software, and networks. Hardware components such as computer sets and photographic tools are essential. Software in digital marketing can be used for digital editing, content development, optimizing the utilization of earned and paid media, and analysing the company's online presence. A company's presence can be monitored through mentions, Google alerts, Hootsuite, web positioning, Alexa ranking, Klout, peer index, or kreed. Network components consists of the network infrastructure, network security and accessibility, and high-speed internet connections. Supporting facilities needed to support the digital marketing include particular rooms for digital marketing staff and editing.

The last phase in the digital marketing plan is action and control. Although the period or target for digital marketing must be achieved quickly, resources in a digital context should be determined as humanware. This means suitable criteria for human resources related to digital

marketing. This includes certified staff in digital design, digital marketing communication, and digital human relation. Besides that, medical staffs also need attention because the determination of the content is related to the performance of the medical personnel of a hospital. A study in Iran showed one of the important factors in the delivery of health services in hospitals is quality of service (Bafghi *et al.*, 2018). Another challenge that needs to be addressed is the perception of dentists about marketing. This might be an issue due to the perspective that marketing may make dentistry seem more like a trade than healthcare service (Shukla *et al.*, 2019). In addition, the infoware component must be fulfilled in designing a proper digital marketing plan. Infoware is information content that must be presented in digital marketing. This includes the variation of content and digital communication styles that suit the majority of prospective patients in online media. According to Hootsuite, content that involves asking questions, comparisons, interviews, promotions, giveaways, treatment packages, testimonials, and interactive content can be used in hospital promotion. On the other hand, prices, product discounts, and services should not be displayed. A literature study showed digital marketing has proven to be of great importance in the dental services market. However, it must comply with regulations and ethical precepts of the Dental Ethics Board to prevent ethical challenges (Lira and Magalhães, 2018). The organizational component is also included in the required resources for digital marketing. It consists of formal policies and instructions for operating the system, organizational structure, management system, data processing procedures, and usage guidelines.

The organization is fully responsible for everything related to hospital promotion activities; therefore, it is necessary for the "organiware" section to regulate all regulations related to promotional activities.

Leaders in organizations have an essential role in driving digital marketing maturity (Negricea and Purcarea, 2017). After the action has been taken, monitoring and evaluation will always be needed for every activity that has been carried out or is currently running. This is to ensure they are on track, do not violate existing rules, and are meeting the goals. Every challenge needs to be solved dynamically depending on the changing situations.

Conclusion

The design of a digital marketing plan for the dental hospital was adapted from a basic marketing plan framework (Piñeiro-Otero and Martínez-Rolán, 2016). The revised model includes the following: situation analysis (determining the mission, SWOT analysis, marketing budget, media determination, message category, and measurement of the company's online reputation and the target market); goal analysis (relationship, amenities, choice, scientific knowledge and technical skill, service effectiveness, and safety); strategy planning (media selection, main actions, strategy, and tactics); action and control (timing, resources, monitoring, and evaluation). A novelty in this model emphasizes technology components, including technoware, hardware, software, infoware, humanware, and organiware. The digital marketing model can be started by modifying the organizational structure that specifically facilitates digital marketing units in terms of structure and reliability of human resources, adequate provision of hardware and networks, integration of data and applications between websites, social media, and various digital marketing channels. The digital marketing plan of this study can be applied to other dental hospitals in Indonesia. The application of this model in public hospitals may require adjustments and further investigation.

Abbreviations

SWOT: strength, weakness, opportunity, threat

Declarations

Ethics Approval and Consent Participant

Respondents were addressed before the survey about the survey's objectives and purposes. Verbal consent to participate in the study was obtained from respondents.

Conflict of Interest

The authors declare that there were no significant competing financial, professional, or personal interests that might have affected the performance.

Availability of Data

Data can be provided by request to the corresponding authors.

Authors' Contribution

YA, JFM, and FS conceptualized the study; YA, JFM, and FS created the methodology; YA, JFM, and FS wrote, reviewed, and edited the manuscript; YA, JFM and FS wrote the original draft.

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A QUALITATIVE STUDY: HOSPITAL PATIENT COMPLAINT MANAGEMENT

Studi Kualitatif: Manajemen Keluhan Pasien di Rumah Sakit

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Abstract

Background: Complaint management is vital for hospitals as patient complaints can be used to advance the quality of health services provided.

Aims: This study analyzed patient complaint management at an X government hospital in Yogyakarta.

Methods: The research used a descriptive-qualitative method and phenomenology, which was carried out through in-depth interviews, observation, and document review. It involved the head of the legal and public relations department, the head of the public relations sub-division, two staff of the legal and public relations department, two officers to outpatient and inpatient units, and two patients. This study used purposive sampling to select the samples. Data analysis referred to was from the concept of Miles and Huberman, which consists of data reduction, display, and verification. The accuracy of all data was checked using a triangulation method.

Results: The hospital followed the patient complaint management procedures. Providing complaint reporting platforms is required to lodge patient complaints to the hospital. Moreover, the suggestion box should be managed properly, and thus the complaints on the box can be managed promptly.

Conclusion: Overall, patient complaint management at the hospital has been carried out well and followed the standard operating procedures (SOP).

Keywords: complaint, handling, management, patient

Abstrak

Latar Belakang: Manajemen keluhan penting bagi rumah sakit karena keluhan pasien dapat digunakan sebagai informasi untuk meningkatkan kualitas pelayanan kesehatan yang diberikan.

Tujuan: Penelitian ini menganalisis manajemen penanganan keluhan pasien di rumah sakit pemerintah X di Yogyakarta.

Metode: Jenis penelitian ini adalah kualitatif dengan pendekatan fenomenologi yang dilakukan dengan wawancara mendalam, observasi dan telaah dokumen. Subjek penelitian ini terdiri dari kepala bagian hukum dan humas, kepala sub bagian humas, 2 staf bidang hukum dan humas, 2 penanggung jawab setiap instalasi rawat inap dan rawat jalan, dan 2 pasien. Metode dalam penelitian ini menggunakan teknik sampling purposif. Analisis data dilakukan dengan mengacu pada konsep Miles dan Huberman yang terdiri atas reduksi data, penyajian data, dan penarikan kesimpulan. Keabsahan data penelitian melibatkan metode triangulasi.

Hasil: Rumah sakit Pemerintah X telah menerapkan SOP penanganan keluhan pasien. Namun, penyediaan fasilitas pelaporan keluhan diperlukan untuk menyampaikan keluhan pasien kepada pihak rumah sakit. Selain itu, perbaikan pengelolaan kotak saran perlu dilakukan sehingga keluhan yang masuk melalui kotak saran cepat tertangani.

Kesimpulan: Penanganan keluhan pasien di rumah sakit tersebut secara keseluruhan sudah dilaksanakan dengan baik dan telah sesuai dengan prosedur standar pelaksanaan.

Kata kunci: keluhan, manajemen, pasien, penanganan



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Introduction

According to the Regulation of the Indonesian Ministry of Health No 129/Menskes/SK/II/2008, hospitals as one of the health facilities that provide health services to the community have a very strategic role in accelerating the community health status. Quality services at hospitals need to be following established standards and can reach all levels of society. Based on Law No. 44 of 2009 concerning hospitals, hospitals are obligatory to provide safe, quality, anti-discrimination, and effective health services by prioritizing patient interests under the hospital service standards, as well as respecting and protecting their rights.

Patients have rights to submit proposals and suggestions for improving the hospital's treatment, and to sue the hospital for being suspected of unstandardized services related to either civil or criminal matters. They primarily can complain about inappropriate hospital services through print and electronic media by statutory provisions.

Patients who are not satisfied with the service may complain and express negative responses to the hospital. Handling them quickly, precisely, and responsively will make patients feel calm. Therefore, complaint management is necessary to improve public service systems and to increase the legitimacy of service institutions to the public (Muzanil, 2016). Hospital complaint management is unsatisfying as hospitals only provide a suggestion box for manual complaint submission. Evidently, hospitals still implement slow complaint management and do not deliver complaint handling information from the hospital to patients. Otherwise, complaints that are not handled properly can impact the hospital's health care process (Irawan, Nawawi and Ahmad, 2016).

Complaint submission facilities are not appropriately provided according to the Decree of the Republic of Indonesia Law No. 25/2009 concerning Public Services.

Hospitals have incomplete stationery and complaint forms that prevent patients from submitting their complaints. Also, hospitals sometimes open the complaint submission once a week due to the limited staff in charge of taking the suggestion box.

Based on the interview with the Head of Legal and Public Relations Division, dr. Sardjito Central General Hospital has provided a patient complaint platform where patients can submit their complaints directly to the Law and Public Relations Office or indirectly to suggestion boxes, letters, or social media. Patient complaints can be resolved within three timeframes: 7x24 hours, 3x24 hours, and 1x24 hours. It is also categorized based on facilities used to submit the complaints. Based on the above background, this study aimed to analyze patient complaint management at an X government hospital in Yogyakarta.

Method

This study was qualitative and used phenomenology which was done through in-depth interviews, observation, and document review. It involved the head of the legal and public relations division, the head of the public relations subdivision, two staff of the legal and public relation division, two officers in charge of each inpatient and outpatient installation, and two patients. The research subjects should fulfill the following criteria: being officers in charge of complaint handling and management in the legal and public relations department, outpatient and inpatient units for at least two years.

A purposive sampling technique was performed to select the informants. Data analysis in this study referred to the concept of Miles and Huberman (2014). First, data reduction was carried out by simplifying and sorting the results according to needs, and data display was then carried out to present the data narratively. The last was concluding the results (verification) by comparing the results with existing theoretical studies. To maintain the validity of the data, this study used triangulation methods and sources.

Results and Discussion

Planning

Purpose of Complaint Handling

The X government hospital renews complaints handling policy every five years to provide access for the community to lodge their complaints about unstandardized treatment. The results of the interview stated that the complaint management system gathers the community to channel their dissatisfaction or complaints about the health services provided. The following is the interview excerpt with the informant.

"We are planning to build a new system and it has been running for 3-4 years because the complaint handling planning policy is carried out every 5 years" (Informant A)

"How do we see the planning by opening access to the public and then channeling complaints through the suggestion box and then through the media, namely email, WA, SMS, FB, we will monitor this letter during working hours" (Informant B)

The hospital also provides basic compulsory training on complaint management, for example how to input, deliver information, or handle complaints on social media to not humiliate the image of the hospital.

"We are overcoming it, that every new employee will be given training every year there is basic compulsory training so that monitoring / helping to deal with complaints through social media / FB is not only public relations people but it could be from the hospital employees themselves if there is information that deviates from customer" (Informant A)

Training not only affects work efficiency and effectiveness but also benefits the hospital from performance improvement (Yuniarti and Lingga, 2019). With the training, officers can do their job properly. The Decree of the Director of RSUP Dr. Sardjito Number: 1647/

MENKES/PER/XII/2005 states that the legal and public relations department is responsible for providing information and communication services, reports, as well as managing public opinion or customer complaints quickly and accurately.

Feedback could be either negative or positive value. The positive feedback could be useful to evaluate shortcomings and improvements either for hospital management and image. Hospital pain has a character in response to complaints, namely with kinship and honesty (Ariadi, 2019). Patient complaints that are not handled properly will decline the quality of hospital services and cause dissatisfaction or disappointment. Consequently, that also can increase competition between these hospitals (Sujarwo and Subekti, 2019).

Funds

Based on the results, funding for patient complaint management at the hospital is managed by the legal and public relations department. That also involves budgeting to improve facilities/infrastructures. However, the funding was inadequate because it was used to pay for the staff at the department. The budget is submitted to the Director-General of Operations. If it is approved, the Budget Planning (PEA) section will allocate funding for operational support and priority of goods. The results are shown in the following interview excerpt.

"Ourselves compile the budgeting, after that we will proceed it to the board of directors from there it will be processed again" (Informant A)

"For the budget for repairing the facilities, yes, we propose that the budget must be under the government bureaucratic mechanism, and the financial accountability is tiered" (Informant B)

Service resources include manpower, financing, infrastructure, facilities, and institutional arrangements. With adequate resources, the services will be run smoothly; otherwise, it is very difficult to provide quality service according to its objectives (Suhadi *et al.*, 2019).

Another study showed no budget for funds specifically allocated for customer complaint handling (Yonosari, Pawelas, and Kusumastuti, 2018). To meet the needs of complaint handling, budgeting goes to other units (mains). Sources of funds are allocated from the hospital's macro funding sources, namely the Regional Budget and BLUD.

Organizing

This study discovered that Human Resources (HR) involved in patient complaint handling come from different units. The Head of Legal and Public Relations Department designates all existing staff to handle both direct and indirect complaints. The following is the interview excerpt with the informant.

"In Public Relations, to handle complaints, all PR people must be able to handle complaints. So all public relations staff have the responsibility for handling complaints, for complaints originating from outpatient installations which are assigned four people from the public relations and inpatient departments who have their service responsibility". (Informant A)

"Those involved in handling complaints of all staff at PR because we are required to be able and able to handle problems that customers complain about". (Informant C)

However, the availability of human resources was not adequate because there were only officers who are responsible for checking or collecting suggestion boxes. Meanwhile, staff in other units had their respective responsibilities in handling complaints.

It is highlighted that the front desk officers received five basic compulsory training besides the officers who handle complaints also refer to the Flow and SOP for handling complaints so that the ability to handle complaints is good enough. This is in line with Yulianti (2015) who states that training is a process of forming employees to obtain work effectiveness and of staff development. Also, it is useful to increase

the capacity of human resources to be better at knowledge, work skills, and work professionalism in achieving the company goals (Aswad and Ferrial, 2016).

Implementation

Standard Operational Procedures

Patient complaint management at the hospital already followed the Standard Operational Procedures (SOP). The SOP was formulated by the Head of the Legal and Public Relations Department in accordance with the organizational structure, main tasks, and functions. The standardized patient complaint handling starts from receiving incoming minor or major complaints. This result is extracted from the interview excerpt as follows.

"We establish SOPs by referring to the legal and community sections, then make the procedures of the complaint reporting mechanism. Lastly, we consider the complaint status either complete or closed"(Informant A)

"So the complaint handling procedure that we have includes starting from the follow-up of complaints, the level of complaints, which means starting from minor, moderate and severe complaints. They are all included in one procedure" (Informant B)

It is relevant to the research by Marliana (2017) who found the officers received, recorded, confirmed, and resolved complaints based on its types: minor, moderate or major. According to Law Number 25 of 2009 concerning Public Services, a manager should create complaints management procedures, appoint an executor for handling the complaints, and determine which complaints are prioritized. Complaints from the suggestion box and social media must be resolved based on the SOP.

Complaint Handling Flow

The results showed several important activities of complaint handling had been run effectively. The first step performed was receiving and identifying both direct and indirect complaints. Second, incoming

complaints would then be recorded and recapitulated by the officers. Next, the officers would find and propose the solutions by coordinating with the installation/work unit; afterwards, they would respond to customers with respect. Then the last one was providing feedback to the patient and gathering their responses.

Receiving and Identifying Complaints

The first step taken in handling complaints was receiving and identifying patient complaints. The officers dredged the data up and completed information needed for resolution discovery. The result is shown in the interview excerpt as follows.

"When the patient comes, we listen to what he is complaining about and the important thing is not to talk from the person who reported it, then we say thank you. If we have already noted it down first then we will contact the related department (Informant F)"

"The first step in dealing with incoming customer complaints is handling the customer's anger. Be patient and allow the patient to express their annoyance and anger first. After we figure out the case and calm the patients, we can try to solve the problem or provide a solution." (Informant D)

Generally, complaints could be submitted through the suggestion box available at the service point, where every customer may receive fast, smooth, straightforward, and affordable services (Suhadi et al., 2019).

This is in line with previous research discovering direct and indirect methods in the complaint submission (Ariadi, 2019). Direct complaint submission has a positive effect on the hospital since both patients and officers can discuss what has happened directly. Previous research found organizations collected customer complaints in several ways, such as suggestion boxes, customer complaint forms, special telephone lines, websites, comment cards, customer satisfaction surveys, and customer exit surveys

(Indriyani, S. Mardiana, 2016). Such complaint handling is known as the "Recovery Paradox".

From three types of complaints, the hospital refers minor complaints to administration and moderate complaints to doctors' and nurses' services. In addition to these types, serious complaints deal with errors in the administration of medical actions by officers and could be detrimental to patients. The following interview excerpt explains the results.

"Light is usually facilities such as dirty toilets, broken doors when it comes to the doctor himself, it is wrong to administer the medicine with weight" (Informant C)

Research at A.M Parikesit Hospital found 3 types of complaints. First, minor complaints were resolved immediately after coordination with the relevant work units. Second, moderate complaints required further coordination than just resolving with the customer. Three, Serious complaints are complaints that are resolved through legal channels (Marliana, 2017). Complaint handling at dr. Sardjito Central General Hospital was handed over to the legal and public relations department that determined the types and solution.

Complaint Documentation

The X government hospital recorded complaints using complaint forms. Complaints were recorded by type and submission method. The following is an interview excerpt to support the result.

"We record the complaints depending on the type so that when we recapitulate we will know which complaints came directly and through the media. Complaints that come in directly already have a form containing their identity as well as complaints that come in through the media or indirectly also have the same form. It's the same, usually I don't usually state my identity either" (Informant A)

"What we need in documenting all complaints is his identity. Usually, if we complain directly, we give the

complaint form so that the patient is filled in. If indirectly through the suggestion box, they already have their own identity, so they have filled in their own identities so we just need to record it back in the complaint report book. The form used is the same, it's just that we differentiate the records " (Informant B)

Complaints are recorded monthly by types of service, ethics, and facilities as well as submission media. The documented complaints would later be used as evaluation materials by the relevant work units in monthly meetings with related heads of units. However, the hospital still faces obstacles in the complaint management. For instance, patients who submitted complaints did not provide their identity or fill in the forms. The following interview excerpt explains the results.

"All complaints that we enter are recorded manually, then in a month we will recap, if there are complaints that have not been resolved, then we will submit it to PR and will be discussed during the coordination and evaluation meeting" (Informant F)

"I make a report every month, through the head of the Legal and public relations section we convey it to the Director of the general and operational section. We make a report after the patient's complaint status is closed, if it is still open it means that the status is open. Because usually there are complaints that can be handled quickly, some are not that fast" (Informant C).

Complaint records are effective complaint management to facilitate any continuous improvement efforts (Marliana, 2017).

Search and Submission of Solutions

Every officer who received complaints coordinated with the installation/work unit. The search for a solution depends on types of complaints and submission facilities. This is in

accordance with the interview excerpt as follows.

"We solve problems /complaints if the category is mild to moderate, then it can be resolved right away. If it has entered into the realm of law, then it is immediately submitted to PR but still coordinates with the unit being complained of " (Informant E)

"When the customer comes with a legal complaint, the Public Relations department will immediately coordinate with the board of directors and committees. But that rarely happens, unless it's heavy if it can still be mediated. So try not to complain about getting up, so the end of the complaint must be finished when it's finished. But if he doesn't finish proceeding to the ethics committee, there's another SOP. " (Informant A)

To handle customer complaints optimally, the hospital should improve several aspects; improving quality of customer service officers; providing call center/contact center available for disseminating information about the doctor's practice schedule, available rooms; providing the hospital's website for information update and a suggestion box where patients can lodge complaints privately (Sujarwo and Subekti, 2019).

Customer complaints can be responded directly by active listening and without taking sides (Yonosari, E. Pawelas, S. and Kusumastuti, 2018). The hospital currently researched had three time frames to solve patient complaints. According to Irawan et al. for minor and moderate complaints, the hospital needed no more than 1x24 hours. However, complaints submitted to the suggestion box require a longer time because checking was done once a week, and so did major complaints (Irawan, Nawawi and Ahmad, 2016).

A good and appropriate feedback method is required, and thus customers can understand the solutions offered. Good speaking skills are required for each officer. This further confirms that each officer and installation/unit has sufficient ability to

handle complaints as seen from the following interview excerpt.

"In handling complaints, the staff here is quite good, because, in PR itself, all officers must be able to handle it so they already understand". (Informant A)

"Enough, both the installation and the staff here already understand what the process should be." (Informant B)

The problem of service complaints requires a little handling of the section head. Also, providing information on staff assigned to the patient is good and clear in handling complaints. Novitasari (2018) found in her research handling minor complaints only took ≤ 15 minutes.

Feedback

Feedback for patients aims to find out their response towards complaint handling. Based on the results, the officers approached the patients if the patient wanted to get information related to the service. This is in accordance with the interview excerpt as follows.

"When the patient is satisfied with the answer we give, we will ask again, maybe there is still something left unanswered. If the patient is satisfied and says enough and says thank you. Yes, it means closed and finished". (Informant B)

Previous research showed officers who offered assistance with patient complaints could make patients satisfied with the services (Irawan, Nawawi, and Ahmad, 2016). The officers in charge provided other solutions by talking with the head of the department when the patient was not satisfied. Good feedback can also promote a good image for the hospital. If complaints are not addressed, it may cause a bad reputation that will decline patient visits and trust. Customer complaints are things that cannot be ignored (Marlinae *et al.*, 2016).

Complaints are public expressions arising because of public dissatisfaction with a service product. However, not each dissatisfaction will be expressed with complaints. The public will lodge a

complaint if they feel that the complaint submitted has not received a positive response (Hendramawan, 2016).

Facilities for Complaint Handling

The hospital has available facilities to accommodate complaints including a special room for direct complaint reporting, and telephone, suggestion box, email, and WhatsApp for indirect complaint submission. This is in accordance with the interview excerpt as follows.

"We provide facilities, there is a suggestion box, email, WhatsApp and telephone, for direct complaints, you can go directly to Public Relations". (Informant A)

"You can directly go to the public relations office if indirectly you can via telephone, suggestion box, email, WhatsApp". (Informant B)

The hospital has established standards in the facility management. For example, complaints from the suggestion box were collected twice a week on Wednesday and Friday. Whereas, complaints from the media were gathered every day during working hours. Problem solving should be undertaken through effective and assertive communication, especially in the information and customer service sections (Muhadi, 2016).

Control

Supervision of SOP

Meriza (2018) defined oversight as the overall summary of supervising, checking, matching, and controlling all activities that follow the planned plans and desired results. Supervision is not solely intended to find and correct mistakes, but rather to prevent mistakes from occurring (Meriza, 2018).

Supervision carried out at the hospital was related to the implementation of SOP, officers' work performance, and follow-up actions or reports of complaints. At the hospital, complaints handling started from the lowest level to the highest level, where the directors involved all relevant units. The results concerning the hospital supervision

is evidenced from the interview excerpt below.

"After we resolve the existing complaints, do not forget to check again whether it is true that all complaints have been handled. If it turns out that there are complaints that have not been resolved, then we will follow up to the patient through the existing identity". (Informant A)

"The handling of complaints is effective and is in accordance with the procedure, so for each room, they usually handle the existing complaints first, if they are not finished, then proceed to the public relations department. Usually, all units already understand the procedure." (Informant B)

In addition to monitoring the applicability of the SOP for complaint handling, the legal and public relations department also supervised unresolved complaints by checking the complaint report book and contacting the patient from their registered identity. Major complaints posted on social media or suggestion box outside working hours were handled once the officers checked them out. Therefore, it is necessary to develop human resources, and thus productivity can encourage the company's progress.

Minimizing Complaints

Complaints are very useful as the experiences of service users at hospitals. Hospitals must respond positively to complaints without hesitancy to deal with them. Complaints can be used to improve hospital services (Ariadi, 2019). Using complaints, hospitals can find out their weaknesses of services and thus repair their future performance (Megawati, 2018).

Minimizing complaints could prevent further complaints from recurring. The results showed complaints could be minimized after the officers evaluated the meetings with directors and customer satisfaction surveys, as well as provided orientation to patients.

"Every month there is a meeting with the board of directors, one of which is

to find out about things that many patients complain about, and things that are still lacking in providing services, so that there are no more complaints, besides that we also see the results of the patient satisfaction survey. (Informant A)

"We always motivate patients, provide education to patients, until we record / inform patients regarding hospital procedures so that the same complaints do not happen again". (Informant F).

The result accords with the interview excerpts that the officers took a good step in minimizing complaints. However, inaccuracy in complaint handling will be a restraint to patient satisfaction and quality service (Suhadi *et al.*, 2019).

Evaluation

Evaluation is an examination of the implemented programs for better performance. The hospital conducted a more forward-looking evaluation to improve the success of the complaint management. Through evaluation, the hospital could find out the most recurrent complaints.

"Once a month there is an evaluation with management. Everyone is present at the meeting, both the board of directors, all divisions, and work units will be present. Evaluation is carried out to analyze the parts that always cause complaints." (Informant B)

"The standard refers to the number of complaints each month, to see whether the complaints increase or decrease, and continue if the types of complaints are mild, moderate or severe. With the hope of complaints that no patient will return with the same complaint". (Informant C)

This study found that the hospital conducted monthly meetings involving the board of directors, departments, and installations. In the evaluation, the hospital reviewed the number, topics, and types of complaints.

The hospital leader significantly plays a role in complaint handling. Under current conditions, hospital leaders who lack the political relation will manage complaints effectively, leading to inadequate human resources in the complaint handling department (Jiang *et al.*, 2014).

Conclusion

The analysis of patient complaints management at an X government hospital in Yogyakarta concluded that a complaint handling policy has been established by providing facilities where patients can submit their complaints and training to new officers/employees to participate in handling negative responses on social media. A person was already assigned to handle complaints in the law and public relations department and outpatient and inpatient installations. However, additional human resources are required to manage the suggestion box. Despite the implemented complaint management, the hospital had several obstacles for documenting the senders of the complaints as well as having inadequate stationery and complaint forms and mismatched schedule of complaint collection.

Complaints handling at the hospital was supervised and evaluated every month through meetings with the board of directors, departments and installations/work units. The evaluation considered the number, topics, and types of complaints.

Abbreviations

BLUD: regional public service agency, SOP: Standard Operating Procedure, PR: public relation.

Declarations

Ethics Approval and Consent Participant

This study has passed the ethics review from the ethics Review Center of the Medical and Health Research Ethics Committee (MHREC) Faculty of Medicine Gadjah Mada Dr. Sardjito General Hospital.

Conflict of Interest

The authors state that there is no conflict of interest for this article.

Availability of Data and Materials

The availability of data and materials based on demand from journal and readers.

Authors' Contribution

SKW and NCB conceptualized the study and created the methodology; SKW wrote, reviewed, and edited the manuscript; NCB wrote the original draft.

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PARENTS' SATISFACTION WITH MEASLES RUBELLA IMMUNIZATION SERVICES FOR SCHOOLERS DURING THE COVID-19 PANDEMIC

Kepuasan Orang Tua pada Layanan Imunisasi Measles Rubella Anak Sekolah Selama Pandemi COVID-19

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Abstract

Background: Measles Rubella (MR) immunization coverage for schoolers in Semarang City decreased to 92.7% in 2020 due to the COVID-19 pandemic. However, in practice, many parents still complain about MR immunization services for schoolers.

Aims: This study aimed to determine parental satisfaction with MR immunization services during the COVID-19 pandemic.

Methods: This quantitative study used a cross-sectional approach. Purposive and proportional sampling was used to select 102 samples. Data collection was done through questionnaire, and data were analyzed using the chi-square test and importance-performance analysis test.

Results: The lowest suitability dimension level was tangibility (81.52%), followed by responsiveness (86.6%). The reliability dimension had the highest average conformity level (92.87%). The priority items for improvement were related to health workers' compliance with the use of complete personal protective equipment (PPE), spacious immunization service rooms, registration officers' responsiveness in giving directions, punctual immunizations distribution, polite and friendly registration services officers, as well as health workers' initiative to remind parents about health protocols. Bivariate analysis showed there was no relationship between respondents' characteristics and their satisfaction level.

Conclusion: Parental satisfaction with MR immunization services for schoolers did not match their expectations; therefore, it is necessary to improve future immunization services.

Keywords: COVID-19, MR immunization, satisfaction, service quality

Abstrak

Latar Belakang: Cakupan imunisasi Measles Rubella (MR) anak sekolah tahun 2020 di Kota Semarang menurun hingga 92,7% akibat pandemi COVID-19. Namun, dalam pelaksanaannya masih ditemui keluhan orang tua pada pelayanan imunisasi MR anak sekolah.

Tujuan: Penelitian ini bertujuan untuk mengetahui kepuasan orang tua terhadap pelayanan imunisasi MR di era pandemi COVID-19.

Metode: Penelitian kuantitatif dengan pendekatan cross-sectional. Pengambilan sampel menggunakan teknik purposive and proportional sampling dengan jumlah sampel 102. Pengumpulan data dengan kuesioner dan dianalisis menggunakan chi-square dan uji importance performance analysis.

Hasil: Tingkat kesesuaian rata-rata dimensi yang paling rendah adalah tangibles (81,52%), diikuti dimensi responsiveness (86,6%). Dimensi reliability mempunyai tingkat kesesuaian rata-rata paling tinggi (92,87%). Item-item yang menjadi prioritas perbaikan terkait kepatuhan petugas kesehatan menggunakan alat pelindung diri (APD) lengkap, ruang pelayanan imunisasi luas, petugas pendaftaran tanggap dalam memberikan arahan, imunisasi dilakukan tepat waktu, petugas pendaftaran melayani dengan sopan dan ramah, petugas kesehatan mengingatkan orang tua untuk menjaga protokol kesehatan. Analisis bivariat menunjukkan tidak ada hubungan antara karakteristik responden dengan tingkat kepuasan.

Kesimpulan: Kepuasan orang tua pada layanan imunisasi MR anak sekolah belum sesuai antara harapan dengan kenyataan, sehingga perlu adanya perbaikan pelayanan imunisasi di masa mendatang.

Kata kunci: COVID-19, imunisasi MR, kepuasan, kualitas pelayanan



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Introduction

Measles Rubella (MR) immunization for schoolers, especially for 1st graders in elementary school, is part of a follow-up vaccination program administered through integrated activities between school-health units and the School Children Immunization Month (SCIM) program provided by primary health centers (PHCs). The MR immunization has been deemed inadequate during infancy to protect the body from vaccine preventable diseases (VPDs/ PD3I). It is given again as a booster when children enter school age (Maimunah, 2017).

A preliminary study at the Semarang City Health Office showed that the SCIM coverage decreased to 92.7% in 2020 from 98.8% in 2019 partly due to the COVID-19 pandemic, which was first confirmed in March 2020 in Indonesia. The implementation of immunization for schoolers is carried out by PHCs in accordance with the Indonesian Ministry of Health with a Letter Number SR 02.06/4/9/9760/2020 regarding the Implementation of the School Children Immunization Month during the Corona Virus Disease 2019 (COVID-19) Pandemic. In Point 3, the immunization provision strategies for schoolers must be designed according to the epidemiological situation, regional government policies, education units, as well as regional PD3I epidemiological conditions. The SCIM procedures changed because school was held online.

Further preliminary studies were conducted at two PHCs, Poncol PHC (69.21%) and Halmahera PHC (80.69%) which also experienced decreasing immunization coverage. The results showed that the immunization program was worse due to the COVID-19 pandemic. In the research, ten parents who immunized their children at the PHCs were interviewed. Seven out of ten parents considered the immunization services not optimal during the pandemic. The negative perceptions that arose about services affected parents' assessment of service quality during the COVID-19 pandemic.

Parents who fear of contracting COVID-19 tend to not go to PHCs.

Service quality is one of the most important factors in health services. Hence, conducting quality assessment contributes to service satisfaction. This assessment is not only limited to physical or visual forms but also related to attitudes, knowledge, and skills of health officers, as well as service punctuality, officer's responsiveness, support, and an adequate physical environment (Pohan, 2016). Service quality could be determined through five dimensions, namely tangibles, reliability, responsiveness, assurance, and empathy (Kuntoro dan Istiono, 2017). These five factors will determine parental satisfaction with MR immunization services for schoolers in the COVID-19 pandemic. Satisfaction from service users is the comparison between perceptions and expectations desired by users (Purwaningrum, 2020). Little research focuses on parental satisfaction with MR immunization for their children during the COVID-19 pandemic. Based on the background, this study aimed to determine parental satisfaction with MR immunization services for schoolers in the COVID-19 pandemic.

Method

A quantitative study was conducted using the descriptive analytic method with a cross-sectional approach. The target population were 1,954 parents who had children at first grade of elementary school and had visited the PHCs before the research took place. These consisted of four health centers, namely Ngesrep PHC, Poncol PHC, Karanganyar PHC, and Rowosari PHC. The PHC samples were determined using the purposive sampling technique based on the criteria. Only PHCs close and far from the city center, as well as the highest and lowest immunization coverage in Semarang City. Based on these criteria, the four PHCs were selected as research locations. The number of samples amounts to 102 respondents who were divided proportionally according to inclusion and exclusion criteria. The selected respondents have to have a child

at 1st grade and utilize the MR immunization services at the PHCs, reside in Semarang City, and voluntarily fill in the questionnaires. The exclusion criteria were respondents who did not provide the answers and/or respondents who did not answer the questionnaire completely.

Data were collected through an online questionnaire via Google Form to all parents according to the PHCs' visitor list. The questionnaire consists of closed questions about aspects of expectations and reality of child immunization at PHCs. The independent variables include a) tangible dimensions (health workers' appearance, physical infrastructure, information and communication media, and ease of access to services); b) reliability dimension (the ability to provide services, ease of service, and service suitability); c) responsiveness dimension (service delivery speed, responsiveness in providing services, response time to users' needs, and the ability to provide information); d) assurance dimension (officers' knowledge, skills, courtesy, friendliness, ability to communicate, and service security); and e) empathy dimension (officers' attention, understanding service users' needs, and respondents' characteristics i.e., age, gender, education, occupation, and income. The dependent variable is the parental satisfaction level. Data were analyzed using the importance performance analysis (IPA) test and chi-square test for a bivariate analysis to determine the relationship between

respondents' characteristics and satisfaction. Statistically, there is a relationship if the p-value obtained is less than 0.05 ($p < 0.05$).

Result and Discussion

Respondents' Characteristics

As Table 1 shows, the majority of respondents were females (64.7%) and young adults aged 18-40 years old (55.9%). Most of them had completed secondary education (51.9%), and 52.9% had a high income ($> \text{Rp}2,810,025$). The percentage of respondents who had formal work was higher (71.6%) than those who did not work.

Parental Satisfaction with MR Immunization Services for Schoolers

Tangibility Dimension

The tangibility dimension had the lowest average conformity level compared to the other four other dimensions (81.52%), supporting the findings from the preliminary study. Health workers did not use complete personal protective equipment (PPE) such as masks, hazmat suits, hair protection, and latex gloves. It turns out parents were worried about receiving immunization services. Rukmana's study uncovered health workers' reluctance to use PPE. As a result, it may worsen disease transmission from patients to health workers or vice versa (Rukmana, Putri and Novariana, 2020).

Table 1. Respondents' Characteristics

Characteristics	Variable	n	%
Gender	Male	36	35.2%
	Female	66	64.7%
Age	Young adults (18-40 years old)	57	55.9%
	Adults (≥ 41 years old)	45	44.1%
Education	Basic education (SD-SMP/MTS)	28	27.4%
	Secondary education (SMA/SMK)	53	51.9%
	Higher education (Diploma/Bachelor)	21	20.5%
Occupation	Unemployed (or housewife)	29	28.4%
	Work in formal sectors	73	71.6%
Income	Low income ($\leq \text{Rp. } 2,810,025$)	48	47.1%
	High income ($>\text{Rp. } 2,810,025$)	54	52.9%

Table 2. Parental Satisfaction Levels in the Quality Dimensions of Measles Rubella (MR) Immunization Services for Schoolers in the COVID-19 Pandemic

Dimensions	Expectation Scores (y)	Reality scores (x)	Suitability level (%)
Tangibility	488.0	397.8	81.52
Reliability	501.7	466.1	92.89
Responsiveness	486.8	421.7	84.66
Assurance	481.8	431.1	89.48
Empathy	484.0	433.0	89.46
Total	2,442.3	2,149.7	88.01

Prior to the pandemic, health workers usually only used masks and latex gloves when carrying out medical procedures. However, currently all health workers are required to use complete PPE to avoid exposure to COVID-19. Health workers are a high-risk group for contracting COVID-19 (Alta, Baju and Wahyuni, 2020).

Previous studies show health workers who did not comply with immunization protocols could feel uncomfortable about the use of PPE. Hot and uncomfortable ambience of PPE makes officers reluctant to use PPE (Rifqi, 2020). Supporting this finding, Neraz's research (2021) shows lack of supervision from managers or leaders causes health workers to neglect the PPE protocols. Meanwhile, the World Health Organization (WHO) (2020) considers the use of PPE as the easiest way to prevent infection besides the need for administrative and mechanical controls.

The use of PPE affects respondents' satisfaction. Saleh and Satriani (2018) explain that health workers' attire has an effect on patient satisfaction. In addition to the use of PPE, immunization room's items, ventilation, and lighting conditions are still considered unsatisfying (Saleh and Satriani, 2018). PHC buildings, especially the immunization service room, are limited in space. In accordance with immunization technical instructions during the pandemic, PHCs must ensure that immunization services have to be performed in large and spacious room with 1-2 meters away from parents. The waiting rooms must also have seats spaced 1-2 meters away from each other (Indonesian Ministry of Health, 2020).

Most respondents complained about the limited immunization room. They were worried about service safety as the immunization users were overcrowding. Although immunization services were carried out after the PHCs' service hours, they still cannot accommodate crowds and long queues. Therefore, PHCs need to advocate to health offices for MR immunization out-services. Ulandari and Yudawati's research (2019) proves infrastructure, especially the services room in PHCs, significantly influenced patient satisfaction.

Moreover, the tangibility aspect could influence consumer expectations as the service users experience the services directly. It will be assessed for the first time through physical condition of the services (Pangerapan, Palandeng and A. Joy M. Rattu, 2018). Widya Astari, Noviantani and Simanjuntak (2021) discover the tangible aspect was the most influential aspect on the perceived service quality, which leads to customer satisfaction.

Reliability Dimension

The average conformity level of reliability dimension on MR immunization service was the highest average conformity level (92.87%). The analysis results showed that there were two items included in the A category of the Cartesian diagram for improvement (the main priority) with the average reliability score below the standard. The respondents perceived the services were lacking, untidy, and orderly (90.85%), and no COVID-19 screening was performed before immunization to detect fever symptoms, history of contact

with patients or suspects, and travel history checking (87.89%). Meanwhile, officers must perform immunization screening to ensure child health according to the immunization procedures during the COVID-19 pandemic (Indonesian Ministry of Health, 2020). The COVID-19 screenings are an effective way for COVID-19 case tracking fast to facilitate follow-up care.

Lack of discipline in COVID-19 screening is influenced by some factors such as heavier workload, limited personnel, lack of awareness about COVID-19 monitoring function, and the minimal use of online health-check applications during the pandemic. The results of online screenings e.g., COVID-19 symptoms could be obtained by making an appointment in advance with health workers. Online-based technology makes screening easier. Zidni's research in Lubis (2021) proved that providing online services such as telemedicine reduces physical contact between health workers and patients. With the telemedicine method, patients could also directly report the symptoms more easily and fast (Lubis, 2021).

The respondents perceived the implementation of immunization was not well-organized. A new policy about the MR immunization services for schoolers in PHCs was enacted before the pandemic. Immunization service procedures affect parental satisfaction (Selviani, 2019). The reliability dimension consists of service quality which may increase the likelihood of attracting people to come back or revisit. Therefore, service reliability assessments should be carried out to gather customer satisfaction (Purwaningrum, 2020).

Responsiveness Dimension

Responsiveness dimension is a service quality aspect related to health workers' ability to respond to and assist service users. The average conformity level of responsiveness dimension was 86.6% below the standard. In this dimension, the respondents thought registration officers were responsive in providing directions to immunization registration services (79.3%) according to

the schedule (81.94%). On the other hand, some parents stated that registration officers did not provide clear directions to registration process. As a result, waiting time for service became longer, and it may cause confusion. Meanwhile, patient satisfaction is related to health workers' responsiveness (Nababan, Listiawaty and Berliana, 2020). Lack of communication skills in responding to what patients need or a lack of coordination with schools regarding immunization registration might lead to unresponsiveness. Hence, communication between health officers and patients is very important and affects satisfaction (Pandoh, T and Rumayar, 2018).

Some respondents mentioned that the immunization services were not performed according to the schedule. It consequently may interfere with their working hours. Datuan's research (2018) asserts that service speed is associated with work effectiveness. Research by Chasanah and Amanah in Sriatmi, Patriajati and Fatmasari (2018) shows that the service speed, discipline, and timeliness are determinants of patient dissatisfaction with PHC services.

In the immunization program, MR vaccine had to be administered immediately. It does not contain preservatives and can only be used a maximum of 6 hours after opening (Neraz, 2021). Prior to the pandemic, school vaccination was administered to students per class when the number of recipients reached the target.

Assurance Dimension

Assurance dimension is a quality dimension related to health officers' knowledge, skills, courtesy, friendliness, and ability to communicate in providing services. Good officers' attitude may increase users' satisfaction. Assurance dimension has an average conformity level of 89.48%. The respondents perceived registration officers provided understandable directions to services politely and friendly (85.9%). Medical and non-medical officers have to exhibit friendliness and courtesy in providing services (Sari, 2017). It is considered polite to perform "3S : *Senyum*,

Salam, Sapa" (smile, say '*salam*', and greet) when health workers communicate with service users.

Lack of friendliness may be due to relatively heavy workload which affects mood and psyche. This is in line with previous research which shows that officers' positive attitude supported by concrete actions could increase user satisfaction and becomes a manifestation of health service quality (Anasril and Husaini, 2019).

On the other hand, lack of friendliness towards patients could also be caused by ignorance of health protocols. The use of mask may interfere with articulation, intonation and actual expression. As a result, it affects how people perceive their attitudes.

Empathy Dimension

Empathy dimension is related to how serious one gives attention to service users (Astari, Noviantani and Simanjuntak, 2021). Empathy dimension has an average conformity level of 89.46%. The respondents noticed that health workers reminded them to maintain health protocols after immunization (86.26%). For example, they had to keep distance, avoid crowds, reduce mobility, wash hands, and wear masks. Health protocols during the COVID-19 pandemic are obligations. Attitudes and behavior have a positive impact on health services in building good relationships with service users. Patient, considerate, and reassuring health workers positively affect the service users' satisfaction (Hastuti *et al.*, 2017). Thus, empathy dimension and users' satisfaction level are related (Hasim, Induniasih and Asmarani, 2018).

Good personal relationships develop from trust and credibility i.e., attention, respect, and appreciation. This implies attending to patients's needs in appropriate ways may help achieve patient satisfaction.

The Relationship between Gender and Parental Satisfaction Level

The analysis results showed no relationship between gender and parental satisfaction ($p = 0.341$). These results are in line with research by Isakh and Suryatma (2021), which finds no significant

relationship between gender and satisfaction with vaccination services at PHCs. Gender has no correlation with satisfaction level likely because the majority of respondents in this study are male (58.3%). However, gender is considered not affecting the service assessment as women evaluate services more thoroughly than men (Matondang, Madjid and Chotimah, 2019)

Table 3. Results of Bivariate Analysis of Parents' Characteristics with Satisfaction Level

Parental Characteristics	p-value	Notes
Gender	0.341	Not related
Age	0.879	Not related
Education	0.107	Not related
Occupation	0.682	Not related
Income	0.414	Not related

Source: Primary data (processed)

If a p-value is < 0.05 , there is no significant relationship, and vice versa.

The Relationship between Age and Parental Satisfaction Level

The analysis results showed that there was no relationship between age and parental satisfaction ($p = 0.879$). Age and satisfaction level are not correlated with vaccination services at health centers (Isakh and Suryatma, 2021). The majority of respondents were 37 years old, and they were more satisfied with the MR immunization services for their children (52.6%). However, previous research confirms one's age will affect how one evaluates service aspects. Older individuals might have higher maturity level for decision-making (Kuntoro and Istiono, 2017).

The Relationship between Education and Parental Satisfaction Level

The analysis results showed that there was no relationship between education level and parental satisfaction ($p = 0.107$). Previous research discovers no relationship between education and satisfaction with vaccination in PHCs (Isakh and Suryatama, 2021; Rizal and Jalpi, 2018). The majority of respondents who completed secondary education felt

more satisfied (60.4%) than those with higher education (66.7%). In similar ways, previous research shows individuals with higher education feel less satisfied than those with lower education levels (Eninurkhayatun, Suryoputro and Fatmasari, 2017). It is assumed that knowledge may influence one's evaluation towards services.

The Relationship between Occupation and Parental Satisfaction Level

The analysis results showed that there was no relationship between occupation and parental satisfaction ($p = 0.682$). Previous research has confirmed the same finding. Unemployed individuals tend to feel more satisfied than those who have a permanent job. Individuals who work in formal sectors likely have higher expectations about services they receive than unemployed ones (Eninurkhayatun, Suryoputro and Fatmasari, 2017). Working individuals are considered better able to assess services in greater detail.

The Relationship between Income and Parental Satisfaction Level

The analysis results show no relationship between income and parental satisfaction ($p = 0.414$). Service users' income level has no effect on satisfaction (Subait *et al.*, 2016; Eninurkhayatun, Suryoputro and Fatmasari, 2017). Parents with low and high incomes both want the best MR immunization services for their children in the COVID-19 pandemic. Therefore, highly qualified services need to be provided to boost patient satisfaction.

Conclusion

Parental satisfaction with MR immunization services for their children during the COVID-19 pandemic has not met their expectations. In the quality service, tangible and responsiveness dimensions had conformity level scores below the average. PHCs need to carry out intensive coordination with the Semarang City Health Office to prepare for the implementation of MR immunization for school children during the COVID-19 pandemic. Besides, parents' complaints

about immunization services need to be addressed and corrected immediately. Health centers also need to give health workers immunizations service permits in wider areas, especially those with limited access to PHCs. In addition, communication training is necessary for health workers to practice good and effective communication skills. Additionally, supervisory actions should be taken to monitor compliance with PPE. Further socialization on the use of online applications for registration and COVID-19 screenings should be performed to educate parents about the importance of MR immunization services for their children.

Abbreviations

MR: Measles Rubella, PD3I: Penyakit yang Dapat Dicegah Dengan Imunisasi (Vaccine Preventable Diseases/ VPDs) PHCs: Primary Health Centers, SCIM: School Children Immunization Month.

Declarations

Ethical Approval and Informed Consent

All respondents involved in this study were given explanations about the research objectives and a statement of consent form with free withdrawal of participation at any time. The Health Research Ethics Commission, Faculty of Public Health, Universitas Diponegoro has granted an Ethic Permission Letter No: 81/EA/KEPK-FKM/2021.

Conflict of Interest

The authors state that no personal interest influences this study.

The Data and Materials Availability

Not applicable

Authors' Contribution

LIP, AS, and EFY conceptualized this study; AS developed the methodology; LIP and EFY wrote and edited the manuscript; AS and EFY reviewed and edited the manuscript; LIP wrote the original draft.

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THE EFFECT OF SERVICE QUALITY DIMENSIONS ON HEMODIALYSIS PATIENT SATISFACTION IN INDONESIA

Pengaruh Dimensi Kualitas Pelayanan Terhadap Kepuasan Pasien Hemodialisis di Indonesia

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Abstract

Background: Chronic kidney disease is a catastrophic disease ranked second in Indonesia for high health costs. The number of renal units in Indonesia has rapidly increased since the launch of the National Health Insurance program in 2014. Its increase was accompanied by the increased number of patients.

Aim: This study analyzed the effect of service quality dimensions on patient satisfaction with hemodialysis care.

Methods: This study used a cross-sectional design and a quantitative method. It retrieved data from respondents who had undergone hemodialysis care at hospitals and clinics in Jakarta and surroundings. The PLS-SEM approach was used to analyze the data.

Results: Eight service dimensions were proven to influence the overall service quality and directly impact patient satisfaction. The influential dimensions included facilities and organization of the service, care by attending nurses and assistants, attention to psychological and administrative issues, medical attention and care, nutrition attention and care, medication supply and quality, features and administration process, attention and care given by the head nurse. All of these dimensions affected patient satisfaction as a dependent variable. This study has strong predictive accuracy, and thus it can be replicable in future research with different populations.

Conclusion: This study demonstrated eight service quality dimensions that affect service quality and directly impact satisfaction of hemodialysis patients both with hospital and clinic services.

Keywords: hemodialysis, patient satisfaction, service quality

Abstrak

Latar Belakang: Penyakit ginjal kronis termasuk penyakit katastrofik yang membutuhkan biaya penanganan yang tinggi di Indonesia. Jumlah renal unit di Indonesia berkembang pesat sejak diluncurkannya program Jaminan Kesehatan Nasional (JKN) tahun 2014. Peningkatan tersebut diiringi peningkatan jumlah pasien

Tujuan: Penelitian ini menganalisis pengaruh dimensi kualitas layanan dan kepuasan pasien dengan pelayanan hemodialisis.

Metode: Penelitian ini menggunakan desain potong lintang dan metode kuantitatif. Data dikumpulkan dari responden yang menjalani perawatan hemodialisis di rumah sakit dan klinik di Jakarta dan sekitarnya. Pendekatan PLS-SEM digunakan untuk menganalisis data.

Hasil: Terdapat delapan dimensi pelayanan yang terbukti membentuk kualitas pelayanan secara keseluruhan dan berdampak langsung terhadap kepuasan pasien. Dimensi tersebut meliputi fasilitas dan organisasi layanan, perawatan yang diberikan oleh perawat, perhatian masalah psikologis dan administrasi, perhatian dan pelayanan medis, perhatian dan perawatan nutrisi, pasokan dan kualitas obat, fitur dan proses administrasi, perhatian dan perawatan yang diberikan oleh kepala perawat. Seluruh dimensi tersebut berpengaruh terhadap kepuasan pasien sebagai variabel terikat. Penelitian ini memiliki akurasi prediksi yang kuat, sehingga dapat direplikasi pada penelitian selanjutnya dengan populasi yang berbeda.

Kesimpulan: Penelitian ini menunjukkan delapan dimensi pelayanan yang membentuk kualitas pelayanan dan berdampak langsung terhadap kepuasan pasien pelayanan hemodialisis.

Kata kunci: hemodialisis, kepuasan pasien, kualitas pelayanan



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Introduction

Chronic kidney disease (CKD) is a disease because of damage to the kidney's structure or function that lasts more than three months with a glomerular filtration rate (GFR) of less than 60 mL/min/1.73m² (KDIGO, 2012).

Chronic kidney disease and dialysis are not only medical problems but also economic problems. A renal replacement therapy requires a lot of resources because the equipment and materials are quite expensive (Peeters *et al.*, 2000). The Social Security Agency for Health (BPJS Kesehatan) released data from 2014 to 2016 mentioning chronic kidney disease was in the second position after heart disease which spent 1.6 trillion of BPJS funds in 2014.

According to the ninth report of the Indonesian Renal Registry (IRR) (2016), the most common cause of CKD was diabetic nephropathy at 52% (Pernefri, 2018). Karopadi (2013) revealed that there are about 1.75 million patients worldwide who routinely undergo dialysis, of whom was about 1.55 (89%) million undergoing hemodialysis (Karopadi *et al.*, 2013).

The number of the renal units in Indonesia has grown very rapidly since the launch of the National Health Insurance (NHI) or *Jaminan Kesehatan Nasional* (JKN) program in 2014. It goes along with the increased number of patients because, with this NHI program, all Indonesians have access to chronic dialysis and one of the therapies (Pernefri, 2018). Renal units are mostly owned by private hospitals compared to public hospitals (Pernefri, 2018).

In Indonesia, hospital accreditation is mandatory for all standards of healthcare facilities and human resources who need to be competent and certified. Most of the standards have not completely been fulfilled. The lack of dialysis training centers in turn minimizes learning opportunities for staff (Karopadi *et al.*, 2013). The ratio of the number of machines and nurses is assumed to affect the quality of service in the hemodialysis unit.

Medical service managers may achieve effective operational performance

if they understand techniques for improving service quality and the cause-and-effect relationship between service quality indicators, quality structure, customer satisfaction, and measurement of sustainable service quality (Raadabadi *et al.*, 2017).

Satisfaction with health services is defined as patient's perception of service quality, and it becomes an indicator of the healthcare organization's performance (Nguyen Thi *et al.*, 2008). Patient satisfaction is also associated with adherence to therapy. Increased satisfaction may lead to increased adherence (Wasserfallen *et al.*, 2004). In dialysis patients, previous studies have shown that satisfaction can make patients more likely to comply with medical rules (Rundle *et al.*, 2004), for example, dietary restrictions, while non-adherence likely can reduce life expectancy (McGee *et al.*, 1998).

Palmer *et al.* (2014) conducted a study on patient satisfaction at hemodialysis service centers using data from Diaverum. He discovered most of the respondents considered that the overall dialysis treatment was very good but still had to be improved. From this study, few patients recommended the hemodialysis treatment to others as they did not understand the suggestions and improvements of the hemodialysis centers (Palmer *et al.*, 2014).

Besides, few validated instruments are available to evaluate satisfaction among renal disease patients undergoing a dialysis therapy. The Choice for Healthy Outcomes in Caring for End-Stage Renal Disease (CHOICE) is an instrument used to compare satisfaction with types of dialysis therapy (Rubin *et al.*, 1997). Other instruments for evaluating satisfaction of patients undergoing dialysis are Satisfaction of Patients in Chronic Dialysis (SEQUS) (Wasserfallen *et al.*, 2004) and SDIALOR (Satisfaction des patient dialysés en Lorraine) (Nguyen Thi *et al.*, 2008). Various factors affecting service quality and patient satisfaction have been analyzed. Some studies on patient satisfaction with dialysis services have been done in many countries across

multiple dimensions, including the physical environment, aspects of interpersonal care, and psychosocial support (Kovac *et al.*, 2002). From several questionnaires and research conducted on satisfaction of patients receiving a dialysis therapy, this current study adopted the ESUR-HD (Service Satisfaction Evaluation) questionnaire from the study of Sanabria-Arenas *et al.* (2017).

The topic about service quality and customer satisfaction is not new. These two causal sequences in different industries have been given considerable attention since the last 30 years. (Crosby and Stephens, 1987). Service quality depends on the level of significant service dimensions. The SERVQUAL, a service quality measurement, involves five dimensions, namely assurance, reliability, tangibility, empathy, and responsiveness (Berry, Parasuraman and Zeithaml, 1988). It is then widely applied to research in the field of health, including hospital services (Babakus and Mangold, 1992).

Donabedian (1988) explained the theory of healthcare quality related to patient satisfaction as an important outcome of the interpersonal health service process (Donabedian, 1988). Another theory explicates the quality of health care is an increasingly key issue in medicine (Bodenheimer, 1999) and related to chronic conditions, such as cases of end-stage renal disease. Regarding kidney disease, quality improvement is necessary not only in dialysis therapy but also products and services (Kirchgessner *et al.*, 2006).

According to Parasuraman (1988), the notion of consumer satisfaction is concerned about how far the difference (gap) between expectations and perceived performance is. There are two important aspects, in this case, which are expectations of receiving services (beliefs) and perceptions after receiving the services (perception) (Berry, Parasuraman and Zeithaml, 1988). Patient satisfaction with chronic kidney care and services, it has been said, is also related to the quality of life as perceived by the patient (Wasserfallen *et al.*, 2004). Another remarkable aspect of the hemodialysis

service is its specific procedure and long-term nature of the therapy. Patients and caring teams usually develop a close and lasting relationship (Kimmel, 2005). Sanabria-Arenas *et al.* (2017) revealed that patient satisfaction is an indicator of the quality of health services. Satisfaction can be measured by using developed and validated instruments. The former research has validated the scale to measure satisfaction of hemodialysis patients using the Service Satisfaction Evaluation (ESUR-HD) (Sanabria-Arenas *et al.*, 2017). The research adopted the SERVQUAL model by Parasuraman (1988) five dimensions of SERVQUAL applied were developed to be nine dimensions. However, the current study did not select contact and social workers dimensions because there were very few patients visiting private hospitals and private hemodialysis clinics in Indonesia.

Method

This study focused on hemodialysis services at hospitals and clinics that had a minimum of five hemodialysis machines. The hospitals and clinics resided around the Jakarta area where hemodialysis patients generally had the middle to upper socioeconomic status with a good level of education. Given their background, it was assumed that as potential consumers, they could provide an overview of their expectations, and they were technology literate patients for surveys. The patients were considered to represent the general hemodialysis patients in Indonesia. This study also included several characteristics of respondents, such as their age, gender, occupation, length of hemodialysis treatment, and payment methods for service bills.

This study investigated the effects of independent variables (facilities and organization of the service, attention provided by nurse, attention to psychological and administrative issues, medical attention and care, attention to nutrition and care, medication supply and quality, features and administration process, attention and care given by the head nurse) on patient satisfaction as a

dependent variable. The study adopted a research method from Sanabria-Arenas *et al.* (2017). Nine indicators were developed, but only eight indicators were chosen as the indicators could represent services at hemodialysis facilities in Indonesia. The other indicator, contact and social workers, was not chosen due to few patients attending private hospitals and private hemodialysis clinics in Indonesia. There were 44 items available to evaluate satisfaction with services received by patients with chronic kidney disease.

The respondents met some criteria: patients still undergoing hemodialysis treatment, currently undergoing other kidney replacement therapy (Continuous Peritoneal Ambulatory Dialysis and kidney transplantation), being at least 18 years old, and taking hemodialysis therapy at hospitals and clinics in Jakarta and surroundings.

This study was a cross-sectional, quantitative survey study whose research model was modified from the previous research. It added some measurable aspects that would affect the quality of service and then customer satisfaction. The questionnaires used in the previous research were adapted to current conditions of hemodialysis service in Indonesia.

This study used the Partial Least Square Structural Equation Modeling (PLS-SEM) analysis method. The minimum sample size was 160 respondents. This study finally included 321 respondents as the research samples were selected purposively. The respondents would receive an online questionnaire link.

In this research model, there were eight variables (formative and reflective variables) with nine paths as well as repeated indicators (service quality). Then, the effect between variables simultaneously was tested. Furthermore, from the various available multivariate analysis methods, the partial least squares-structural equation modeling (PLS-SEM) based on variance was selected.

The eight variables with nine paths were marked with arrows to describe the research hypothesis. The research model

along with the hypothesis is presented in Figure 1.

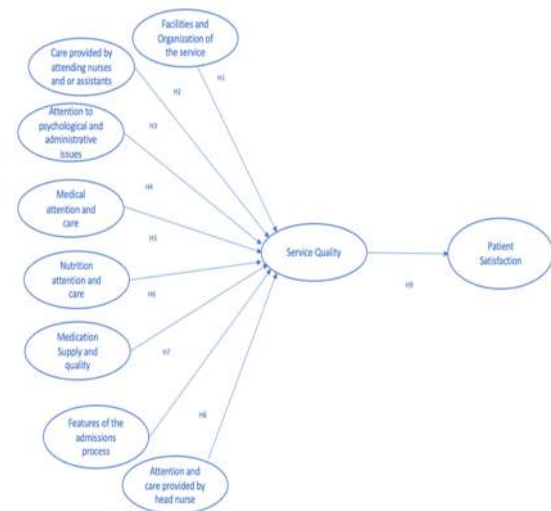


Figure 1. Conceptual Framework

Result and Discussion

Viewed from the respondents' characteristics, the majority of the respondents were aged between 41-50 years old, which is the productive age. They mostly work as housewives and mostly use social media or online social networks to communicate and express their feelings or share their experiences. About 7.5% of the respondents were retirees who probably did not understand technology-based questionnaires. Almost all of the respondents financed their hemodialysis treatment with BPJS Kesehatan (91%). Two fifth of the respondents had undergone dialysis treatment at private hospitals, which likely have developed HD units. Private hospitals also have a strategic role in the government's health development program, and thus their consumers are also considered potential. With the competitive business environment, the respondents as the consumers mostly had the upper-middle socioeconomic status with a good level of education. Therefore, they could provide an overview of the expectations of the hospital's hemodialysis services.

Out of 321 respondents, 82% had undergone hemodialysis treatment for more than 1 year, and only 0.9% for less

than 1 month ago. With such situations, the data gathered on the quality of hemodialysis treatment and patient satisfaction were quite representative.

From the output of the outer model, there were 42 indicators out of 44 reflective indicators used in the survey. The indicators used were the FOH2 and FOH3 indicators from the variable of facility and organization of the services to meet the reliability and validity of the model. From the outer model, all 42 indicators were reliable to measure the quality of hemodialysis and patient satisfaction according to the required outer loading value (Hair *et al.*, 2014).

The four parameters of the reliability and validity test on the outer model include reliability indicator (outer loading), construct reliability (Cronbach's alpha and

composite reliability), construct validity (average variance extracted or AVE), and discriminant validity (Fornell-Larcker Criterion). All indicators were reliable and valid to measure the respective constructs; thus, the inner model test (structural model) could be used afterwards.

The image of the inner model shows the T-statistic values of the 9 paths in the research model. All of the paths whose T-statistic values are above the t-table were significant. From the structural model analysis on the values of R² and Q², this research model was in a moderate to a strong category on the dependent variable on the service quality variable. It had a strong predictive accuracy on the effect of service quality variable on patient satisfaction variable.



Figure 2. Inner Research Model Results

Table 1. Respondents' Characteristics

Descriptions	Category	Count	Percentage
Age	< 20 years old	2	0.6 %
	21-30 years old	27	8.4 %
	31-40 years old	74	23.1 %
	41-50 years old	61	34.4 %
	51-60 years old	111	19.1 %
	> 60 years old	46	14.4 %
Total		321	100 %
Gender	Male	183	56.9 %
	Female	138	43.1 %
Total		321	100 %
Occupation	Professional	3	0.9 %
	Private employee	50	15.3 %
	Public employee	21	6.6%
	Entrepreneur	35	10.9%
	Housewife	100	31.3 %
	Retirement	24	7.5 %
	Others	88	27.5 %
Total		321	100 %
Payment	BPJS	290	91 %
	Private	14	4 %
	Insurance	3	1 %
	Company	14	4%
Total		321	100 %
Length of Hemodialysis	> 1 years	263	82 %
	6-12 months	32	10 %
	3-6 months	13	4 %
	1-3 months	9	3%
	< 1 month	4	1 %
Total		321	100 %
Dialysis Unit	Private hospitals	240	75%
	Public hospitals	59	18.1%
	Clinics	22	6.9 %
Total		321	100 %

Table 2. Important Performance Map Analysis (IPMA)
Facilities and Organization of Services

Facilities and Organization of The Service	IPMA Total Effect of Service Quality Indicator	IPMA Performance of Service Quality Indicators
FOH 1	0.0244	84.5794
FOH 10	0.0257	85.7477
FO H11	0.0268	85.5140
FO H12	0.0281	88.7072
FO H4	0.0336	90.1869
FO H5	0.0307	88.7850
FO H6	0.0246	82.9439
FO H7	0.0258	86.4486
FO H8	0.0251	84.8131
FO H9	0.0263	84.7352

This study also had a large predictive relevance, and thus this research model could also be replicated with different populations. The independent variables in this model had a significant effect. Facilities and organization of the service had the strongest effect on service quality, followed by attention to psychological and administrative issues. The next variable that had a considerable influence on service quality was care given by nurses or assistants. The Importance Performance Map Analysis (IPMA) showed tangible and empathy variables, represented by facilities and organization of the service and attention to psychological and administrative issues, had good results. The patients also considered the variables important.

From the facilities and organization of the service variable, FOH4 on the total effect and performance indicator had the highest value (see at Table 2). It indicated hemodialysis patients' rights need to be respected, and this has also been carried out well in the HD facilities studied.

However, all of the indicators had a positive effect on the quality of hemodialysis services despite being considered important by the patient

The number of renal units in Indonesia has grown very rapidly since the launch of the National Health Insurance (NHI) program in 2014. At the same time, the number of patients increasingly have access to chronic dialysis therapies covered by this program (Pernefri, 2018).

Previous studies have shown that satisfied patients are more likely to comply with medical rules (Rundle *et al.*, 2004). Some studies around the world have been conducted on various variables of patient satisfaction with dialysis services, including the physical environment, aspects of interpersonal care, and psychosocial support (Kovac *et al.*, 2002). The gray relational analysis (GRA) method could analyze the service quality and patient satisfaction besides evaluating the quality of services (Rundle *et al.*, 2004) at dialysis centers (Aydemir and Sahin, 2019).

The results of the PLS-SEM analysis showed an empirical research model. In this model, the nine paths, all of them are

significantly proven with a positive effect following the direction of the hypothesis so that all hypotheses can be supported.

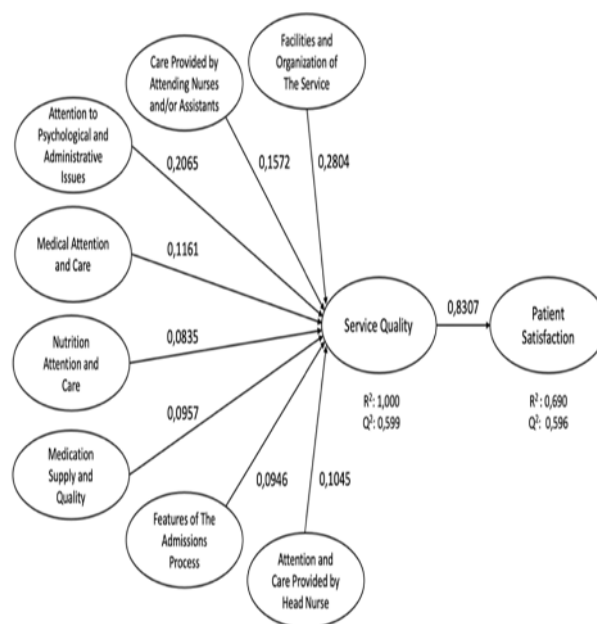


Figure 3. Empirical Model

The strongest effect was resulted from facilities and organization of services on service quality, followed by attention to psychological and administrative issues. Donnabedian (1988) stated that interpersonal quality refers to the extent to which the needs and preferences of patients are accommodated. Facilities include features such as the comfort of the physical environment and the attributes of the service. Previous research has also defined that satisfaction with health facilities is the quality of service perceived by patients and becomes an indicator of organizational performance (Nguyen Thi *et al.*, 2008).

Facilities and organization of services are also a reflection of tangibility. The FOH4 indicator showed that patients' expectations of being respected. Therefore, hospital managers and hemodialysis unit developers need to prioritize budget and resources e.g., facilities and management for improving the service quality. The Indonesian Nephrology Association (IASN) and the Indonesian Ministry of Health advise health facilities to properly manage the structure

and functions of each profession, employ adequate numbers of skilled nurses, as well as create a comfortable and safe environment as a patient's second home. Staff must behave friendly to patients; hence, the patients feel appreciated. Communication with human resource staff can also be of management concerns. Despite facilities and management, attention to psychological and administrative issues could be a reflection of the empathy variable. This variable could determine patients' expectations of warm and friendly care from the staff.

Service quality may impact patient satisfaction with a coefficient of 0.8307 which was the greatest value of all paths and thus had a significant impact. Previous research by Bodenheimer (1999) mentioned the quality of healthcare is influential on treatment, especially chronic disease treatment, for example, end-stage kidney disease (Bodenheimer, 1999).

Patient satisfaction with chronic kidney care and services is also related to the perceived quality of life (Wasserfallen *et al.*, 2004). It confirms that service quality has a positive effect on patient satisfaction. This study is in line with research by Babakus and Mangold (1992), who used the SERVQUAL for assessing the magnitude of patient perceptions and expectations (Babakus and Mangold, 1992).

When compared with previous studies, Sanabria-Arenas *et al.* (2017) concluded that the significant variables were facilities and organization of the service, social workers, and medical attention and care. Similarly, the strongest influential variable in this study was the variable facilities and organization of services, and, the indicator with FOH4 had the largest value is FOH4, which is where patients feel that their rights as patients are respected. This also shows that the tangibility represented by the facilities and organization of the service variable is important for HD patients. And Tangibility i.e., facilities and management can be input for the hospital management to improve hemodialysis services. From the specific indirect effect, the facilities and organization of the service variables had

the strongest influence on patient satisfaction through service quality. Attention to psychological and administrative issues had a big influence on the facilities and organization of the services, this variable has a considerable influence, and shows that the empathy variable it represents is important and expected for HD service satisfaction. The last important variable was empathy.

Conclusion

The PLS-SEM analysis showed that the research model of hemodialysis services significantly proved the nine paths and all hypotheses. The structural model analysis showed that this research model presented a moderate to a strong effect of the dependent variable on service quality. It also showed a strong predictive accuracy on service quality that impacted patient satisfaction. With a large predictive relevance, this research model is replicable in different populations. The strongest influential variable was facilities and organization of services, followed by attention to psychological and administrative issues. This study can prove that eight dimensions had a positive effect on service quality and patient satisfaction with hemodialysis services both at hospitals and clinics.

This study has some limitations. First, the online questionnaire might be biased for whether the respondents just started hemodialysis treatment or had undergone the hemodialysis treatment. With many indicators studied, it might put the respondents in boredom when filling out the questionnaire. Another bias is about factors that influence some types of treatment payment. Therefore, future researchers need to address this financing aspect based on hospital classes.

Abbreviations

CKD: Chronic Kidney Disease, GFR: Glomerular Filtration Rate, BPJS: Social Security Agency for Health, NHI: National Health Insurance, CHOICE: Choice for Healthy Outcomes in Caring for End-Stage Renal Disease, PLS-SEM: Partial Least

Square Structural Equation Modeling, SERVQUAL: Service Quality.

Declarations

Ethics Approval and Participation Consent

The respondents were given the survey's objectives and purposes. Before participating, they confirmed their participation verbally.

Conflict of Interest

There is no conflict of interest in this study.

Availability of Data and Materials

Data and material can be obtained upon request.

Authors' Contribution

LKH and FA conceptualized this study; FA developed the methodology; LKH wrote the original draft.

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PREVALENCE OF BURNOUT SYMPTOMS IN NURSES HOSPITAL ASSIGNED TO COVID-19 ISOLATION ROOMS

Prevalensi Gejala Burnout Perawat di Rumah Sakit yang Ditugaskan di Ruang Isolasi COVID-19

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Abstract

Background: Burnout is a health problem that may happen to nurses and may impact patient safety and organization in any situations, especially during the second wave of COVID-19 pandemic.

Aims: This study aimed to identify the prevalence of burnout among nurses in charge of isolation rooms and its relationship to their demographics factor.

Methods: This research design is descriptive-analytic quantitative and cross-sectional. It involved 124 nurses assigned to isolation rooms for COVID-19 patients admitted to the first referral hospital in Bali. Data were collected using a questionnaire adopted from the Maslach Burnout Inventory to identify burnout symptoms. Demographic questionnaire was administered to garner respondents' demographics.

Results: High category of burnout was related to emotional exhaustion found in 66.1% of the respondents, depersonalization in 33.1%, and reduced personal accomplishment in 0.8%. Age, marital status, education, and gender were not related to burnout. Nurses who worked in non-ICU experienced higher burnout than ICU ($p < 0.05$).

Conclusions: The prevalence of burnout symptoms in the nurses who were in charge in COVID-19 isolation rooms is in the high category. Hospital management must consider demographic factors to improve the work environment, recruit new employees, conduct routine health checks, and provide mental health treatments consistently.

Keywords: Burnout symptoms, COVID-19 pandemic, isolation room.

Abstrak

Latar Belakang: Burnout merupakan masalah kesehatan yang dapat terjadi pada perawat dan dapat berdampak pada keselamatan pasien dan organisasi pada berbagai situasi terutama pada masa pandemi COVID-19 gelombang kedua.

Tujuan: Penelitian ini bertujuan untuk mengidentifikasi prevalensi gejala burnout perawat di ruang isolasi dan hubungannya dengan faktor demografi.

Metode: Penelitian ini merupakan deskriptif analitik kuantitatif yang dilakukan secara potong lintang. Penelitian ini menggunakan 124 perawat yang ditugaskan di ruang isolasi COVID-19 pada rumah sakit rujukan pertama di Bali. Data dikumpulkan pada tahun 2021 menggunakan kuesioner dari Maslach Burnout Inventory untuk mengidentifikasi gejala burnout. Selain itu, kuesioner demografi digunakan untuk mengevaluasi demografi responden.

Hasil: Kategori burnout tinggi pada dimensi burnout didapatkan aspek kelelahan emosional pada 66,1% responden, depersonalisasi pada 33,1%, dan penurunan prestasi diri pada 0,8% responden. Uji analisis korelasi menunjukkan bahwa usia, status perkawinan, pendidikan, dan jenis kelamin tidak berhubungan dengan burnout. Perawat yang bertugas di ruang non-ICU mengalami burnout lebih tinggi dari ruang ICU ($p < 0,05$).

Kesimpulan: Prevalensi gejala burnout pada perawat yang bertugas di ruang isolasi COVID-19 berada pada kategori tinggi. Manajemen rumah sakit perlu mengidentifikasi karakteristik demografis yang akan meningkatkan lingkungan kerja, penerimaan pegawai, pemeriksaan kesehatan, dan pelayanan kesehatan mental secara berkala.

Kata kunci: Gejala burnout, pandemi COVID-19, ruang isolasi.



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Introduction

Burnout is a chronic, prolonged and energy-draining condition characterized by emotional exhaustion, depersonalization, and reduced personal accomplishment (Bährer-Kohler, 2017). Fatigue and stress are the main burnout symptoms that affect worker well-being. Stress is a process of rebuilding homeostasis. Herbert Freudenberg in 1974 explained that burnout is a professional pathology that involves stressful conditions, especially in people who carry out nursing activities. According to Christina Maslach in 1997, burnout involves some symptoms such as emotional exhaustion, depersonalization, and reduced personal achievement that arise in workers who work in contact with people (Lupo *et al.*, 2021). People who work in social public services such as social workers, nurses, teachers, and employees are at risk of burnout.

Hospitals are dominantly occupied by nurses who spend most of their time there. A good hospital environment will encourage nurses to work productively. Nurses who have high work stress will easily experience burnout, especially during the COVID-19 pandemic (Abarghouei *et al.*, 2017). This situation results in health problems and challenges health system resilience. As the frontliners in the health system, nurses have an essential role in serving and caring for sick people directly at hospitals. They are directly in contact with COVID-19 patients during this pandemic (Hu *et al.*, 2020).

Psychological illnesses and other mental health symptoms are some possible threats for health personnel actively involved in the diagnosis, treatment, and care of COVID-19 patients. Excessive workload, lack of personal protective equipment (PPE), abundance of news exposure, unavailability of certain medications, and lack of emotional support may add to the mental burden of health workers, particularly nurses. (Luceño-

Moreno *et al.*, 2020). Thus, studying the health professional's state of mind and the potential harm is necessary during this pandemic. More than half of the 958 health professionals in Wuhan experienced anxiety and depression symptoms. Notably, 54% of them experienced anxiety symptoms, and 58% had depression. A higher prevalence of stress was found in health workers than other health professionals. Research showed out of 1,257 health workers in China, 760 of whom were from Wuhan, 71.5% showed symptoms of fatigue, 44.6% anxiety, 50.4% depression, and 34% insomnia. Nurses as frontline professionals and others who serve health services during the COVID-19 outbreak likely have more possibilities of experiencing burnout symptoms (Lai *et al.*, 2020).

Research showed during the pandemic in Singapore female nurses and administrative health staff were susceptible to burnout which happened most to nurses. Disengagement and exhaustion occurred to 79.7% and 75.3% of respondents, respectively. Among the respondents, 86.8% met the thresholds for either of the symptoms, and 68.2% for both (Tan *et al.*, 2020).

Health workers in Spanish were found to experience higher levels of fatigue during the pandemic than before. The prevalence of burnout symptoms was at 43.4% since the number of health workers in contact with COVID-19 treatment (49.6%) was higher than those with other diseases (34.6%). They developed some concerns about infection in the workplace, the risk of transmission to nurses' families, and the pandemic period which lasts even longer. Besides, they feel worried about patient safety, practice, and quality of care that they give. Being a physician or nurse doubles the risk of burnout (Torrente *et al.*, 2021).

The first wave of COVID-19 pandemic likely contributes to the occurrence of burnout in the second wave (Bellanti *et al.*, 2021). During the second wave, many nurses were exhausted in carrying out their duties. Therefore, they

dealt with exhaustion, decreased productivity, clinical assignment errors, and lack of attention to patient condition because they suffered severe psychological and mental health issues (Galanis *et al.*, 2021).

Burnout occurs due to several factors such as emotional exhaustion, depersonalization, and reduced personal accomplishment. Marital status and work experience are likely associated with emotional exhaustion. Employment status and age could be correlated with depersonalization. Reduced personal accomplishment is specifically related to marital status. A survey conducted by Persatuan Perawat Nasional Indonesia (Indonesian National Nurses Association) reported 50.9% of nurses from four Indonesian provinces felt stressful, disoriented, weary, and sleepless due to heavy workloads and low salary. The uncertainty during the pandemic makes nurses handle increasing workloads (Putra and Setyowati, 2019).

The high prevalence of burnout impacts patient safety, organization, and its staff. Burnout nurses are less optimal in carrying out nursing care and turn out having physical, social, and psychological health issues. It is also associated with extrinsic factors such as workload, extended hours, and interpersonal relationships (Garcia *et al.*, 2019; Schlak *et al.*, 2021).

Burnout symptoms seem to have correlation with age, gender, marital status, childbearing, health level, type of work shift, health service area and performance. For people who feel burnout symptoms, they tend to get angry very easily, face conflicts between workers, cry easily, and experience victimization. Once employees are less enthusiastic, stagnant, frustrated, and apathic at work, this may lead to turnover in which they decide to leave the organization, adjust work responsibilities and switch their job (Andarini, 2018).

Based on the above background, the prevalence of burnout among nurses in charge of COVID-19 patients in isolation rooms of the first referral hospital was investigated.

Method

This study is analytic observational research using a cross-sectional approach. It was conducted at one of the university hospitals designated as a COVID-19 referral hospital in Bali from September to October 2021. Online survey was distributed to 124 nurses in charge of COVID-19 patients in isolation rooms. Informed consent and research procedures were informed before filling out the questionnaire. The Maslach Burnout Inventory (MBI) questionnaire was used to measure burnout symptoms in addition to a demographic questionnaire to gather information on age, gender, education, marital status, and work location based on cut-off points according to categories (high, intermediate and low level). This demographic questionnaire consists of 22 statements about emotional exhaustion in seven statements, depersonalization in seven statements, and personal achievement in eight statements (Maslach *et al.*, 2013; Putra and Setyowati, 2019).

The validity test of the MBI-HSS was conducted using the confirmatory factor analysis method which proves whether Maslach's burnout theory (1981) fulfills one-dimensionality of the questionnaire. The confirmatory factor analysis (CFA) results showed that all items on the MBI scale were valid, and thus none of the items were eliminated. The adapted MBI can be used for future research because all items are valid and significant, and none have a negative factor load (Yulianto, 2020).

Supporting data were obtained by reviewing hospital documents such as the hospital's work plan, nurse schedule, bed occupancy ratio, work strategy plans, and management reports. A chi-square test was done in SPSS to examine the frequency distribution of possible burnout levels in the nurses.

Results and Discussion

Demographic characteristics

The respondents were mostly women (54%), and they were mostly aged between 21 and 30 years (83%) and married (67.7%); most of them had nursing certification (66%) and worked in non-ICU for COVID-19 (57.3%). Table 1 presents the demographic characteristics of the respondents.

Table 1. Demographic characteristics of respondents

Demographic	n	%
Gender		
Male	57	46
Female	67	54
Age (years)		
21-30	103	83.1
31-40	21	16.9
Education		
Associate Degree III	29	23.4
Associate Degree IV	3	2.4
Bachelor	1	0.8
Nursing certification	91	73.4
Marital Status		
Single	40	32.3
Married	84	67.7
Location		
ICU	53	42.7
Non-ICU	71	57.3

*Source: Primary data 2021

Relationship between burnout and nurse' demographic factors

As many as 25 males and 27 females experienced high burnout. Thirteen male respondents experienced moderate burnout, and 19 males had low burnout. Moreover, 22 female respondents had low burnout, and 18 females suffered moderate burnout. Gender was not related to burnout ($p = 0.86$). Research in a government hospital in East Java found similar findings that gender did not deal with burnout (Putra *et al.*, 2021).

Results showed 37 respondents aged 21-30 years and four respondents aged 31-40 years experienced low burnout. In addition, 26 respondents aged 21-30

years experienced moderate burnout, and those who experienced high burnout were five people. Forty respondents aged 21-30 years had moderate burnout, and 12 respondents aged 31-40 years experienced high burnout. Age was not related to burnout ($p = 0.23$). Previous research showed similar results about burnout factors in nurses with mental problems (Ramdan and Fadly, 2016).

Seven respondents with associate degree III and 32 respondents with nursing certification experienced low burnout. Two respondents with associate degree IV had low experience, and one respondent of the group had high burnout. One respondents with bachelor's degree experienced high burnout. Of respondents with associate degree III, six people experienced moderate burnout, and 16 people had high burnout. Among nursing certified respondents, 32 people had low burnout, 25 had moderate burnout, and 34 had high burnout. The statistical analysis suggests education had no significant relationship with burnout ($p = 0.40$). Supporting this result, previous research found burnout syndrome in nurses in ICU and emergency rooms did not have a relationship with education level (Mariana *et al.*, 2020).

Furthermore, eleven married respondents and thirty single respondents experienced low burnout. The number of married respondents with moderate burnout was 20 people, and that with high burnout was 34 people. Eleven unmarried respondents had moderate burnout, and 18 of them had high burnout. This study showed an insignificant relationship between marital status and burnout. Previous research among nurses in the inpatient installation rooms also showed no significant association between marital status and burnout (Mawarti, 2018).

Regarding patient rooms, 30 respondents in ICU and 53 respondents in non-ICU experienced low burnout. Seventeen respondents in ICU had low burnout, 19 of them had moderate burnout,

and 17 of them experienced high burnout. The number of respondents in non-ICU rooms with low burnout was 24 people, that with moderate burnout was 12 people, and that with high burnout was 35 people. It indicates a relationship found between work location and burnout ($p = 0.03$). Results reveal that nurses in non-ICU experienced more burnout than those in ICU possibly due to increased workload during the second wave of the pandemic. These findings contradict previous research that found nurses in the ICUs were more emotionally exhausted. Concerns about possible infection or transmission to family and relatives seem to cause stress (Abdelhafiz *et al.*, 2020). The relationship among the variables are presented in Table 2.

Burnout level in nurses in charge in isolation rooms

The survey results describe the burnout categories in nurses assigned to isolation rooms for COVID-19.

Table 3. Burnout levels of nurses in charge of COVID-19 isolation rooms

	Frequency	Percentage
Low	41	33.1
Medium	31	25.0
High	52	41.9

*Source: Primary data 2021

Table 3 shows the burnout incidence among nurses in charge of COVID-19 isolation rooms (ICU and non-ICU). Most of them experienced high burnout (41.9%). Stress in adults may include learning problems, conflicts, marital problems, work-related problems, financial problems, and others. Burnout found in health workers usually leads to conflicts related to friends, family, and partners. Work-related problems correlate with job stress or problems that arise between coworkers or superiors (Kepmenkes RI no 1529/MENKES/SK/X/2010, 2010).

Etiology of burnout in nurses in isolation rooms

The isolation rooms at the hospital studies were divided into five rooms, namely EF isolation room, GH isolation room, I isolation room, ICU room without a ventilator (room J), and ICU room with a ventilator. Each room had morning, afternoon, and evening shifts. The morning and evening shifts lasted for six hours, while the night shift required 12 hours of work. The EF isolation room had eight nurses; GH isolation room had 21 nurses; I isolation room had 16 nurses; the ICU without a ventilator (room J) had 32 nurses (room I and J with one head of the room); and the ICU with a ventilator had 45 nurses. B isolation room (ICU with a ventilator) with four beds had 10 nurses in each shift. J isolation room (non-ICU) with eight beds had eight nurses in each shift. I isolation room with 18 beds had four nurses in charge in each shift. The GH isolation room had 34 beds and five nurses per shift. The EF isolation room with 12 beds had three-four nurses per shift. On average, five new patients were admitted to one of the rooms per day.

The GH isolation room which had the highest bed capacity compared to other rooms was prioritized for patients suspected with COVID-19. The interview results showed nurse fatigue likely caused work accidents to the patients and nurses themselves. Over workloads and non-standard work shifts, especially for night shifts, likely cause work fatigue in nurses (Lutfbis and Tasminih, 2018). Burnout symptoms in nurses can be reduced by providing a comfortable work environment. The role of head nurse seems important in managing the workforce functions including planning, scheduling and staff allocation to prevent and reduce burnout symptoms (Putra *et al.*, 2021).

Burnout found in nurses assigned to the isolation rooms occurred due to some reasons. First, the hospital had insufficient number of nurses during the second wave around the middle of 2021. All decisions regarding staff recruitment are regulated by the rectorate of the university since the hospital is a teaching hospital. Second,

delay in service and incentive payment and inequality of the payment are among others. The respondents said that incentives would be provided after one-year work. The nominal amount was not satisfying and paid late. Availability of incentives is assumed to correlate with quality of service given (Gadzali and Suryani, 2021).

Third, increased workload, risk of infection, use of PPE, and thorough hospital environment caused the nurses to be anxious. Such conditions require a head nurse' role that could give a direct positive effect on nurses' accomplishments. Leaders who show care to their employees may also impact the way they see their workload, community, justice, rewards, and values. The mediation of rewards, control's the problem, and fair workload likely promote less emotional wariness and depersonalization (Putra *et al.*, 2021). Otherwise, nurses working in COVID-19 rooms are affected psychologically (Zerbini *et al.*, 2020).

Fourth, most of the respondents lived in Denpasar area and outside South Badung. On average, they needed approximately 45 minutes to reach workplaces. In addition, finding nurses with advanced nursing qualifications was difficult. The human resource department had to pay the qualified nurses using funds allocated by the hospital. Qualified nurses have more experience, more education and training and thus deserve the fair payment (Hartawan and Ilyas, 2016). Another reason is a poor information system. Medical records of patients were still recorded manually since this hospital had not implemented a hospital management information system (SIMRS). The system allows all service processes to connect with coordination, reporting, and administrative operations to gather information quickly, precisely, and reliably. In the digital era 4.0, SIMRS is a very important facility to support the operational management of hospitals. It makes the services faster and reduces workloads and human errors (Wahyuni and Parasetorini, 2019).

Table 2. The relationship between nurse burnout and sociodemographic characteristics

Demographic characteristics	Burnout					
	Low		Medium		High	
	n	%	n	%	n	%
Sex						
Male	19	33	13	23	25	44
Female	22	33	18	27	27	40
Age						
21-30 years old	37	36	26	25	40	39
31-40 years old	4	19	5	24	12	57
Education						
Associate Degree III	7	24	6	21	16	55
Associate Degree IV	2	67	0	0	1	33
Bachelor	0	0	0	0	1	100
Nursing certification	32	35	25	28	34	37
Marital status						
Single	11	28	11	28	18	45
Married	30	36	20	24	34	41
Location						
ICU	17	32	19	36	17	32
Non-ICU	24	34	12	17	35	49

Burnout symptoms in nurses in charge of COVID-19 isolation rooms

Burnout symptoms consist of emotional exhaustion, depersonalization, and low personal accomplishment. Figure 1 presents the results of burnout symptoms in this study.

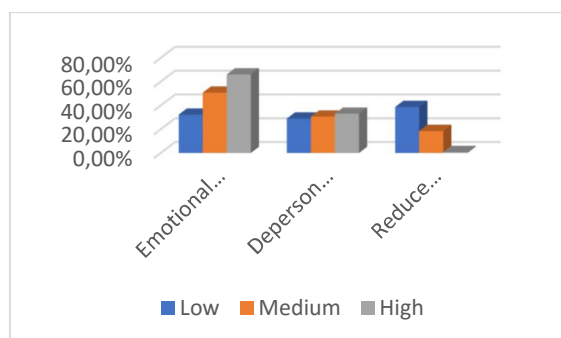


Figure 1. Burnout dimensions in nurses in charge of COVID-19 isolation rooms

Most of the nurses had high burnout. Most of them experienced high emotional exhaustion (66.1%), and some had high depersonalization dimension (33.1%) and highly insignificant personal achievement (0.8%). The nurses were at high risk of exposure to COVID-19, thereby leading to tiredness and fatigue.

Intervention for nurses with mental health issues

Burnout may happen likely due to tiredness and job dissatisfaction. Nurse burnout should be a priority in any policy to enhance the quality of healthcare services. Burnout could affect the hospital environment, which interferes with work productivity and healthcare services to patients besides personal life and turn over which decreases the number of qualified nurses (Ezenwaji *et al.*, 2019).

There are several things to reduce burnout symptoms and maintain the mental health of nurses. First, the hospital needs to conduct regular mental health screening for nurses who are at risk of developing depression, anxiety, insomnia, and discomfort; such an intervention is immediately required for nurses during this

pandemic (Lai *et al.*, 2020). Otherwise, they will develop psychological pressure and mental illness at work. Stakeholders and management should support, motivate, and protect nurses by providing training and interventions in education (Vizheh *et al.*, 2020). In addition to regular mental health screening, regular COVID-19 testing is required to reduce burnout in nurses.

Second, psychological counseling should be provided to turn down the fear of being infected with COVID-19. The head nurse should talk to them at least 30 minutes before their duty day. Nurses suffering from anxiety or insomnia are encouraged to seek treatment for stress or depression from the expert available within 24 hours a day. (Huang *et al.*, 2020).

Third, mind-body training and progressive muscle relaxation are required interventions to reduce burnout in nurses. Mind and body therapy focuses on the relaxation of mind, structures, and body organs and systems such as bones, joints, soft bones, blood circulation, and the lymphatic system. This therapy may include breathing exercises, yoga, meditation, body exercises, progressive muscle relaxation, and music therapy. The mind-body training (MBT) program is designed to engage nurses in emotional intelligence and physical resilience that tend to produce positive responses to brain structure and function. Mind body training and progressive muscle relaxation (MBT and PMR) could significantly reduce burnout symptoms, especially emotional exhaustion and depersonalization, in nurses while improving self-achievement (Rahmayanti *et al.*, 2021).

Conclusion

Nurses experienced high burnout since they were assigned to COVID-19 isolation rooms. They mostly suffered from emotional exhaustion. Work location correlated with the incidence of burnout in nurses, but age, gender, education, and marital status had no correlation with

burnout. Hospital management must consider demographic factors to improve the work environment, recruit new employees, conduct routine health checks, and provide mental health treatments consistently. Some alternatives to reduce burnout symptoms in nurses include mental health screening, psychological counseling, and mindfulness therapy.

Since this study did not explore the issue in the qualitative study, future research should gather bigger populations and focus on personality traits, attitudes toward work, and others that might affect workplace situations and workloads in nurses.

Abbreviations

WHO: World Health Organization; PPNI: *Persatuan Persatuan Perawat Indonesia*; COVID-19: Corona Virus Infection Disease; ICU: Intensive Care Unit; SIMRS: *Sistem Informasi Manajemen Rumah Sakit*; MBI-HSS: Maslach Burnout Inventory – Human Service Survey; PPE: Personal Protective Equipment.

Declaration

Ethics Approval and Consent Participant

Respondents were addressed before the survey about the survey's objectives and purposes, and verbal consent to participate in the study was taken from them.

Conflict of Interest

The authors declare that there is no significant competing financial, professional, or personal interests that might have affected the performance.

Availability of Data and Materials

Data and material research can be provided by request to Correspondence Author.

Authors' Contribution

SJK and IGUH conceptualized the study and created the methodology; SJK and KRP wrote, reviewed, and edited the manuscript; SJK wrote the original draft.

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THE IMPACT OF THE COVID-19 PANDEMIC ON MATERNAL MORTALITY ATTRIBUTES

Dampak Situasi Pandemi COVID-19 Terhadap Karakteristik Kematian Maternal

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Abstract

Background: The COVID-19 pandemic is a challenge for mothers to access health services in Indonesia. Patient management, referral processes, and maternal screening protocols are the reasons for this issue.

Aims: This study aimed to analyze maternal mortality trends in East Java Province before and during the COVID-19 pandemic.

Methods: This study was conducted using retrospective observation with a cross-sectional design, and samples were selected using a total sampling technique. The number of maternal deaths in East Java was 520 in 2019 and 565 in 2020. The independent variable in this study is the number of maternal deaths, and the dependent variables include age, gravida, place of death, rescue relay, time of death, and maternal complications. The variables of age, place of death, rescue relay, and gravida were assessed using the Chi-square test.

Results: Statistical tests showed a p value of 0.195 for age; 0.916 for place of death; 0.646 for rescue relay; and 0.048 for gravida.

Conclusion: Maternal mortality showed different trends before and after the pandemic in East Java. Significant differences in maternal mortality rate are influenced by gravida status.

Keywords: maternal mortality, pandemic, COVID-19

Abstrak

Latar Belakang: Situasi pandemi menjadi tantangan bagi ibu untuk mendapatkan pelayanan kesehatan di Indonesia. Manajemen pasien, proses rujukan, dan protokol skrining ibu adalah salah satu penyebabnya.

Tujuan: Penelitian ini bertujuan untuk menganalisis perbedaan angka kematian ibu di Provinsi Jawa Timur sebelum pandemi COVID-19 tahun 2019 dan selama pandemi COVID-19 tahun 2020.

Metode: Observasi retrospektif dilakukan dengan menggunakan desain potong lintang, dan sampel dipilih melalui teknik total sampling. Variabel independen penelitian ini adalah jumlah kematian ibu dan variabel dependennya meliputi usia, gravida, tempat kematian, estafet penolong, waktu kematian, dan komplikasi ibu. Variabel usia, tempat kematian, estafet penolong dan gravida dikaji menggunakan uji Chi Square.

Hasil: Uji statistik menunjukkan nilai p 0,195 pada variabel umur; nilai p 0,916 pada tempat kematian menunjukkan; nilai p 0,646 pada variabel bantuan berkelanjutan; dan nilai p 0,048 pada variabel gravida.

Kesimpulan: Terdapat perbedaan jumlah kematian ibu di Provinsi Jawa Timur sebelum dan selama pandemi COVID-19. Perbedaan signifikan tingkat kematian ibu yang signifikan dipengaruhi oleh status gravida.

Kata kunci: kematian ibu, pandemi, COVID-19



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Introduction

The sustainable development goals 3.1 (SDGs) reducing the worldwide maternal mortality ratio (MMR) to less than 70 is targeted by 2030. The number of maternal mortality in some regions worldwide could impede the country's socio-economic development and result in unequal access to medical services (WHO, 2019). Maternal mortality is a serious public health concern in developing countries including Indonesia (Girum and Wasie, 2017). In Indonesia, the national maternal mortality rate was consistently at a high level (WHO, 2019). East Java is one of the regions with the highest maternal mortality rate in Indonesia, and it consists of 45 regencies/cities.

The World Health Organization on January 30, 2020 announced that COVID-19 outbreak was a public emergency of international focus. Due to this pandemic, health care systems worldwide have been focused on increasing the capacity of hospitals to anticipate abundance of patients due to the impacts of COVID-19 (Ombere, 2021). By the end of 2020, there were more than 4 million COVID-19 cases causing at least one million deaths (WHO, 2020b). On July 8, 2020, East Java was reported to have the highest number of COVID-19 cases in Indonesia (WHO, 2020b). The COVID-19 pandemic poses new challenges, especially maternal mortality, for the community, government and health workers. Therefore, many policies have been issued by the government.

The maternal mortality rate has increased throughout the world (Chmielewska *et al.*, 2021; de Carvalho-Sauer *et al.*, 2021; Mendez-Dominguez *et al.*, 2021). Based on the results of the CDC survey in June 2020, 8,207 cases of COVID-19 were found in pregnant women, about 9% of whom were of reproductive age (Ellington, 2021). In Pakistan, the maternal mortality rate increased over the past decade. Previously, the rate was 70 per 100,000 live births, but it was increasing to 186 per 100,000 live births in Pakistan (Siddiqui and Ali, 2022).

Pregnant women with comorbidities are considered at a greater risk of experiencing severe diseases, morbidity, and mortality (POGI, 2020). COVID-19 likely increases the risk of premature birth, preeclampsia, stillbirth, neonatal death, and maternal death (Marchand *et al.*, 2022). It is more threatening that 1.30% of 11,758 pregnant women infected with COVID-19 died, and 20% of the postpartum women, had comorbidities (Karimi *et al.*, 2021). The Indonesian Ministry of Health has changed health guidelines for checking pregnancy, childbirth, and postpartum during the COVID-19 pandemic, for example, delay in pregnancy programs and routine pregnancy examinations for suspect and positive confirmed mothers, and change in mode of second-trimester pregnancy examination (Ministry of health Republic of Indonesia, 2020b).

The government has to allocate more funds to manage COVID-19 cases among pregnant women, since it needs additional accommodation for isolation rooms, PPE, and medicines whose supplies are below the standard. Hospitals have currently faced two big issues: patient management and funding; as response to patient management, initial screening protocol for referred pregnant women is carried out. The patient referral system in Indonesia is unable to provide emergency services due to COVID-19 (Do *et al.*, 2021). Based on this problem, maternal mortality rates in East Java were examined to identify the difference before and during the pandemic.

According to the Decree of Indonesian Ministry of Health No. HK.01.07/MENKES/2020 concerning the Designation of Referral Hospitals for the Management of Certain Emerging Infectious Diseases, several hospitals have been designated as referral hospitals in Indonesian regions. Hospitals which could not accommodate the number of patients will suffer much from this pandemic. Based on the issues, maternal mortality rates between 2019-2020 were further analyzed.

Method

A retrospective observation was conducted using a cross-sectional design. All maternal mortalities in East Java were collected using a total sampling technique. The research was conducted from July-September 2021. Data on maternal mortality during January 1, 2019-December 31, 2020 were collected from the East Java Provincial Health Office. The data were then tested using the Chi-Square test.

Result and Discussion

The COVID-19 pandemic has destroyed various aspects of human life, of which are maternal and neonatal health. The World Health Organization initiated lockdown policies in various countries to minimize its spread (WHO, 2020a). It also has reduced mobility both regionally, locally, and internationally, causing travelers to be in quarantine (Onyeaka *et al.*, 2021).

In 2020, the number of maternal deaths (565 deaths) in East Java increased, a lot more than in 2019 (520 deaths). Out of 38 regencies/cities in East Java from January 2019 to December 2020, 1,085 maternal deaths were identified. Figure 1 shows the districts and cities in East Java with high maternal mortality rates. Increased maternal

mortality rates occurred in 21 out of 38 districts/cities in East Java in 2020.

The World Health Organization collaborated with the Indonesian Ministry of Health to conduct a rapid health assessment in 34 provinces in April-May 2020. The assessment showed that around 46% of health facilities delayed antenatal care (Ministry of Health Republic of Indonesia and United Nations International Children's Emergency Fund (UNICEF), 2020). A quantitative study in West Jakarta, Indonesia showed that the Large-Scale Social Restriction Policy (PSBB) reduced maternal visits (Fitrianingrum, Sabarinah and Pratomo, 2021). Similar trends were found in Sangurara Primary Healthcare Center, Palu in March-May 2020 (Hutagaol, Arini and Mujiarti, 2021). As a result, prevention of pregnancy complications in pregnant women has declined.

The government put efforts to minimize the spread, and improve early COVID-19 treatment, and management (Ali and Shahil Feroz, 2020). However, the pandemic has devastated the health system much. Its impacts include limited access to health services, stress, maternal anxiety, and so on (Chmielewska *et al.*, 2021). Among adults, most of whom were women, 42.6% were worried about COVID-19 infection (Wolf *et al.*, 2020)

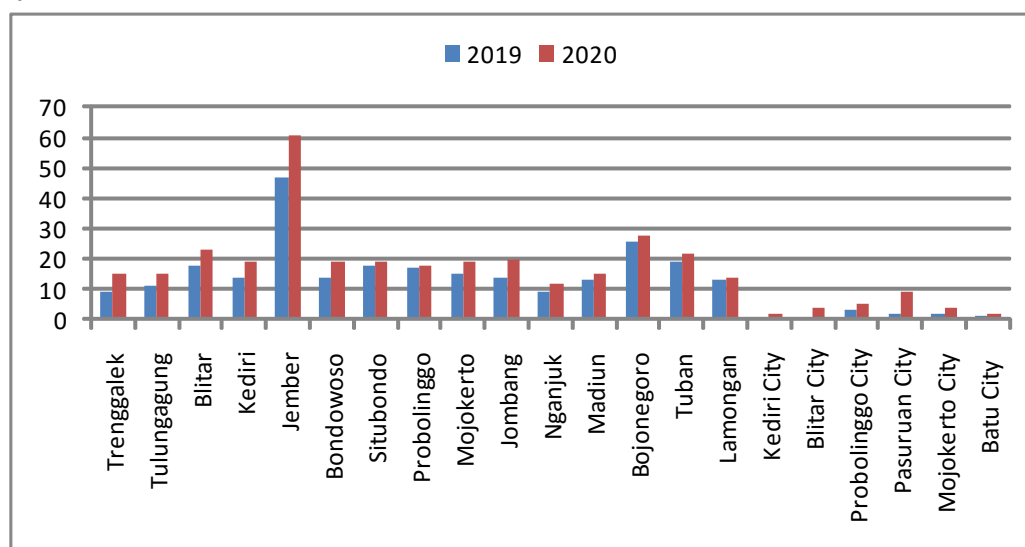


Figure 1 Distribution of maternal mortality rates across districts and cities in East Java

Table 1. Maternal mortality based on socio-health demographics

Characteristics	2019	%	2020	%	Total
Age					
<16	1	0.19	0	0	1
17-18	17	3.27	19	3.36	36
20-35	334	64.23	385	68.14	719
>35	168	32.31	161	28.50	329
Gravida					
1	113	21.73	153	27.08	266
2-3	301	57.88	320	56.64	621
≥4	106	20.38	92	16.28	198
Place of deaths					
Public hospital	349	67.12	384	67.96	733
Private hospital	97	18.65	104	18.41	201
PHCs	9	1.73	12	2.12	21
Maternity clinics	0	0	1	0.18	1
Private practice	5	0.96	1	0.18	6
Home	25	4.81	35	6.19	60
Referral trip	35	6.73	28	4.96	28
Rescue relay					
0x	103	19.81	116	20.53	219
1x	152	29.23	170	30.09	322
2x	180	34.62	193	34.16	373
3x	73	14.04	70	12.39	143
4x	11	2.12	13	2.30	24
>4x	1	0.19	3	0.53	4
Period of death					
Antepartum	150	28.85	194	34.34	344
Intrapartum	98	18.85	103	18.23	201
Postpartum	272	52.31	268	47.43	540
Complications					
Hemorrhage	120	23.08	121	21.42	241
Eclampsia	162	31.15	151	26.73	313
Infection	36	6.92	37	6.55	73
Heart disease	66	12.69	63	11.15	129
AFE	15	2.88	13	2.30	28
Miscariage	0	0.00	1	0.18	1
COVID-19	0	0.00	56	9.91	56
Tuberculosis	26	5.00	22	3.89	48
Hepatitis	6	1.15	6	1.06	12
HIV	15	2.88	4	0.71	19
Pneumonia	3	0.58	15	2.65	18
Others	71	13.65	76	13.45	147

Pregnant women in Surabaya showed increased anxiety about the infection as well (Hatmanti, Rusdianingseh and Septianingrum, 2021). Table 1 shows maternal mortality rates according to the socio-health demographics.

Table 1 shows that the deaths occurred among mothers aged 20-35

years. In 2019, some mothers died at the age of less than 16 years, but in 2020 there were no reports of deaths below 16 years old. In 2020, maternal deaths at the age of over 35 years decreased by 3.81% and 17-18 years by 0.09%. Maternal mortality at the age of below 35 years significantly increased in 2020. The risk of COVID-19

infection increased in mothers of reproductive age. According to the CDC report, 9% of pregnant women infected were of reproductive age, and about 5% of them were aged 15-44 years (Ellington, 2021). In Brazil, the average maternal mortality occurred to women aged 31 years old (S Takemoto *et al.*, 2020). This present study showed mothers of reproductive age had a higher percentage of death than groups at risk (less than 20 years old or more than 35 years old). Indirect factors that potentially increase maternal mortality include poverty, distance, lack of information, inadequate services, cultural practices, and others (McCall, Nair and Knight, 2017; World Health Organization, 2019; Chinwah, Nyame-Asiamah and Ekanem, 2020).

Maternal mortality by gravida occurred mostly to gravida status 2-3. In 2020, the number of maternal mortality increased up to 5.35% in women with primigravida status. The maternal mortality during 2019 and 2020 dominantly occurred to multigravida mothers who were not supposed to be at risk. While women with primigravida at risk of preeclampsia and those with grand multigravida at risk of Hemorrhage PostPartum (HPP), contributed a quarter to the overall deaths. Attention must be given to all risk and non-risk women. Self-efficacy is important for pregnant and postpartum women in dealing with pregnancy, childbirth, and postpartum (Delavari, Mohammad-Alizadeh-Charandabi and Mirghafurvand, 2018). Midwives are responsible to prevent complications and maternal mortality by promoting maternal health (Rosyidah, Koning and Ormel, 2019).

The majority of maternal mortality occurred in public hospitals. In 2020, a lot more women giving birth at maternity clinics died. Most maternal mortality occurred in 2-time rescue. Most of the deaths occurred to women with rescue relay more than once. Maternal handling procedures and referrals for COVID-19 and non-COVID-19 mothers

are urgently needed for the need of emergency, fast and precise treatment. Almost all maternal mortality at tertiary referral hospitals were resulted from referrals to lower hospitals (Mahmood *et al.*, 2021). Limited research on maternal impacts and the quality of health services hinders the progress of health workers to adapt to new situations immediately (Rosyidah, Koning and Ormel, 2019; Patrick and Johnson, 2021). Access to health services has a very strong impact on maternal mortality. Research showed the risk of maternal death will increase by about 3.9% for every 10 kilometers distance to access health services (Cameron, Suarez and Cornwell, 2019).

Most maternal mortality during the periods were caused by bleeding and eclampsia. In 2020, 9.91% of mothers died due to COVID-19. Eclampsia cases decreased in 2020. Maternal mortality likely has a relationship with the incidence of eclampsia, especially for nulliparous women, followed by perinatal morbidity and mortality (Mendoza *et al.*, 2020; Coronado-Arroyo *et al.*, 2021; Papageorgiou *et al.*, 2021). Pregnant women infected with COVID-19 in the second and third trimesters have the potential to experience cardiopulmonary complications and death (Hantoushzadeh *et al.*, 2020). Comprehensive management on infectious diseases such as HIV, tuberculosis, hepatitis, and others must also be taken into action.

Of the 38 cities/regencies in East Java, maternal mortality occurred in 22 districts/cities in 2020. At least seven mothers died from COVID-19 infection in Pasuruan. Table 2 shows the relationship between the demographic characteristics of maternal mortality before and during the pandemic. This study showed no difference between age of death ($p > 0.05$), place of death ($p > 0.05$), and rescue relay ($p > 0.05$), in 2019 and 2020. There was a difference in maternal deaths by gravida within these periods ($p < 0.05$).

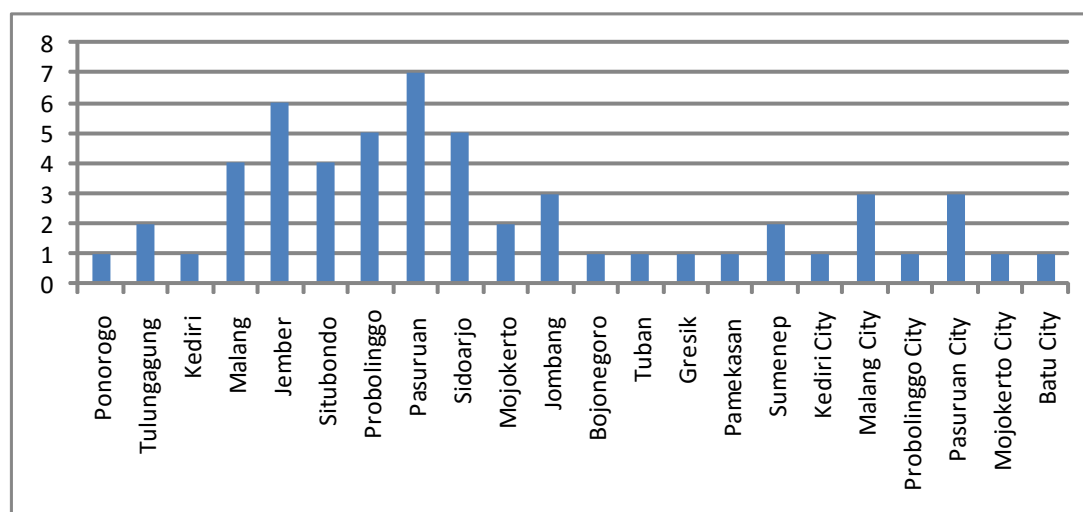


Figure 2. Distribution of maternal mortality due to COVID-19 in 2020 across regions.

Table 2. Difference of Demographic and Maternal Mortality

Variable	2020 (n)	%	2019 (n)	%	P	Std Dev
Age (years)						
< 20 or > 35	180	31,86	186	35.77	0.173	0.473
20-35	385	68.14	334	64.23		
Place of death						
Health care facility	502	88.85	460	88.46	0.84	0.317
Non Health care facility	63	11.15	60	11.54		
Rescue Relay						
≤1x	286	50.62	255	49.04	0.60	0.5
>1x	279	49.38	265	50.96		
Gravida						
≤1	153	27.08	113	21.73	0.041	0.430
>1	412	72.92	407	78.27		

Maternal mortality ratio (MMR) is one of the main issues in several countries, especially developing countries. Maternal health is influenced by the service system and access to health services, the availability of service providers, and skills in providing adequate services, education and health information (Bhan *et al.*, 2020). By improving professional and adequate midwifery services during childbirth developed countries have previously succeeded in reducing maternal mortality rates by up to 50% in the early 20th century (Prawirohardjo, 2016). Poor management, lack of policy, inadequate number of staff and senior clinical staff, delay in emergency response, unresponsive procedures, the poor process of information sharing,

pyramidal referrals, poor knowledge and skills of antenatal care staff, poor communication and lack of recognition of the seriousness (Mahmood *et al.*, 2021).

Conclusion

Gravida is the main variable that influences the maternal mortality rates before and during the COVID-19 pandemic. However, age, place of death, and rescue relay do not make any difference in the cases before and during the pandemic.

Maternal mortality cases were mostly found in women aged 20-35 years, admitted to hospitals, during the postpartum period, and having complications due to eclampsia.

This study could not give holistic results since it did not touch down primary resources e.g., pregnancy, childbirth, postpartum and women with COVID-19. Further qualitative research is needed for more comprehensive results.

Abbreviations

WHO: World Health Organization; SD: Standard Deviation; OR: Odds Ratio; MMR: Maternal Mortality Ratio; SDGs: Sustainable Development Goals; COVID-19: Corona Virus Disease 2-19; SARS-CoV-2: Severe Acute Respiratory Syndrome- Corona Virus-2; USG: Ultrasono Graphy; PSBB: *Pembatasan Sosial Berskala Besar*.

Declarations

Ethics Approval and Consent Participant

This study has received ethical clearance approval from the Ethics Committee of the Faculty of Medicine, Universitas Airlangga No. 162/EC/KEPK/FKUA/2021.

Conflict of Interest

There is no conflict of interest in this study.

Availability of Data and Materials

Not applicable

Authors' Contribution

DAF and WA conceptualized the study; WA and MACL reviewed and edited the manuscript; DAF wrote the original draft.

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THE INTERNET AS A HEALTH INFORMATION IN DECISION MAKING OF PREGNANT WOMEN

Internet Sebagai Informasi Kesehatan dalam Pengambilan Keputusan Wanita Hamil

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Abstract

Background: Maternal and Child Health (MCH) is still becoming a health problem in Indonesia. One of the causes of maternal mortality is the speed of decision making in the family. Decision making is influenced by knowledge, awareness, family shape and culture in the neighborhood.

Aims: the study aimed to identify and analyze the relationship between the use of the internet as a health information and maternal decision-making regarding emergency help

Methods: This study used a mixed-method approach. The sample of 175 respondents. Data analysis performed in this study was frequency analysis, cross tabulation and chi-square.

Results: There were 40% of respondents used the internet as a source of pregnancy information. Pregnant women had the information about pregnancy from google, instagram and whatsapp group. There were 45.70% of them have made decisions independently regarding the emergency relief. Chi-square analysis showed a p-value = "0,000" with a contingency coefficient of 0,368 indicating the use of the internet as a health information related to decision making of pregnant women regarding emergency relief.

Conclusion: The conclusion of this study is that there were pregnant women who were using the internet for health information and the majority of pregnant women had made decisions regarding emergency relief independently.

Keywords: decisions, health information, internet, pregnant women

Abstrak

Latar Belakang: Kesehatan Ibu dan Anak (KIA) masih menjadi masalah kesehatan di Indonesia. Salah satu penyebab kematian maternal adalah cepat atau tidaknya pengambilan keputusan di dalam keluarga. Pengambilan keputusan dilatarbelakangi oleh pengetahuan, kesadaran, bentuk keluarga maupun budaya di lingkungan sekitar.

Tujuan: Tujuan penelitian ini adalah mengidentifikasi dan menganalisis hubungan penggunaan internet sebagai sumber informasi kesehatan dengan pengambil keputusan ibu mengenai pertolongan kegawatdaruratan.

Metode: Penelitian ini menggunakan pendekatan mix-method. Sampel sebanyak 175 responden. Analisis data yang dilakukan dalam penelitian ini adalah analisis frekuensi, tabulasi silang dan chi-square.

Hasil: Sebanyak 40% responden menjadikan internet sebagai informasi kehamilan. Ibu hamil mendapatkan informasi tentang kehamilan dari google, instagram dan grup whatsapp. Sebanyak 45,70% responden telah membuat keputusan secara mandiri mengenai pertolongan kegawatdaruratan. Analisis chi-square menunjukkan hasil p-value=0,000 dengan contingency coefficient 0,368 menunjukkan penggunaan internet sebagai sumber informasi kesehatan berhubungan dengan pengambil keputusan ibu hamil mengenai pertolongan kegawatdaruratan.

Kesimpulan: Kesimpulan dari penelitian ini adalah terdapat ibu hamil yang menggunakan internet sebagai informasi kesehatan dan mayoritas ibu hamil telah melakukan pengambilan keputusan mengenai pertolongan kegawatdaruratan secara mandiri.

Kata kunci: keputusan, informasi kesehatan, internet, Ibu hamil



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Introduction

Maternal and Child Health (MCH) is still becoming a health problem in Indonesia. There have been various efforts to reduce Maternal Mortality Rates (MMR) in Indonesia, including improving antenatal services in all health service facilities with good quality and reaching all target groups, increasing childbirth assistance by skilled health professionals, put it at the end of noun clause increasing inaccurate word order for pregnant women and implementing a referral system and improving neonatal services with good quality. The World Health Organization (WHO) pointed out that the maternal mortality rate in the world in 2015 was 216 per 100,000 live births. The maternal mortality rate in Indonesia in 2017 reached 305 per 100,000 live births and reached 91.92 per 100,000 live births in East Java Province (Ministry of Health, 2017). Those numbers still exceed the SDG's target which is under 70 per 100,000 live births.

The occurrence of maternal mortality is motivated by several factors consisting of the health status of pregnant women themselves, utilizing health care and maternal behavior in maintaining their health. The most common causes of maternal mortality in Indonesia are direct obstetric causes including bleeding 28%, preeclampsia / eclampsia 24%, infection 11%, while indirect causes are obstetric trauma 5% and others. Besides those factors, maternal mortality can be caused by the speed of decision making in the family to get emergency help (Arihta T and Kristina, 2018).

Health care decisions often influence the ability to live a healthy life, livelihoods, disability, and death and could also include risky (and often painful) procedures, lifelong medication for chronic disease, major surgery, rehabilitation, and physical treatment (Osamor and Grady, 2016). An initial survey conducted discovered that there were 10 pregnant women who experienced maternal emergencies at Koja Hospital, Seven of which were mothers who experienced childbirth assistance for their husbands who were slow in making

decisions (Arihta T and Kristina, 2018). Another initial survey conducted showed that in April 2015, there were 20 mothers who experienced obstetric complications and were referred to Sumedang Regional Hospital. They were mothers with the type of decision making in the hands of family and in-laws (Wulandari, Susanti and Mandiri, 2016).

These studies showed that the decision to seek childbirth assistance or other obstetric emergency care could come from the mother herself, her husband, the joint decision made by mother and husband, parents and parents-in-law. In fact, not all pregnant women and families recognized high risk during pregnancy. In addition, decision making was also still influenced by cultural factors or customs. Therefore, it was sometimes too late for them to get to emergency maternal care, to find transportation and to make referral decisions (Ganle *et al.*, 2015). The important role of the health-seeking behavior among women is the power balance between men and women. The women's accession and attainment of healthy and meet household needs at personal, society and public levels can be inhibited by the power relationship. In addition, especially poor women with little or no education, are more likely to be in unequal relationships and to have limited autonomy in accessing maternal care (Nigatu *et al.*, 2014; Rao *et al.*, 2016).

One of an attempt to make effective decision-making for delivery assistance for pregnant women and families is by increasing knowledge and awareness regarding the risks of pregnancy and childbirth. Lack of knowledge about health can have an impact on mortality during pregnancy and childbirth (Damayanti *et al.*, 2019). Knowledge and awareness are not only fostered through formal education, but also obtained through attending associations, accessing the internet and other media such as TV, radio, posters, leaflets to get information directly through health workers.

The use of the Internet has become more and more developed through education and technological processes

(Slomian, *et al.*, 2017). In this modern era, digital technology is developing rapidly which can provide real opportunities to overcome the challenges of the health system (WHO, 2019). One of the health interventions with digital technology is the internet which is the media chosen because it can be accessed anywhere and anytime by pregnant women through smart phones or computers. In addition, many health services and other organizations use social media to deliver health information with a more attractive appearance and create an online group that is useful as a forum to discuss pregnancy knowledge (Sayakhot and Carolan-Olah, 2016).

Based on the afore-mentioned issues, this study focuses on the use of the internet among pregnant women in increasing knowledge and awareness about pregnancy health. The aim of this study is to identify and analyze the association between the use of the internet as a source of health information with the type of mother's decision making regarding emergency help. If the mother has good knowledge and is aware of the importance of maintaining a healthy pregnancy, she will be able to make effective decisions regarding their pregnancy health and the safety of her childbirth. The results of this study can be used as an input or advice in developing awareness and knowledge of pregnant women regarding the health of pregnancy and childbirth safety so that it can reduce the maternal mortality rate.

Method

This study utilized a mixed-method approach, in which the data collection was done through questionnaires (quantitative) and in-depth interviews (qualitative). The research populations in this article were multiparous pregnant women and mothers of toddlers in 5 Public Health Centers (Puskesmas) in the city of Surabaya representing the capital city and 5 Community Health Centers in Bojonegoro District representing the district area. The city of Surabaya and the district of Bojonegoro are included in the 10 most maternal deaths in East Java. The Public

Health Centers in Surabaya involved in the research were Puskesmas Bulak Banteng, Puskesmas Sememi, Puskesmas Simolawang, Puskesmas Tenggilis and Puskesmas Kedurus, while the Public Health Centers in Bojonegoro District involved in the study were Puskesmas Balen, Puskesmas Ngasem, Puskesmas Padangan, Puskesmas Purwosari and Puskesmas Trucuk. Data was collected from June to August 2019.

Sampling was carried out the formula for estimation of proportion data and produced a sample of 175 respondents. The dependent variable used in this study was the type of decision making by pregnant women. The independent variable used in this study was the use of the internet as a source of health information. Data processing was performed by frequency analysis, cross tabulation and statistical tests with chi-square to determine the association between variables. Two-tailed p-value <0.05 was considered statistically significant.

The purpose of this study is to identify and analyze the relationship between the use of the internet as a source of health information and maternal decision-making regarding emergency help. The results of this study can be used as an input or advice in developing knowledge and awareness of pregnant women regarding the health of pregnancy and childbirth safety so as to reduce the maternal mortality rate.

Result and Discussion

Maternal health refers to the health of the mother during pregnancy, childbirth, and the puerperium. A healthy mother can avoid complications, death and disability so that she can be more productive and contribute to the welfare of the family and community. On the other hand, mothers who have health problems can cause complications and, the worst possibility, death. To prevent the occurrence of maternal death, a concrete solution is needed to make sure that the mother can be empowered in terms of her health by strengthening information and knowledge

about maternal health adequately. This can help the mother to detect risks and to prevent problems that may be experienced by mother and fetus (Mulauzi and Daka, 2019).

Emergency is a serious and dangerous situation which occurs suddenly and unexpectedly that requires immediate action to save lives. Emergency in pregnancy and childbirth can cause maternal death if it is not immediately handled by skilled health workers (Novvi K, Ermalinda E, 2016). Therefore, it is important to improve the knowledge and awareness of mothers regarding emergencies. Having consultations with health workers to obtain information about pregnancy has limitations, in which mothers usually do not have enough time and energy and need money to access it. It causes mothers to prefer to access the internet either through smartphones and computers to find useful information about pregnancy and childbirth. However, there are also mothers who do not access the internet because they do not have adequate skills or equipment in accessing the internet (Lupton, 2016).

Univariate Analysis Results

The results showed that there were 70 pregnant women (40.00%) who made the internet a source of pregnancy information. According to the results of in-depth interviews, pregnant women had the information about pregnancy from Google, Instagram and WhatsApp group. Some pregnant women stated that the information accessed was tips about pregnancy,

restrictions during pregnancy, tips on smooth delivery and the dangers that might arise during pregnancy and childbirth and how to overcome them. In addition, some pregnant women who did not use the internet as a source of health information were caused by not having a smartphone and not being able to access the internet (Table 1).

The results showed that most people did not use the internet as a source of information. This finding is in line with the previous African studies examining mothers' perceptions of information regarding dissemination using Information and Communication Technology (ICT). This happens because of the lack of access to internet services in rural areas where the level of ICT infrastructure is far below the urban areas. Therefore, a better Internet connection service is needed to improve the effectiveness of ICT interventions in Nigeria (Obasola and Mabawonku, 2018; Slomian, *et al.*, 2017).

The use of the internet by pregnant women is influenced by information needs, convenience, and speed of access and finding fellow pregnant women with the similar problem. The benefits of using the internet in meeting health information needs can reduce anxiety, get personal support, create emotional connections and increase confidence in pregnant women. The majority of pregnant women usually look for the information using the internet which is done at the early age of pregnancy. The existence of information

Table 1. Univariate Analysis Results

Variables	N	%
The use of the internet as a source of health information		
Yes	70	40,0
No	105	60,0
Decision Maker		
Own decision	80	45,7
Husband	19	10,9
Parents	7	4,0
Parent-in-laws	3	1,7
Joint decision between husband and wife	62	35,4
Others	4	2,3

Source: Primary Data, 2019

about pregnancy on the internet allows mothers to have the confidence to make decisions (Javanmardi *et al.*, 2018). Moon *et al.*, (2019) in their research pointed out that mothers use the internet as a source of health information since it is considered more practical, faster, as a convenient place to get information, specifically non-urgent information, and they do not want to disturb health workers with the number of questions they have.

According to Sanders and Crozier (2018) mothers search for information using the internet due to the power to find sources that support and also challenge their own belief systems to make the right decisions. Apart from the internet including social media forums, other sources of information used are books, magazines, and other visual media. The internet plays a basic role as well as having a positive impact on enhancing mothers' insights. Compared with other sources, the internet is seen as a source of all knowledge by many mothers. Apart from that, the internet offers a wider range. Books and magazines are considered narrow, out of date, and expensive and do not offer accurate information at this time.

Types of decision making by pregnant women can be divided into 6 categories, namely the decision of pregnant women themselves, waiting for husband's decision, waiting for parents' decision, waiting for parents-in-law's decision, the decision between husband and wife and others (medical personnel's decision). The majority of respondents, 80 pregnant women (45.70%), had made independent decisions regarding natural emergency relief. In addition, it was followed by 62 pregnant women (35.40%) who had discussions with their husbands to make decisions about emergency assistance. The results of the in-depth interview indicated that pregnant women who depended on emergency help decisions on parents and in-laws were pregnant women who lived together with parents and in-laws, while pregnant women who determined independently or discuss only with their husbands on the emergency

help, some of which were small families or newly married couples (Table 1).

The results of in-depth interviews in this study also showed that mothers who had the type of decision making 'waiting for parents and in-laws' were mothers who lived in extended families. Therefore, although mothers had accessed various online and offline media to increase their knowledge about pregnancy health, decision making was still done based on their culture or the views of parents and parents-in-law, while the majority of mothers who made decisions independently or only discussed with their husbands were mothers living in nuclear families.

Research in Ghana shows that women with decision-making in health autonomy have a tendency provision of health facilities, which is high compared with those who did not self-sufficient. Other than that, economic factors, educational level, also affect the mother to give birth in health facilities (Ameyaw *et al.*, 2016). In addition, study in rural Sierra Leone found that to control the finances, women were often required to get permission from their husbands before they attend hospital or access certain maternal medical care. (Treacy, Bolkan, and Sagbakken, 2018).

Several factors including elements of problem-solving and informed choice affect decision making in seeking healthcare so requiring a collaborative dynamic until a deal is reached through deliberation and consideration. There are general components of women's autonomy: decision-making over household matters or health care, is controlled over some finances and freedom of movement. Women's ability to maintain their health and use health care services appropriately may depend on their part in decision-making autonomy. This study showed that decision making is mostly done by pregnant women themselves i.e. 45.70%, which is higher compared to a report from Malawi, where 25.9% of women decided independently (Rao *et al.*, 2018). In line with Nigatu *et al.*, (2016) they reported that 43.9% of women were free to access a maternal health facility for their own health care service

needs. Positive association between women autonomy and health care decision-making and better health outcomes (Osamor and Grady, 2016).

There are still many such societies which still have strong social structures that define the roles of men and women rigidly, usually encoded in religious, tribal, and social traditions. When pregnant women face obstetric complications, they should ask permission from their partners or consideration from mother-in-law to undergo treatment in a health facility. Addition, it was reported that husbands were often absent during an obstetric emergency although the majority of husbands provided financial and emotional support for their wives. These barriers often explain the circumstances under which women have or do not have the autonomy to make decisions concerning their own health (Geleto *et al.*, 2018; Osamor and Grady, 2016; Rao *et al.*, 2016).

This is in line with research conducted in Bangladesh by Ghose *et al.*, (2017) which states that the majority of decision-makers in utilizing health services are joint decisions of mothers and husbands. Research in Burkina Faso also found that decision-makers were dominated by husbands and mothers-in-law. The husband has an important role in regulating family income, as the head of the family, and all matters relating to the household must get permission from him. While the mother-in-law is seen as a model for the wife so that in matters relating to women the decision making is often discussed not with a partner but with the mother-in-law (Somé and Sombié, 2013).

Bivariate Analysis Results

The results showed that pregnant women who utilized the internet as a source of health information had a tendency to be able to make decisions independently regarding emergency assistance as it is shown in Table 2. Bivariate Analysis Results experienced. It was because pregnant women got knowledge and awareness about pregnancy health through the internet, so they were able to make decisions independently, while pregnant women who did not use the internet as a source of health information tended to discuss or rely on decisions for others. Chi square test results showed a p-value of 0.000 or less than α (0.05) with a contingency coefficient of 0.368. Therefore, it could be concluded that the use of the internet as a source of health information had a relationship with the type of decision making of pregnant women regarding emergency relief. Pregnant women who use the internet mostly make their own decisions (65.7%). While those who do not use the internet mostly make decisions with their husband's (48.6%).

The result showed that the use of the internet as a source of health information has a relationship with the decision makers in accessing health services and pregnant women who use the internet as a source of health information will tend to be independent in making decisions about their health. This is in accordance with a research conducted by Lagan, Sinclair and Kernohan (2011) which found that the internet has an impact or relationship with

Table 2. Bivariate Analysis Results

Table 2: Bivariate Analysis Results													
Variable	Types of Decision Making by Pregnant Women												P-value
The use of the internet as a source of health information	Own Decision		Waiting for Husband's Decision		Waiting for Parents' Decision		Waiting for Parents' In-Law Decision		Joint Decisions of Husband and Wife		Others		
	n	%	n	%	n	%	n	%	n	%	n	%	
Yes	46	65,7	5	7,1	4	5,7	1	1,4	11	15,7	3	4,3	0.000
No	34	32,4	14	13,3	3	2,9	2	1,9	51	48,6	1	1	

Source: Primary Data, 2019

the independence of pregnant women in decision making. Pregnant women can seek information and get support from other pregnant women, especially in the first pregnancy. Thus, mothers are more confident in undergoing pregnancy and determine the health services they should take during pregnancy. When mothers have confidence through their knowledge, mothers can make decisions independently, while mothers who are not exposed to information either through the internet or other media will rely on decision-making from other parties because they are less sure of the consequences of the decisions they make in an emergency.

According to Notoatmodjo (2003), the more information obtained can lead to awareness in which someone eventually will behave according to the knowledge he/she has. Therefore, mothers can be empowered in making decisions to immediately access health services and delivery safely. The impact of making the right decision is to prevent delays or being too late in giving the treatment. These delays include: too late to recognize the high risks and dangers of pregnancy and childbirth, too late to make the decision in seeking delivery assistance and handling of complications by health workers in pre-referral and referral services so that emergency cases can be quickly dealt (Path, 2010).

The study has identified pregnant women in Mexico, Italy, China, Turkey, Sweden, United States of America and the United Kingdom who use the internet. It is found that six out of the seven countries have a significant proportion around 80% to over 90% of pregnant women who sought maternal and child health information frequently from the internet. Pregnant women utilize the Internet during pregnancy because they need information. They access the internet as a source of information for seeking additional information about pregnancy to improve their confidence before a prenatal visit or immediately after a visit. Most pregnant women consider the information they found to be reliable and useful. So, they do not need to discuss information they had

retrieved from the Internet with their physicians or midwives. The information was widely accessed by pregnant women on the internet was early pregnancy, fetal development and maternal emergencies. (Sayakhot and Carolan-Olah (2016).

Another study has found that pregnant women are more confident to make better decisions after using the internet. Pregnant women use the internet because it feels easier and the information obtained is considered quite good and reliable. The internet has even become the first source of information related to the health of pregnant women. It does not only provide opportunities for mothers to find and access different information but also becomes an important factor in their choices and decisions (Lynch and Nikolova, 2015).

In addition, the results of this study are also in line with what was stated by Huberty *et al.*, (2013) that knowledge obtained by mothers through the internet will make mothers tend to be more empowered in making decisions regarding delivery assistance independently. Information that can be obtained on the internet in the form of inspection services are available for pregnant women, choices regarding health care facilities, budgeting in delivery preparation and methods of delivery and their consequences. It will make the mother more understand that there are many choices that can be taken so that the delivery process can be done safely and if there is a maternal emergency, the mother has understood the situation and does not panic. Mothers can also share the knowledge they get with those around them, especially their families to make sure that when an emergency occurs, they will be able to make decisions effectively and efficiently.

According to the research of Shorten *et al.*, (2015) the development of health information technology is a new method that can support mothers in making decisions. With the potential benefits of cellular health information technology, paper-based decision aids are transformed into safe and interactive Web sites to meet

the diverse needs of pregnant women and healthcare workers in medical care decisions. Of course, this support tool contains evidence-based information, helps pregnant women weigh the pros and cons of treatment options, and assess benefits and risks according to maternal values and preferences.

Research in Canada mentions the use of the internet, especially mobile applications in accessing information about maternal and child health, presents a great opportunity in making medical decisions. The application can improve access to health services on time during emergencies. In addition, there are public health information services and help manage patient care. The use of a mobile application can make a mother helpless because there is accurate medical information in it. There is a feature to update information automatically so that mothers do not lag behind the latest information on maternal and child health. Another advantage is improving service efficiency, time, cost and connecting in real-time. Patient decisions are made based on joint decisions of medical officers and patients do not need to go to health services because they only need to access the mobile application (Rahimi *et al.*, 2017).

Conclusion

The conclusion of this study is that there are pregnant women who use the internet as a source of health information and the majority of pregnant women have made decisions regarding emergency relief independently. The results of the cross tabulation show that pregnant women who use the internet as a source of health information have a tendency to make decisions regarding emergency relief independently. In addition, the statistical test results also show that there is a relationship between the use of the internet as a source of health information and decision making regarding emergency relief independently.

Declarations

Ethics Approval and Consent Participant

The ethical approval by the faculty of nursing, Airlangga University, no : 1494-KEPK. Respondents were addressed before the survey about the survey's objectives and purposes, and verbal consent to participate in the study was taken from them.

Conflict of Interest

There is no conflict of interest in this study.

Availability of Data and Materials

The availability of data and materials based on demand from journals and authors.

Authors' Contribution

NAD, RDW, IAR, NACK, and AP wrote the original draft.

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THE ACCEPTANCE OF MEDICAL RECORD OFFICER TOWARDS MRMIS IN X HOSPITAL MATARAM

Penerimaan Petugas Rekam Medis terhadap SIMRM RS X Kota Mataram

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Abstract

Background: MRMIS needs to be evaluated to know the actual conditions of implementing the system. One of the evaluations that can be done is user acceptance of MRMIS.

Aims: The study aims to determine MRMIS acceptance in X hospital Mataram City based on the variables in the UTAUT model.

Methods: This is a quantitative study with a correlational approach. The sample size was 70 medical record officers using total sampling. Data processing used Partial Least Square (PLS) method.

Results: The test results showed the t-statistic of effort expectancy was 2.507, facilitating conditions 3.787 behavioural intention 4.928, however the performance expectancy, social influence and moderate variables like age and gender variables had t-statistic values below 1.96.

Conclusion: The variables of effort expectancy, enabling conditions, and behavioural intentions all have a significant impact on respondent acceptance of MRMIS, whereas the variables of performance expectancy, social influence, and moderate variables of age and gender do not.

Keywords: Information Systems, Medical Records, PLS, UTAUT

Abstrak

Latar Belakang: Penerapan sistem informasi perlu dilakukan evaluasi agar diketahui kondisi sesungguhnya dari penerapan sistem tersebut, salah satu evaluasi yang dapat dilakukan yaitu evaluasi mengenai penerimaan pengguna terhadap SIMRM

Tujuan: Penelitian bertujuan untuk mengetahui penerimaan SIMRM di RS X Kota Mataram berdasarkan variabel pada model UTAUT

Metode: Merupakan penelitian kuantitatif dengan pendekatan korelasional. Sampel dipilih sebanyak 70 petugas dengan cara total sampling. Data dikumpulkan menggunakan kuesioner serta diolah menggunakan metode Partial Least Square (PLS).

Hasil: Hasil uji menunjukkan nilai t-statistik dari setiap variabel yaitu effort expectancy (2,507), facilitating conditions (3,787) behavioral intention (4,928), sedangkan variabel performance expectancy, variabel social influence dan variabel moderat usia dan jenis kelamin memiliki nilai t-statistik dibawah 1,96

Kesimpulan: Variabel effort expectancy, variabel facilitating conditions, dan variabel behavioral intention berpengaruh signifikan terhadap penerimaan SIMRM oleh petugas, sedangkan variabel performance expectancy, variabel social influence, dan variabel moderat usia dan jenis kelamin tidak signifikan.

Kata kunci: PLS, Rekam Medis, Sistem Informasi, UTAUT



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Introduction

Advances in health technology, especially in hospitals, are needed because the implementation of management in hospitals often has difficulty in managing information so that it is necessary to improve the management of information that is efficient, fast, easy, safe, integrated and accountable so that hospitals need an information system to support health services. The Indonesian Minister of Health's Regulation No. 1171 year 2011, which says that hospitals must operate hospital information systems, supports the deployment of the information system. Hospital management information system is a communication information system that can process and harmonise all hospital service processes such as coordination, reporting and administrative procedures in order to obtain appropriate and accurate information (The Indonesian Minister of Health's Regulation No. 82 year 2013 on Hospital Management Information System).

Based on data from the Association of Hospitals throughout Indonesia (PERSI) in mid-2020 there are 2560 hospitals in Indonesia, 2177 of which have used hospital information systems and functions, one of which is the X Hospital in Mataram City. X hospital has implemented a management information system in the medical record section (MRMIS / SIMRM) since 2014 in all installations including medical records installations. The installation of medical records is one of the parts responsible for the application of information systems, this is in accordance with one of the competencies possessed by the medical recording profession, namely data management and health information (Decree of the Minister of Health of the Republic of Indonesia No: HK.01.07/Menkes/312/2020).

As long as MRMIS is applied, of course, there are obstacles experienced by officers including system errors, and some features of MRMIS are not used by officers. The results of the preliminary study show that as many as 35.71% of officers feel MRMIS often experience interference and some features are not used because it is not in accordance with the work needs of

medical record installation officers, and it is known that during MRMIS applied there has never been an evaluation related to the officer's acceptance of MRMIS. Evaluation of information systems is an effort made to find out the true condition of the implementation of information systems, and through evaluation can be known the achievements of the application of the system so that action can be done to improve the performance of the information system (Putra, 2020).

The UTAUT (unified theory of acceptance and use of technology) evaluation model can be used to determine the user's acceptance of MRMIS based on these findings. The Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Motivational Model (MM), Theory of Planned Behavior (TPB), combined TAM and TPB, model of PC utilisation (MPTU), innovation diffusion theory (IDT), and social cognitive theory are all used in the UTAUT evaluation model (Venkatesh, 2003).

The purpose of the study was to determine the acceptance of MRMIS in X hospitals in Mataram City based on each variable in the UTAUT model so that it can be used as one of the considerations in decision making that is useful for MRMIS improvement.

Method

The study was conducted from July 2021 to September 2021. Some of the stages carried out in this study are presented in figure 1.

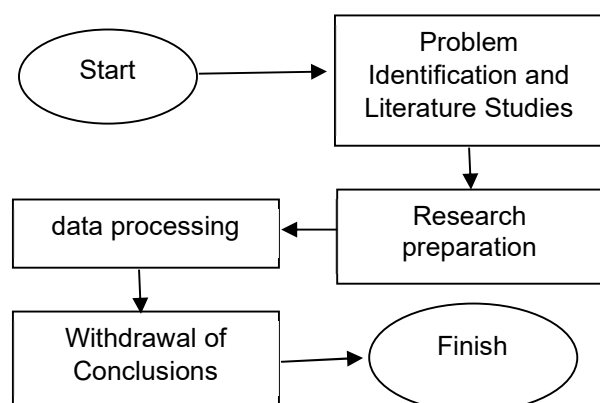


Figure 1. Research Stage

Problem Identification and Literature Studies

The initial stage is to identify problems at the research site so that the preparation of research problems can be done, then a literature study is conducted aimed at obtaining theories and information that can support the research process.

Determination of Evaluation Model

Based on the results of problem identification and literature studies can be determined the evaluation model used Venkatesh's UTAUT model is used in this research (2003) which has been modified using only two moderation variables namely age and gender, the following UTAUT evaluation model applied to this study presented in Figure 2.

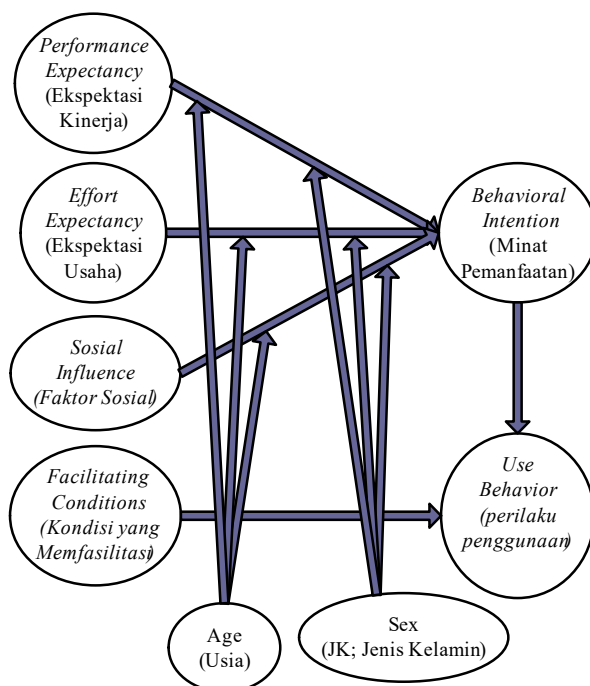


Figure 2. Modified UTAUT Evaluation Model

Research Preparation

The research conducted is a quantitative research with a correlational approach. Quantitative research is a study whose measurement of data is obtained through scientific calculations obtained from samples of people who respond to inquiries in order to determine the frequency of responses (Creswell, 2018), while correlational research is a study to

find out the relationship of a variable with one or more variables (Azwar, 2010).

The sample in this study was determined by the total sampling technique so that the sample used was all officers at the medical record installation of the X hospital in Mataram City which numbered 70 people. Data collection is carried out using research instruments in the form of questionnaires with a five-tier strongly agree, agree, disagree, strongly disagree on a likert scale.

Data Processing

Data processing in research using Smart-PLS (Partial Least Square) software, with such software can be done with the outer model, inner model, and hypothesis models.

The purpose of outer model testing is to determine the validity and reliability of research instruments. Testing the validity of the instrument refers to the value of the outer loading and AVE, while the reliability test uses the value of Cronbach's alpha and composite reliability.

The inner model test is based on the R-Square value. The inner model is used to explain the relationship between research variables.

A path coefficient model test is used to perform the hypothesis test. Observe the original sample value to see the direction of the relationship and the t-statistical value to see its significance when testing the path coefficient model. A significant variable if it has a t-statistical value > t-table (1.96). Here are the hypotheses in this study:

H1 : There is a correlation between performance expectancy (PE) and behavioral intention (BI).

H1a : The correlation between performance expectancy (PE) and behavioral intention (BI) are moderated by age.

H1b : The correlation between performance expectancy (PE) and behavioral intention (BI) are moderated by gender.

H2 : There is a correlation between effort expectancy (EE) and behavioral intention (BI).

H2a : The correlation between effort expectancy (EE) and behavioral intentions are moderated by age (BI).

H2b: The correlation between effort expectancy (EE) and behavioral intention (BI) are moderated by gender.

H3: There is a correlation between social influence (SI) and behavioral intention (BI).

H3a: The correlation between social influence (SI) and behavioral intentions (BI) are moderated by age.

H3b: The correlation between social influence (SI) and behavioral intentions (BI) are moderated by gender.

H4: There is a correlation between facilitating conditions (FC) and use behavior (UB).

H5: There is a correlation between behavioural intention (BI) and the use of behavior (UB).

Conclusion Withdrawal

The final stage of this study is the withdrawal of conclusions. The conclusions obtained in this study are based on the results of statistical tests compared to theories.

Result and Discussion

It is known that the percentage of women is more than men, the number of female respondents as much as 58.6% while male respondents as much as 41.4%. The age of the respondents was 30 years and above (58.6%) while those aged less than 30 years were 41.4%. D3 educated respondents amounted to 41.4%, D4 or S1 educated as much as 35.7% and the remaining 22.9% of high school educated respondents

Outer Model Testing

The instrument is valid if it has an outer loading value above 0.5 (Chin, Marcolin and Newsted, 1996) and an AVE value above 0.5 (Ghozali, 2014). The results of the study in table 1 show all the outer loading values of each indicator above 0.5. Each variable in table 1 shows that the AVE value is not below 0.5 which means that all indicators are valid. Thus, no indicators are excluded from the research model.

Table 2 shows the composite reliability values and Cronbach's alpha values used in reliability testing. Variables are said to be reliable if they have a composite reliability value and a cronbach alpha value of more than 0.7 (Ghozali, 2014). The test results reveal that all study variables have values above the standard, indicating that they are all trustworthy.

Inner Model Testing

Sarstedt mentioned that the value of R-square is classified into three, namely 0.75 (strong), 0.55 (moderate) and 0.25 (weak) (Sarstedt, Ringle and Hair, 2017). The behavioural intention (BI) and Use of Behaviour (UB) variables are included in the moderate category since their R-square value is less than 0.75, as seen in figure 3. The behavioural intention (BI) variable and the facilitating conditions can explain 68.6% of the use of behavior (UB) variable, and the behavioural intention (BI) variable can be described by performance expectancy (PE), effort expectancy (EE), and social influence (SI) variables by 70%.

Table 1. Convergent Validity Test Results

Variable	Indicators	Statement	Outer Loading	AVE
PE	PE1	MRMIS makes work easier	0.859	0.686
	PE2	MRMIS increases productivity	0.837	
	PE3	MRMIS improves performance	0.783	
	PE4	MRMIS is useful for getting my work done	0.865	
	PE5	MRMIS accelerates the completion of work	0.794	
EE	EE1	MRMIS is easy to use	0.747	0.609
	EE2	Easy-to-run system features	0.827	
	EE3	Information systems make it easier to get some work done more effectively.	0.817	

Variable	Indicators	Statement	Outer Loading	AVE
SI	EE4	MRMIS makes it easy to complete multiple jobs at a time	0.704	0.647
	EE5	MRMIS is easy to learn its use	0.801	
	SI 1	MRMIS is used because hospital management expects it	0.703	
	SI 2	MRMIS is used because someone helps to use	0.769	
	SI 3	MRMIS is used because the boss supports	0.745	
	SI 4	Someone thinks MRMIS can make my job easier	0.877	
FC	SI 5	Someone believes, I have to use MRMIS in work	0.880	0.539
	SI 6	Management motivates to use MRMIS	0.835	
	FC1	MRMIS is used because it already has IT capabilities	0.774	
	FC2	There is training in the use of MRMIS	0.734	
	FC3	There are facilities and infrastructure to use MRMIS	0.776	
	FC4	Using MRMIS because there is an opportunity to use it	0.679	
BI	FC5	MRMIS is used because there is help when difficulty using MRMIS	0.687	0.538
	FC6	MRMIS is used because it has functions that are in accordance with the needs of work activities	0.750	
	BI1	MRMIS will continue to be used.	0.725	
	BI2	MRMIS is used out of self-desire.	0.769	
	BI3	MRMIS will be used in the next few months	0.58	
	BI4	I intend to continue using MRMIS	0.834	
UB	UB1	Using MRMIS is a good idea	0.834	0.626
	UB2	MRMIS makes work more interesting	0.828	
	UB3	Using MRMIS is fun	0.839	
	UB4	Most of the work is done with MRMIS.	0.616	
	UB5	I actually use MRMIS to get the job done.	0.815	

Table 2: Cronbach's alpha and Composite reliability

Variable	Composite reliability	Cronbach's alpha
PE	0.916	0.885
EE	0.886	0.841
SI	0.916	0.891
FC	0.875	0.832
BI	0.821	0.719
UB	0.892	0.848

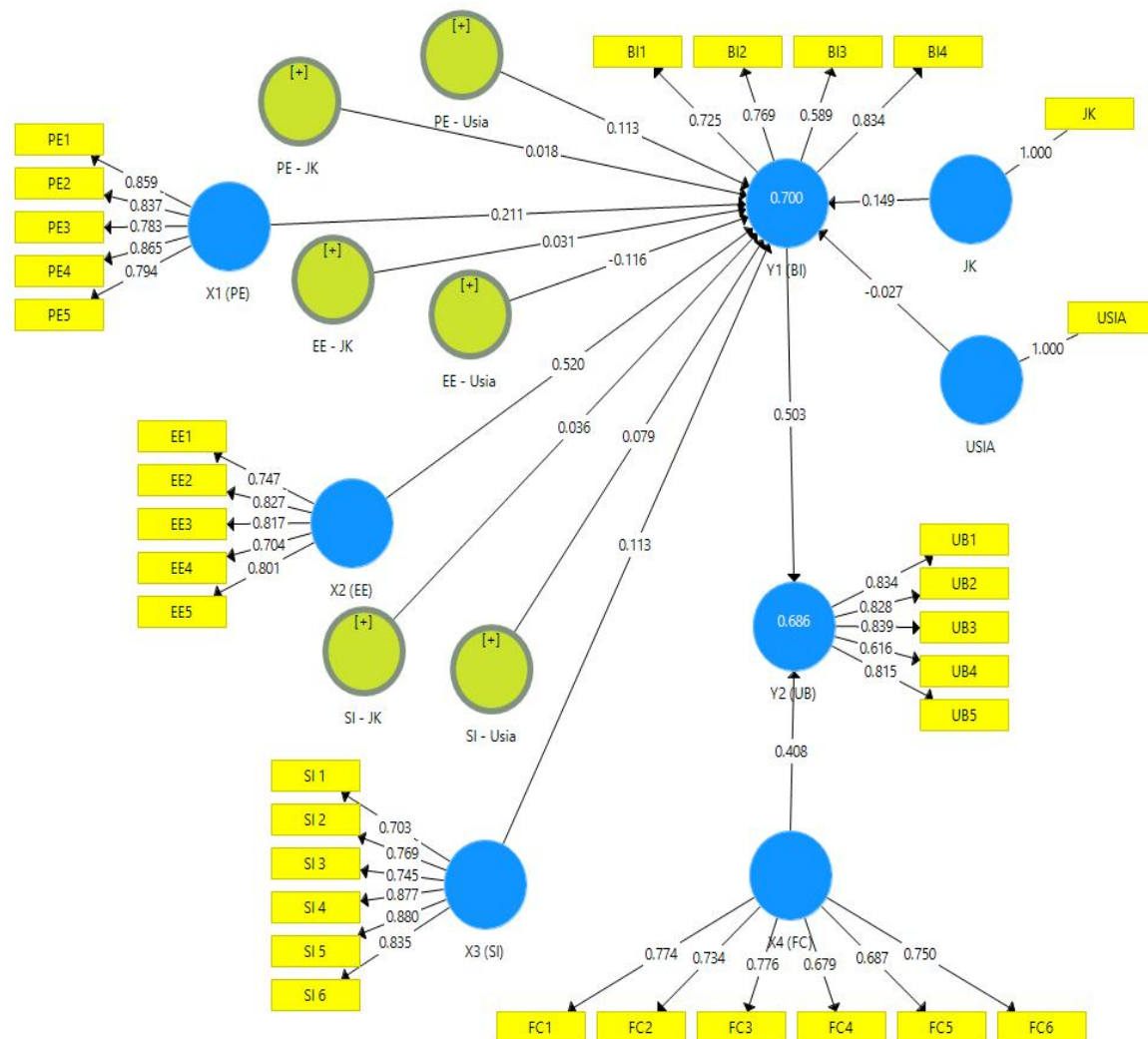


Figure 3. Research Model Flowchart (outer loading, R-Square and original sample values)

Table 3. Path Coefficient and t-Statistical Values

Path Diagram	Original Sample	t-Statistics	Information
PE → BI	0.211	0.903	H1 rejected
PE – Usia → BI	0.113	0.421	H1a rejected
PE – JK → BI	0.018	0.063	H1b rejected
EE → BI	0.520	2.507	H2 accepted
EE – Usia → BI	-0.116	0.366	H2a rejected
EE – JK → BI	0.031	0.125	H2b rejected
SI → BI	0.113	0.514	H3 rejected
SI – Usia → BI	0.079	0.250	H3a rejected
SI – JK → BI	0.036	0.153	H3b rejected
FC → UB	0.408	3.787	H4 accepted
BI → UB	0.503	4.928	H5 accepted

Hypothesis Testing

Through table 3, it is known that the variable effort expectancy has an effect and significant to the variable behavioural intention, the results of hypothesis testing in this study are the same as the results of research conducted by Venkatesh and Butarbutar which states that the variable effort expectancy has an effect and significant on behavioural intention (Venkatesh, 2003) (Butarbutar and Haryanto, 2017). The positive and significant relationship between the variable effort expectancy to behavioural intention shows that the MRMIS applied has features that are able to provide convenience to the medical record officer of the X Hospital in Mataram City so that officers have the desire to use MRMIS continuously.

Another variable that shows a significant relationship between variables is the relationship between variable facilitating conditions to use behaviour variables, the test results are supported by similar research conducted by Putri which states that the variable facilitating conditions have a positive and significant influence of use behaviour variables (Putri and Mahendra, 2017). The results of this study mean that medical record officers feel the working environment conditions and facilities of facilities and infrastructure when MRMIS is applied can support it to use MRMIS continuously. The next variable that has a significant relationship is the relationship between behavioural intention variables to use behaviour, the results of Gao's research showed that behavioural intention variables have an influence on use behaviour variables where in the study known t-test value of 3.61 and correlation coefficient value of 0.516 (Gao and Shao, 2018). The results of the test of a significant relationship between variable behavioural intention and use behaviour prove that MRMIS can improve the performance of medical record officers so that officers will often use MRMIS.

Based on the results of the hypothesis test in table 3, it is also known that the relationship between performance expectancy variables is not significant to behavioural intention variables, the test

results are not in accordance with the research conducted by Venkatesh (2003) namely performance expectancy significant to behavioural intentions, but the results of research conducted in accordance with research conducted by Sutanto and Alawadhi Performance expectancy variables are not significant to behavioural intentions (Sutanto, Ghazali and Handayani, 2018) (Alawadhi and Morris, 2008). The results of this test mean that medical record personnel are not sure that the application of MRMIS can improve their performance, then the relationship between social influence variables to behavioural intentions shows an insignificant relationship. The results of this study are in accordance with research conducted by Wibowo and Nurus Sa'idah which stated that social influence is not significant to behavioural intention variables (Wibowo, Mursityo and Herlambang, 2019) (Nurus Sa'idah, 2017). The results of this test showed that the medical record officer felt unsure that people in his work environment such as management, superiors and co-workers supported him to use MRMIS.

Furthermore, statistical tests in this study showed that age and gender moderation variables could not moderate the relationship between variables such as performance expectancy variables to behavioural intentions, the results of this study were in accordance with research conducted by Gahtani and Rianadewi which stated that performance expectancy variables against behavioural intention variables cannot be moderated by age and gender (Al-Gahtani, Hubona and Wang, 2007) (Rianadewi, Hendra Divayana and Pradnyana, 2019), then the age moderation variable cannot moderate the relationship between the variable effort expectancy to behavioural intention, the results of the test supported by previous research that mentioned that the variable of age moderation does not significantly moderate the variable expectancy to the variable of expectancy (Maita *et al.*, 2018) and other research conducted by Andrianto stated that the moderating variable gender did not moderate the relationship between effort expectancy and behavioural intention

(Andriyanto, Baridwan and Subekti, 2019), then the test results show that The results of the tests show that the moderating variables of age and gender cannot moderate the relationship between social influence and behavioural intention. This is supported by Huzaemi's research, which found that the age moderating variable does not moderate the relationship between social influence and behavioural intention (Huzaemi and Atin, 2018), as well as research conducted by Rianadewi which states that the variable of gender moderation does not moderates the relationship between social influence variables to behavioural influence variables (Rianadewi, Hendra Divayana and Pradnyana, 2019). Based on the results of the test it can be known that the variables of moderation of age and gender were not able to affect the relationship between the variables in this study, this can be caused by the age range of respondents in this study is not too varied and in this study the comparison between the sexes of men and women whose numbers are not too different.

Conclusion

The conclusion of this study is that the variables that affect MRMIS acceptance in X hospital Mataram City are effort expectancy variables where the value of t-statistics is 2,507, facilitating conditions have a t-statistical value of 3,787 and behavioural intentions that have a t-statistical value of 4,928. While performance expectancy variables, social influence showed insignificant results, and the existence of age and gender moderation variables could not moderate the relationship between variables where the resulting value was not significant, so based on the hypothesis made only the hypotheses H2, H4 and H5 are acceptable, while the hypotheses H1, H2a, H2b, H3, H3a, H3b are rejected, therefore the results of this study can be used as one of the hospital considerations for Optimizing the implementation of MRMIS and for future research is expected to add variables that are not used in this study and can also use

the wider population to obtain more varied data analysis results.

Abbreviations

PE: Performance Expectancy; EE: Effort Expectancy; SI: Social Influence; BI: Behavioral Intention; UB: Use of Behavior; PE: Performance Expectancy; EE: Effort Expectancy; SI: Social Influence Facilitating Conditions (FC)

Declarations

Ethics Approval and Consent Participant

This study has obtained ethical eligibility with ethical number 1292/UN25.8/KEPK/DL/2021 from the Health Research Ethics Committee of the Faculty of Dentistry, Jember University.

Conflict of Interest

The writers state that they have no personal interests that may have influenced their work.

Availability of Data and Materials

Not applicable

Authors' Contribution

The manuscript was written, reviewed, and edited by NKP.

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PATTERNS OF MEDICINE USE FOR COVID-19 PATIENTS AT UNDATA HOSPITAL PALU

Pola Penggunaan Obat pada Pasien Covid-19 di RSUD Undata Palu

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Abstract

Background: Covid-19 cases had drastically increased. Little therapy has been formulated to respond to the situation.

Aims: This study aims to illustrate the pattern of drug use in Covid-19 patients at Undata Palu Hospital.

Methods: This study is a type of cross-sectional descriptive study using a cross-sectional design and collecting data retrospectively from medical records at Undata Hospital Palu in 2020.

Results: In 2020, 186 patients were confirmed positive for Covid-19. There were 95 female patients (51.9%) and 50 patients at the age of 46-55 years (27.3%). The severe symptoms happened to 109 patients (59.6%). The most common clinical manifestation was cough in 127 patients (23.3%). The most common comorbidity was pneumonia (30.8%). The most widely used primary therapy was the antibiotic azithromycin applied to 155 patients (30.0%), and the most widely used supportive therapy was vitamin C among 141 patients (20.1%). Oseltamivir antiviral therapy was administered to 132 patients (25.6%) and remdesivir to 34 patients (6.6%).

Conclusion: Covid-19 patients were mostly treated with antibiotic therapy (41.5%), antiviral therapy (32.2%), antimalarial therapy (15.7%), and corticosteroid therapy (10.7%). As many as 132 patients took oseltamivir, and 34 patients took remdesivir. However, for now, oseltamivir is no longer used.

Keywords: antivirus, Covid-19, patterns of medicine use

Abstrak

Latar Belakang: Covid-19 semakin meningkat baru-baru ini. Masih sedikit terapi yang diteliti untuk menanggulangi situasi ini.

Tujuan: Penelitian ini bertujuan untuk mengetahui pola penggunaan obat Covid-19 dan jenis antivirus yang digunakan di Rumah Sakit Umum Daerah (RSUD) Undata Palu.

Metode: Penelitian ini merupakan jenis penelitian deskriptif secara potong lintang dengan pengambilan data secara retrospektif dari data rekam medik di RSUD Undata Palu pada tahun 2020.

Hasil: Selama tahun 2020 terdapat 186 pasien terkonfirmasi positif Covid-19. Terdapat 95 pasien perempuan (51,9%) dan 50 pasien pada usia 46-55 tahun (27,3%). Tingkat keparahan paling banyak terjadi pada 109 pasien (59,6%). Manifestasi klinis yang paling banyak adalah batuk pada 127 pasien (23,3%). Penyakit penyerta yang paling banyak adalah pneumonia yang terjadi pada 117 pasien (30,8%). Terapi utama yang paling banyak digunakan adalah antibiotik azitromisin pada 155 pasien (30,0%). Terapi penunjang yang paling banyak digunakan adalah vitamin C pada 141 pasien (20,1%). Terapi antivirus Oseltamivir diberikan pada 132 pasien (25,6%) dan remdesivir pada 34 pasien (6,6%).

Kesimpulan: Pasien Covid-19 sebagian besar diobati dengan terapi antibiotik (41,5%), terapi antivirus (32,2%), terapi antimalaria (15,7%), dan terapi kortikosteroid (10,7%). Sebanyak 132 pasien memakai oseltamivir dan 34 pasien memakai remdesivir. Namun, untuk saat ini oseltamivir tidak lagi digunakan.

Kata kunci: Antivirus, Covid-19, pola penggunaan obat



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Introduction

Coronavirus disease 2019 (Covid-19) is an infectious disease caused by SARS-CoV-2 (Acute Respiratory Syndrome Coronavirus-2). It was firstly detected in Wuhan, the capital of China's Hubei province in December 2019, and it has spread quickly around the world (Siahaan, 2020). Covid-19 is a new type of virus that has never been identified to attack humans before (Mona, 2020). The number of cases in Indonesia on March 8, 2021, reached 1,386,556 positive cases and 37,547 deaths. Meanwhile, in Central Sulawesi, there were 10,387 positive cases and 264 deaths (Indonesian Ministry of Health, 2021). On March 8, 2021, in Palu there were 2768 confirmed cases and 79 deaths (Central Sulawesi Provincial Health Office, 2021). The medical records from the Undata Palu Hospital in 2020 showed there were 139 suspected patients, 186 positive patients, and 31 deaths.

Pharmacological therapy as Covid-19 management is categorized into asymptomatic, mild, moderate, severe or critical levels. Patients without symptoms are recommended to continue mild treatment through the administration of vitamins and antivirals such as favipiravir. However, those with symptoms such as fever could be given moderate treatment such as paracetamol, comorbid treatment, vitamins, antiviral favipiravir or remdesivir, and anticoagulant. Severe or critical symptoms are treated by giving vitamins, antiviral favipiravir or remdesivir, corticosteroids, anti-interleukin-6, comorbid treatment and supportive drugs. If one performs shock procedures, she/he could be given anticoagulants (Indonesian Lung Doctors Association, 2021).

The increasing number of Covid-19 cases every day is a serious problem, but no cure for Covid-19 has been found yet. As of now, different drugs have been used to save the lives of patients, especially those with severe or critical symptoms (Setiadi *et al.*, 2020). Because of the high incidence, proper treatment of Covid-19 disease and its complications must be given rationally. The Covid-19 symptoms in

Indonesia are divided into 4 classes: asymptomatic, mild, moderate, and severe. Pharmacological therapy given is different in each class (Burhan *et al.*, 2020). Antivirus available at Undata Palu Hospital is oseltamivir, remdesivir favipiravir. Based on the explanation above, the purpose of the study was to describe the pattern of drug use in Covid-19 patients at Undata Palu Regional General Hospital.

Method

This study was conducted from March to May 2021 using a descriptive cross-sectional design. It collected data from medical records of Covid-19 patients at Undata Hospital retrospectively. The research population and samples were all Covid-19 patients at the Undata Palu Hospital in 2020. The inclusion criteria applied to patients diagnosed with Covid-19 positive and those with comorbidities who had been confirmed positive. While patients whose medical record data were incomplete were excluded from the study.

This study analyzed secondary data from medical records on age, gender, occupation, disease diagnosis, types of medical therapy, clinical manifestations, patient severity, and comorbidities. The data were analyzed descriptively to identify patterns of medicine use for Covid-19 patients at Undata Hospital Palu. The data were processed in the Microsoft Excel program and then presented in percentages and average values.

Result and Discussion

Out of 186 patients screened, 183 patients met the inclusion criteria. Table 1 informs that 183 patients were mostly females (51.9%) compared to males (48.1%). The incidence rate in women was more dominant than in men. Physically, women have weak conditions and relatively high-stress factors (Winugroho *et al.*, 2021). Moreover, the data showed some of them were pregnant. Pregnant women are classified as one of the vulnerable groups at risk of contracting Covid-19 because the physiological changes might occur during

pregnancy and decrease immunity (Liang and Acharya, 2020). Male patients are more exposed to Covid-19 than women. The high number of male patients was pictured at national and provincial levels in Indonesia (Chairani, 2020). However, the results could not justify gender factors in Covid-19 cases (Wenham *et al.*, 2020).

Table 1. Distribution of demographic characteristics of Covid-19 patients at Undata Hospital Palu in 2020

Characteristics	n	%
Gender		
Man	88	48.1
Woman	95	51.9
Age		
5-11	1	0.5
12-16	1	0.5
17-25	15	8.2
26-35	30	16.4
36-45	35	19.1
46-55	50	27.3
56-65	31	16.9
≥ 65	20	10.9

Data show (Table 1) that the highest prevalence occurred to Covid-19 patients aged 46-55 years (27.3%), followed by those aged 36-45 years (19.1%). People of working age often work outside the home and thus have contact with public places where chances of contracting Covid-19 are higher (Styawan, 2021). The immunity system will get weaker along with increasing age (Widayanto, *et al* 2021). The most common age group infected by Covid-19 is 40-59 years old (Vermonte and Wicaksono, 2020).

Table 2. Distribution of clinical characteristics of Covid-19 patients at the Undata Hospital Palu in 2020

Clinical Characteristics	n	%
Severity		
Asymptomatic	5	2.7
Mild	36	19.7
Moderate	109	59.6
Severe	28	15.3
Critical	5	2.7

Clinical Characteristics	n	%
Fever	99	18.2
Cough	127	23.3
Cough with phlegm	10	1.8
Dry cough	4	0.7
Coughing up with blood	2	0.4
Have a cold	8	1.5
Flu	6	1.1
Congested	45	8.3
Hard to breathe	50	9.2
Anosmia	30	5.5
Ageusia	2	0.4
Limp body	42	7.7
Decreased appetite	8	1.5
Nausea	26	4.8
Gag	12	2.2
Dizzy	3	0.6
Headache	6	1.1
Back pain	13	2.4
Diarrhea	5	0.9
Decreased consciousness	1	0.2
Itchy throat	3	0.6
Heartburn	10	1.8
Sore throat	5	0.9
Chest pain	11	2.0
Back pain	2	0.4
Whole-body pain	4	0.7
Dysphagia	1	0.2
Adinophagia	2	0.4
Nervous	1	0.2
Worried	1	0.2
Swollen gums	1	0.2
Bleeding gums	1	0.2
Rash	2	0.4
Insomnia	2	0.4
Comorbidities		
No comorbidities	16	4.2
Pneumonia	117	30.8
Bronchitis	24	6.2
Diabetes Mellitus 2	37	9.6
Breathing failure	15	3.9
severe ARI	4	1.0
Hypertension	17	4.4
HHD	21	5.5
Dyspepsia	16	4.2
Acute diarrhea	1	0.3
Hypokalemia	18	4.7
Hypoglycemia	1	0.3
Hyponatremia	9	2.3
Elevated liver enzymes	16	4.2

Clinical Characteristics	n	%
Pleural effusion	3	0.8
Electrolyte imbalance	11	2.9
Gout arthritis	3	0.8
CKD stage 5	2	0.5
CKD	4	1.1
Acute on CKD	4	1.1
CHF ec HHD	9	2.3
ADHF ec HHD	2	0.5
CAD	4	1.0
Increased transaminase enzyme	2	0.5
Thrombocytopenia	2	0.5
Bronchiectasis	1	0.3
Nstemi	2	0.5
Non-hemorrhagic stroke	1	0.
Cardiac arrest	1	0.3
Parkinson	1	0.3
Epilepsy	1	0.3
Cachexia	1	0.3
Pruritus pro evaluation	1	0.3
Weakness	2	0.5
PTCA	1	0.3
Anemia gravis	1	0.3
Renal anemia	1	0.3
Aplastic anemia	1	0.3
prostate cancer	1	0.3
Suspected abdominal tumor	1	0.3
ADHF	1	0.3
Vertigo	1	0.3
VES	2	0.5
Post curettage	1	0.3

The severity of Covid-19 is classified into asymptomatic, mild, moderate, severe, and critical. Asymptomatic people had no symptoms and no evidence of viral pneumonia or hypoxia. Such patients were categorized as mild. Mild symptoms that usually appear include cough, fever, myalgia (muscle pain), fatigue (tiredness), shortness of breath, and anorexia. Unspecific symptoms include stuffy nose, sore throat, diarrhea, headache, vomiting, nausea, loss of smell (anosmia), or loss of taste (ageusia). Moderate severity is

characterized by pneumonia (shortness, fever, cough, and rapid breathing) but no signs of severe pneumonia. The symptoms were accompanied by a respiratory rate of more than 30 x/minute, SpO₂ <93% in room air, or severe respiratory distress. While the critical patients were accompanied by ARDS (Acute respiratory distress syndrome), septic shock, and sepsis (Burhan *et al.*, 2020). Covid-19 patients have similar symptoms experienced by patients with SARS (Severe acute respiratory syndrome). The moderate symptoms are similar to those of the flu but different from person to person. Most people infected by Covid-19 usually have mild to moderate symptoms (Hairunisa and Amalia, 2020). Table 2 informs that Most of the patients had moderate severity (59.6%), followed by mild severity (19.7%).

Common clinical symptoms are fever with a body temperature of > 38°C, cough, difficulty in breathing, myalgia (muscle pain), severe shortness of breath, fatigue (fatigue), and gastrointestinal symptoms such as diarrhea and other respiratory system disorders. In severe cases, progressive life-threatening symptoms include uncorrected metabolic acidosis, septic shock, ARDS, dysfunction of the coagulation system within days, and bleeding (Indonesian Lung Doctors Association, 2020). The most common signs and symptoms are fever (83-98%), cough (76-82%), and dyspnea (31-55%) (Wu *et al.*, 2020). Table 2 shows coughing was the most common clinical symptom found in 127 patients (23.3%).

Serious symptoms occurred to patients who had certain congenital diseases or comorbidities (Marzuki *et al.*, 2021). Table 2 demonstrates pneumonia occurred to 117 patients (30.8%). Covid-19 can attack the respiratory system and also cause respiratory problems, such as pneumonia and mild to severe lung infections leading to deaths (Zhang *et al.*, 2020).

Table 3. Distribution of the medicine use patterns in Covid-19 patients at Undata Hospital Palu

Group Name	Medicine	n	Total	%
Main therapy				
Antibiotics	Azithromycin	155	214	41.5
	Levofloxacin	43		
	Ceftriaxone	16		
Antivirus	Remdesivir	34	166	32.2
	Oseltamivir	132		
Antimalarial	Hydroxychloroquine	81	81	15.7
Corticosteroids	Dexamethasone	55	55	10.7
Supportive therapy				
Vitamin	Vitamin C	141	319	20.10
	Becom-C	32		
	Becom-Zet	33		
	Becefort	6		
	Neurodex	8		
	Lapibal	1		
	Farbion	7		
	Prove-C	5		
	Hemafort	4		
	Cernevit	15		
	Vivena	16		
	Vastral	2		
	Iarce	46		
	Curvit	3		
Mucolytic	Acetylcysteine	223	224	14.10
	Ambroxol	1		
Mineral	zinc	23	23	1.40
Herbs	Curcuma	24	24	1.50
Corticosteroids	Methylprednisolone	7	8	0.50
	Inerson	1		
Antacid	Antacid	3	3	0.20
Calcium channel blockers	Amlodipine	50	60	3.80
	Nicardipine	3		
	Nifedipine	7		
Diuretic	Furosemide	27	30	1.90
	Hydrochlorothiazide	3		
Angiotensin-converting enzyme inhibitor	Lisinopril	3	6	0.40
	Ramipril	3		
ARB (Angiotensin Receptor Blocker)	Candesartan	4	4	0.30
	Beta one	3		
Adrenergic inhibitor	Concor	9	20	1.30
	Bisoprolol	6		
	Methyldopa	2		

Group Name	Medicine	n	Total	%
Nitrate	NTG	4	28	1.80
	(Nitroglycerin)			
	ISDN	21		
Statins	(Isosorbide dinitrate)		19	1.20
	Nitrocav	3		
	Atorvastatin	15		
Biguanide	Simvastatin	4	12	0.80
	Metformin	12		
Insulin	Novorapid	26	45	2.80
	Levemir	19		
Sulfonylureas	Glimepiride	9	9	0.60
Sulfonylureas and Biguanides	Glucovance	1	2	0.10
Opioid analgesics	Amaryl	1	16	1.00
	Ultracet	1		
	Codeine	14		
	Patracet	1		
	Meloxicam	4		
	Ketorolac	14		
	Diclofenac Sodium	1		
NSAIDs (Nonsteroidal Anti-Inflammatory Medicines)	Mefenamic acid	14	83	5.20
	Aspirin	3		
	Ketoprofen	2		
	Ibuprofen	14		
Antipyretic and Analgesic	Paracetamol	83	83	5.20
Antibiotics	Metronidazole	3	11	0.70
	Co-trimoxazole	1		
	Moxifloxacin	1		
	Meropenem	2		
	Ceftazidime	1		
	Anbacim	3		
Antiulcer	Omeprazole	149	295	18.60
	Ranitidine	40		
	Lansoprazole	67		
	Sucralfate	37		
	Nexium	2		
Antiemetic	Domperidone	47	76	4.80
	Ondancetron	24		
	Metoclopramide	5		
Antihistamines	Cetirizine	30	34	2.10
	Betahistine	4		
Antiplatelet	clopidogrel	20	30	1.90
	aspirin	10		
Anticoagulants	Diviti	6	9	0.60
	Lovenox	3		
Antigout	Recolfar	4	4	0.30
Antipsychotic	CPT	1	1	0.10
	(chlorpromazine)			

Group Name	Medicine	n	Total	%
SSRI antidepressants (Selective serotonin reuptake inhibitor)	kalxentin	2	2	0.10
Tricyclic antidepressants	Amitiprine	1	1	0.10
antiparkinson	Hexymer	1	1	0.10
Anticonvulsant and antiepileptic	Gabapentin	2	3	0.20
	Valproic Acid	1		
Antifungal	Ketoconazole	1	1	0.10
Antidiarrhea	Lolida	1	10	0.60
	Loperamide	6		
	Mew tab	3		
Benzodiazepam	Alprazolam	36	43	2.70
	Clobazam	6		
	Diazepam	1		
Xanthine oxidation inhibitor	Allopurinol	10	10	0.60
Prostaglandins & Oxytocin	Methylergometrine	2	2	0.10
Systemic hemostatic	Tranexamic Acid	4	6	0.40
	Kalnex	2		
Liver function supplements	Hepa Q	25	25	1.60
Laxative	Pralax	4	7	0.40
	Dulcolax	2		
	Laxadine	1		
DPP-IV Inhibitors (Dipeptidyl peptidase-4 inhibitors)	Galvus	1	1	0.10
Beta 2 agonist	Symbicort	1	1	0.10
Electrolyte	Potassium Chloride	26	26	1.60
Vasoconstrictor	Epinephrine	1	2	0.10
	Vascon	1		

The main types of therapy most often used are in the antibiotic group, namely 155 azithromycin, 43 levofloxacin, 16 ceftriaxone. Azithromycin is the most commonly used as it can suppress pathogenic bacteria in patients with additional bacterial infections. It is a macrolide antibiotic that can prevent serious respiratory infections in patients with pneumonia (Bacharier *et al.*, 2015). While macrolide antibiotics are suggested as first-line therapy in combination with lactams in CAP patients with Covid-19 (Metlay and Waterer, 2020). In vitro studies have shown that azithromycin can inhibit the replication of Zika virus and H1N1 influenza virus and have anti-inflammatory and immunomodulatory effects on

respiratory systems damaged (Bosseboeuf *et al.*, 2018; Zimmermann *et al.*, 2018; Tran *et al.*, 2019; Zhang *et al.*, 2019).

Oseltamivir is an antiviral group that gets the second highest drug that is widely used by Covid-19 patients at Undata Palu Hospital. Oseltamivir belongs to the group of neuraminidase inhibitors (NAIs) that work by inhibiting viral neuraminidase (Uyeki, 2018). The effect of this barrier is to block the release of virus particles from the infected cells so that the virus less spreads in the respiratory system (Setiadi *et al.*, 2020). Oseltamivir has no activity against SARS-CoV-2 (Choy *et al.*, 2020). However, the antiviral clinical trial for Covid-19 patients was not finished while the research was going on. After the research, it turned

out oseltamivir research was withdrawn. The revised Government's Covid-19 Protocol in Indonesia issued in July 2021 recommends the use of favipiravir as a pharmacological therapy for mild, moderate, severe or critical Covid-19 symptoms (Indonesian Lung Doctors Association, 2021). Favipiravir works as a selective inhibitor of RNA-dependent RNA polymerase (RdRp), which is one of the enzymes used for the transcription and replication of viral RNA genomes (Setiadi *et al.*, 2020). Thus, favipiravir has the potential to inhibit replication of different types of RNA viruses, and it is considered potential as a broad-spectrum antiviral. In-vitro, favipiravir is effective for influenza viruses type A, B, and C. The results of this in-vitro study are confirmed by the results of studies in animals infected with influenza viruses that show that favipiravir can increase survival rate and decrease the number of viruses (viral load) (Setiadi *et al.*, 2020). Chen *et al.* (2020) concluded if favipiravir is used, it can be considered giving a dose of 1,600 mg twice a day on the first day and 600 mg twice a day for the next days. The duration of favipiravir treatment was 14 days, but decisions regarding the length of the drug use were determined by the doctor in accordance with the clinical assessment result. In addition, the use of favipiravir is not recommended in pregnant women because it is teratogenic and embryotoxic. At the time of writing this article, we found that research by Chen *et al.* still needs to go under further investigation by experts (Setiadi *et al.*, 2020). Manabe *et al.* (2021) show favipiravir has a strong possibility of Covid-19 treatment. Patients with mild to moderate symptoms have a lung recovery rate within 14 days while favipiravir is administered. Hence, early initiation of favipiravir is even needed by patients with mild Covid-19 symptoms before pneumonia or lung damage gets worse.

Furthermore, the antimalaria group, namely hydroxychloroquine, is used to treat autoimmune diseases e.g., systemic lupus erythematosus, and to treat malaria. The mechanism of chloroquine and hydroxychloroquine to act in treating

SARS-CoV-2 is by increasing endosome pH and inhibiting ACE2 receptor glycosylation. Thus, they prevent the virus from binding to the receptor. Chloroquine and hydroxychloroquine have immunomodulatory effects, and they are hypothesized to have a potential mechanism in Covid-19 treatment (Rusdi, 2021). However, for now the use of hydroxychloroquine is no longer given to Covid-19 patients. Revocation for hydroxychloroquine use for Covid-19 patients is a second clinical trial termination by the World Health Organization (WHO). The WHO stopped the solidarity trial because it judged hydroxychloroquine to be more risky rather than beneficial (Hayya, 2021).

Another treatment is the corticosteroid group e.g., dexamethasone. According to Russell *et al.* (2020), the rational use of corticosteroids is to reduce the inflammatory response that can cause acute lung injury and acute respiratory distress syndrome (ARDS). Confirmed patients with severe COVID-19 symptoms will develop systemic inflammation, leading to lung injury and multisystemic organ dysfunction (Covid-19 Treatment Guidelines Panel and Recovery Collaborative Group, 2020). Dexamethasone is administered to patients with moderate and severe Covid-19 symptoms (Burhan *et al.*, 2020). Supporting therapy aims to increase the immune system and treat symptoms and comorbidities which can cause more serious clinical symptoms. The most used Vitamin group (20.1%) was Vitamin C. Taking Vitamin C can strengthen the immune system. This vitamin can also act as an antioxidant and increase differentiation and proliferation, as well as modulate the function of B lymphocytes and T lymphocytes (Carr and Maggini, 2017). During the pandemic, taking vitamins is a popular preventive measure to do.

Conclusion

Covid-19 patients were mostly treated with antibiotic therapy (41.5%), antiviral therapy (32.2%), antimalarial

therapy (15.7%), and corticosteroid therapy with a percentage of (10.7%). As many as 132 patients took oseltamivir, and 34 patients took remdesivir. However, for now, oseltamivir is no longer used.

Abbreviations

ARI: Acute respiratory infection; HHD: Hypertensive heart disease; CAD: Coronary artery disease; PTCA: Percutaneous transluminal coronary angioplasty; ADHF: Acute decompensated heart failure; Covid-19: Coronavirus disease 2019; RNA: Ribose nucleotide acid; SARS-CoV-2: Acute respiratory syndrome Coronavirus-2), VES: Ventricular extrasystole.

Declarations

Ethics approval and consent to participate

This study has been approved by the Faculty of Medicine, Tadulako University with the letter number of 3275/UN 28.1.30/KL/2021.

Conflict of interest

There is no conflict of interest in the research.

Availability of data and material

Not applicable.

Author's contributions

AR: conceived, designed the analysis, drafted, wrote, revised, and performed the manuscript; NA: conceived, drafted, and designed the analysis; DSA: collected and analysis data, and revised the manuscript.

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DETERMINANTS OF THE NATIONAL HEALTH INSURANCE UPTAKE IN INDONESIA

Faktor yang Mempengaruhi Tingkat Kepesertaan Jaminan Kesehatan Nasional di Indonesia

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Abstract

Background: Indonesia introduced a national health insurance program, the so-called *Jaminan Kesehatan Nasional (JKN)*, in 2014 to enhance health access for its citizens. However, unattained universal health coverage (UHC) such as participation target becomes a concern.

Aims: This study aimed to examine the factors influencing JKN participation and propose a possible policy improvement to enhance UHC implementation

Methods: A systematic review was performed based on PRISMA guidelines, and literature was collected from PubMed, Scopus, Web of Science, Cochrane Library, and Google Search.

Results: 21 articles in English and Indonesian language are included in the study after being reviewed using the PRISMA flowchart and quality assessment. The main factors that emerged from the found literature affecting the low enrolment of the NHIS include socio-demographic factors: younger people, low education level, rural location, unstable incomes, and larger family members. Also, health-related, and other factors: lack of health insurance literacy, insufficient healthcare accessibility and services availability, inadequate healthcare service quality, complicated administrative procedure, negative stigma, membership data inaccuracy, and low health status.

Conclusion: Twelve factors have been identified as the most influential determinants for the national health insurance program. Some proposed policies derived from the current results might contribute to the attainment of UHC.

Keywords: National Health Insurance, Universal Health Coverage, Indonesia

Abstrak

Latar Belakang: Indonesia telah meluncurkan program Jaminan Kesehatan Nasional (JKN) untuk meningkatkan akses kesehatan bagi masyarakat. Namun, cakupan kesehatan semesta yang belum tercapai seperti target kepesertaan masih menjadi isu.

Tujuan: Menganalisis faktor yang mempengaruhi kepesertaan program JKN dan kebijakan yang mungkin diambil untuk mencapai target cakupan semesta.

Metode: Review sistematis dilakukan berdasarkan panduan PRISMA, dan bahan bacaan bersumber dari PubMed, Scopus, Web of Science, dan Google Search.

Hasil: 21 artikel dalam Bahasa Inggris dan Bahasa Indonesia diikutkan dalam studi setelah dilakukan review menggunakan PRISMA flowchart dan penilaian kualitas. Faktor utama yang mempengaruhi rendahnya tingkat kepesertaan program JKN adalah faktor sosio-demografis seperti usia yang lebih muda, tingkat pendidikan yang rendah, area tempat tinggal di pedesaan, pendapatan yang tidak stabil, dan jumlah anggota keluarga yang besar. Juga faktor yang berhubungan dengan kesehatan dan faktor lain yang berhubungan, seperti rendahnya literasi tentang asuransi kesehatan, akses terhadap pelayanan kesehatan yang kurang memadai, kualitas pelayanan kesehatan yang belum optimal, prosedur administrasi yang rumit, stigma negatif, data kepesertaan yang belum akurat, dan status kesehatan yang rendah.

Kesimpulan: Terdapat dua belas faktor yang teridentifikasi sebagai faktor yang paling berpengaruh dalam program Jaminan Kesehatan Nasional. Beberapa kebijakan yang diusulkan sebagai hasil dari studi saat ini mungkin dapat berkontribusi pada pencapaian cakupan semesta.

Kata kunci: Jaminan Kesehatan Nasional, Cakupan Kesehatan Semesta, Indonesia



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Introduction

The World Health Organization (2019) reported that at least half of the population in the world did not have full health insurance, and approximately 100 million people still fell into severe poverty and thus were unable to pay healthcare expenses. Universal Health Coverage (UHC) ensures that individuals and families receive health care without financial difficulties (WHO, 2019). Moreover, UHC is not only concerned with health financing; it also includes all aspects of the health system, the delivery network for health services, health facilities, health personnel, and connectivity (Kutzin, 2013).

The monitoring of developments in UHC is based on two things: the number of people who can afford essential health services and the portion of the population retaining a high household income on health (WHO, 2013). Also, the World Health Organization (WHO) proposed a conceptual framework to assess the progress of UHC. The scheme suggested three effective assessment metrics that reflect the width of population coverage, the comprehensiveness of healthcare facilities (service coverage), and the percentage of healthcare cost incurred by the public (financial coverage) (WHO, 2010; Noerjoedianto, 2016; WHO, 2015).

Population coverage is one of the essential factors to ensure UHC. The government needs to extend coverage to include more individuals by subsidizing the poor who cannot afford the insurance premium and requiring the obligatory payment of others (National Team for the Acceleration of Poverty Reduction (NTAPR), 2015; Wagstaff and Neelsen, 2020).

With more than 260 million inhabitants from about 730 languages and 300 ethnic groups scattered over 17,744 islands, Indonesia is a fast-growing medium-income nation with obstacles to health equity (Agustina *et al.*, 2019). Poor quality care has resulted in a high and stagnant maternal mortality and neonatal mortality ratio of about 300 deaths per 100,000 births and 15 deaths per 1000 live births, respectively-over the last decade

(Agustina *et al.*, 2019). Moreover, Indonesia's geographical position in the pacific ring of fire caused multiple natural disasters, such as volcanic eruptions, earthquakes, and tsunamis. Equality accessing health care is crucial to address this dynamic public health issue (Mboi *et al.*, 2018).

The long path prior to the National Health Insurance System (NHIS) was established in Indonesia. It began with introducing military and civil servant's health insurance in 1968. The experiments with community health insurance were proposed in the mid-1970s (Dartanto *et al.*, 2019). Social Health Insurance for formal sector employees was launched in 1992. The health card of the "financial assistance" program was developed as part of the social security system to alleviate financial crisis effects in 1990 for disadvantaged citizens (Wiseman *et al.*, 2018). Furthermore, the health insurance scheme for the poor (ASKESKIN) was initiated in 2005, covering 26 million eligible beneficiaries. In 2008, the program's name was changed to JAMKESMAS. It protected near-poor citizens and hit 76 million target recipients (Pisani, Kok, and Nugroho, 2017; Shreeshant *et al.*, 2019; Wagstaff *et al.*, 2016).

Indonesia initiated a groundbreaking National health insurance program in 2014, namely "*Jaminan Kesehatan Nasional*" (JKN), aimed to provide Universal Health Coverage (UHC) to all inhabitants in 2019, which combines all current social health insurance systems. The Social Security Agency for Health (SSAH) was set up by the National Social Security Council to govern the JKN program based on Act No. 40 in 2004 and Law No. 24 in 2011. JKN refers to medical services offered by the public services and licensed private providers and covered services ranging from health promotion, prevention, primary treatments to specialized and long-term treatment, including open-heart surgery, cancer treatment, and renal dialysis (Agustina *et al.*, 2019). All citizens of Indonesia, regardless of previous health conditions or risk, must register with the SSAH to enforce JKN (Tan and Qian, 2019).

However, the growth in the number of participants reached 224,149,019 by December 31, 2019, and became the world's most comprehensive single-payer social health insurance. Still, only 83,86% of the total population of Indonesia, or more than 43 million people, needs to be covered to reach the 100% population coverage target (BPJS kesehatan, 2020). Only a few studies have assessed or evaluated the population coverage in the JKN program in Indonesia after the year 2019, in which the UHC goal has been established. Therefore, this study aims to examine factors that contributed to the JKN ownership and discuss the policy implication for the NHIS improvement to achieve universal health coverage in Indonesia.

Table 1. Study Questions Development

	Key Point	Question Development
Per	<i>Perspective</i>	The dimensions of WHO UHC framework: "population coverage"
S	<i>Setting</i>	Entire regions in Indonesia
P	<i>Problem</i>	Universal Health Coverage remained unachieved as per target
E	<i>Environment</i>	As an archipelagic country with more than 17.000 islands
(C)	<i>Comparison</i>	Compared to the target of 100% population coverage
Ti	<i>Time</i>	The UHC should be achieved by the end of 2019
F	<i>Findings</i>	What factors contributed to the participation in Indonesia's national health insurance program?

Method

The research question was formulated using the PerSPecTIF framework (Booth *et al.*, 2019), which

defines the broader context for the synthesis of complex intervention reviews of qualitative evidence as defined in Table 1.

Qualitative evidence synthesis is obtained by a systematic review, using the adaptation of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) methodological steps include identification, screening, eligibility, and included studies. Literature was selected from PubMed, Scopus, Web of Science, Cochrane Library, and Google search. The literature search was completed on March 31, 2020, using keywords as listed in Table 2. Grey literature such as media reports, government policy papers, and reviews from international institutions' publications was also used.

Duplicated articles were removed, and the articles with the title and abstract beyond the study question were excluded. The articles were further screened based on the inclusion criteria: full text is available and published from 2014 to 2020 in English or Indonesian, relevant to the topic or addressing the study question, and data in the study was obtained after January 2014, when the NHIS was implemented.

Table 2. Resource Database and Keywords for Literature Identification

Database sources	Keywords
<i>PubMed</i>	"universal health coverage"[All Fields] AND ("Indonesia"[MeSH Terms] OR "Indonesia"[All Fields])
<i>Scopus</i>	KEY("universal health coverage") AND ("Indonesia") AND PUBYEAR AFT 2014
<i>Web of Science</i>	TS= (("universal health coverage") AND ("Indonesia"))
<i>Cochrane Library</i>	"universal health coverage" in All Text AND "Indonesia" in All Text
<i>Other related Indonesian Journals</i>	((("Jaminan Kesehatan Nasional") OR ("cakupan semesta")) AND ("Indonesia"))

All the studies included in the analysis were evaluated for bias and quality based on the study type. The assessment tool used for quantitative studies adapted from Akinsolu *et al.* (2019) provided an evaluation of 5 key domains: study design, selection bias, data collection, data analysis, and reporting. The instrument for qualitative studies contained nine questions that preceded the tool from Lorenc T *et al.* (2014). Moreover, the mixed methods study is examined using quantitative and qualitative assessment tools.

All included studies were then examined to find factors that affected attaining JKN. The identified factors were drawn in Table 3.

Result and Discussion

Overall, 208 articles were found with the literature search strategy (see Figure 1). After eliminating 83 duplicates, 125 articles were screened by title and abstract. Of those, 88 articles met the inclusion criteria, and their full texts were obtained. After being reviewed, 60 records are excluded due to; unavailability of full-text access, duplication, incorrect setting, data taken before 2014, or the studies are not relevant or specific to the population coverage issue in Indonesia. It resulted in 28 studies being included for quality assessment. After quality assessment, 11 were rated as "strong," 10 "moderate," and seven as "weak" or low-quality studies. All the respective low-quality studies were excluded, and the analysis contained a total of 21 studies.

Factors Affecting JKN Participation

The Indonesian government did not successfully achieve the target of UHC due to some factors affecting participation in JKN. These factors can be classified into socio-demographic, health-related, and other factors as set out in Table 3.

Socio-demographic Factors

The age of the participants is closely related to the JKN enrolment. Idris, Satriawan, and Trisnantoro (2017) found that people aged 40-55 had the largest

health insurance ownership. Other studies have found that coverage among those aged 70 years remained high, but people aged 20 to 50 years from lower socioeconomic groups typically had lower health insurance. Similarly, coverage was lower for children under nine, particularly those under four. (Agustina *et al.*, 2019). A study from Nopiyani, Indrayathi, and Listyowati (2015) found that the relationship between the age and Willingness to Pay (WTP) has $p < 0,001$ and RR 0,99, it is indicated that the increasing age of one year will raise the willingness to pay as much as 1 %. These findings are also acknowledged by Dartanto *et al.* (2020) that age positively affects the sustainability of premium payments by JKN members. A person's maturity tends to increase as they grow older, influencing their decisions or actions in life. Older people will invest more than younger people in terms of health insurance because an increase in age usually decreases overall health conditions (Idris, Satriawan, and Trisnantoro, 2017).

The geographical location of individuals also influences someone to purchase JKN. Dewi and Mukti (2018) showed that 37% of rural participants lack health insurance due to distance problems, while only 10.7% in urban areas have this issue. As a result, urban inhabitants are more likely to participate in JKN than rural residents, with a proportion of 31.34% and 26.79%, respectively. Another study found that urban residents are more proportionately covered by health insurance than rural areas (Idris, Satriawan, and Trisnantoro, 2017). The rural residents make up 45% of the population in Indonesia, and most of the informal sector workers live in rural areas. They are more hesitant to buy JKN for numerous reasons, including difficulty accessing the SSAH office, distance to the healthcare facility, transportation problems, and insufficient access to qualified health professionals (Agustina *et al.*, 2019; Mboi *et al.*, 2018). So, the government needs to initiate an adequate health equity policy to strengthen health care services in rural areas.

Education is also a primary factor in JKN enrolment; more educated people are

keen to participate in JKN programs (Noerjoedianto, 2016). Formal education affects individuals' thought processes and will improve awareness of the health insurance value. People with better education have higher demand and perceived health to be valuable (Dartanto *et al.*, 2016).

Household size was a leading factor found to affect JKN ownership. The number of members in a household is inversely linked to WTP. The larger family size tends to have a lower likelihood of obtaining JKN. Having more family members will inevitably make people more reluctant to purchase JKN because the family needs to devote more money to pay for contribution fees (Dartanto *et al.*, 2020).

Several studies indicate that primary variables impacting JKN subscription are fixed income (Agustina *et al.*, 2019; Idris, Satriawan, and Trisnantoro, 2017; Dewi and Mukti, 2018; Firdaus and Wondabio, 2019). The likelihood of purchasing JKN was increased by around 13.2 % for those with income over IDR 3.5 million and 11% higher for households with stable incomes (Dartanto *et al.*, 2016). Most informal sector workers do not have regular or guaranteed wages, as farmers need to wait before harvest. This issue makes it rather complicated to implement a contribution-based system since it discourages the processing of a regular payment, which would impact individual withdrawals from the program (Kutzin, 2013). Some reports propose that the government expand the subsidy to the remaining informal sector workers with uncertain wages, financial difficulties, or near-poor living (Shreeshant *et al.*, 2019; Dartanto *et al.*, 2020).

Health-related and Other Factors

Low health status also affected individual decisions to attain JKN. In line with that, the research found that 23% of self-registered participants enrolled when they were sick (Agustina *et al.*, 2019). Also, people with a history of chronic diseases are more likely to use health insurance (Dartanto *et al.*, 2020; Idris, Satriawan, and Trisnantoro, 2017). Other research noticed that people as an inpatient had a higher tendency to join the program by 12.9 % a

year before the survey. While, a month before, those as an outpatient had a 15.1 % higher probability of attaining JKN (Ekawati *et al.*, 2017). Moreover, Zweifel (2007), in the theory of social health insurance, described that health insurance demand is higher when an individual is ill. Someone with a history of chronic illnesses tends to own JKN to seek healthcare services more frequently and cheaper when the illness relapses (Idris, Satriawan, and Trisnantoro, 2017).

Lack of health insurance literacy, particularly for contributing members or informal sector workers, becomes one of prominent factors affecting individual to acquire JKN. Putro and Barida (2017) recorded that 52,2% of the fishers surveyed had no information about the registration process, and 51% acknowledged that they had no socialization in JKN programs. Studies from Made *et al.* (2015) found that most female sex workers in Bali Province did not participate in social health insurance due to a lack of awareness of JKN. Also, a study from Dartanto *et al.* (2016) in 3 provinces surveyed 400 households found that 39% of respondents had zero knowledge of health insurance, and 19% did not know how to register for the program. This study also revealed that insurance literacy increases the probability of acquiring JKN by 9.5 % (Dartanto *et al.*, 2016). Other studies acknowledged that the absence of adequate information and proper education about social health insurance leads to the low enrolment of JKN (Nopiyani, Indrayathi, and Listyowati, 2015; Dartanto *et al.*, 2020; Deloitte Indonesia Perspectives, 2019; Andria and Kusnadi, 2018). Insurance literacy is essential to increase acceptance rates for premiums and expand insurance coverage (Dartanto *et al.*, 2016).

Healthcare service quality is another critical aspect of people buying JKN. People who considered the treatment quality unsatisfactory appear to refuse to join the program (Idris, Satriawan, and Trisnantoro, 2017). Long waiting periods, reduced opening hours, and lack of trust of primary care practitioners are measures of low quality that influenced individual purchasing JKN (Agustina *et al.*, 2019;

(Kieny *et al.*, 2017). Moreover, participants believe the health care services offered by JKN programs are not as satisfactory as out-of-pocket services (Nopiyani, Indrayathi, and Listyowati, 2015; Putro and Barida, 2017). Several studies suggested that the government should raise investment in healthcare facilities to strengthen service quality (Made *et al.*, 2015; Agustina *et al.*, 2019). Also, to enhance human capital capability by redesigning performance-based incentives, introducing reward with training and advancement, and punishment with demotions, allowance reduction and dismissal for poor performance, and conducting further capacity building and establishing an accreditation program in primary care (Retnaningsih, 2018; Ekawati *et al.*, 2017)

Healthcare accessibility and services availability also play a crucial role in JKN ownership. Some reports revealed that JKN could provide only limited services to prior health insurance programs, such as Askes (Agustina *et al.*, 2019; Yustina, 2019; Myint *et al.*, 2019). Imbalanced and

unstandardized healthcare facilities in diverse geographic areas have made access to medical care difficult for patients. People indicated that the provision of healthcare facilities on Java island is greater than other islands (Ekawati *et al.*, 2017; Vilcu *et al.*, 2016). Although more than 20.000 PCPs, 907 public hospitals, and 1106 private hospitals, including pharmacists, clinics, laboratories, and radiology centers, were contracted by the government in 2017 (Shreeshant *et al.*, 2019), it is still vital to develop and distribute healthcare facilities equally in a comparatively significant volume and standard (Dartanto *et al.*, 2020).

The high administrative burden of enrolment is also becoming a prominent factor. Most studies indicated that complicated registration requirements, such as all family members should enroll, led people to be more reluctant to attain JKN (Made *et al.*, 2015). Furthermore, accessibility and long queues in the SSAH office often discourage people from registering.

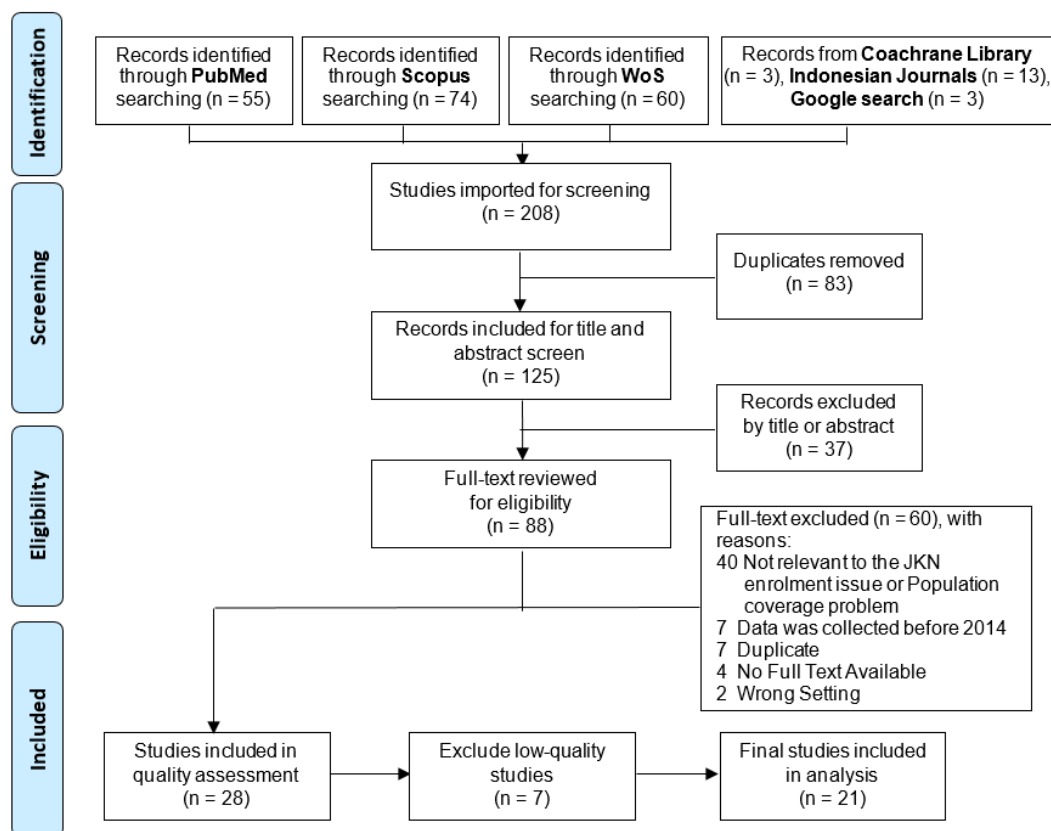


Figure 1. The PRISMA Flow Diagram of Study

Table 3. Factors contributed to the NHIS participation, which summarized from study findings

Ref. No.	Year of Pub	Author	Determinants of the National Health Insurance Uptake in Indonesia													
			Socio-demographic factors							Health-related and other factors						
			Household size	Location	Age	Education attainment	Income	Stability	Health insurance literacy	Perceived inadequate healthcare service quality	Healthcare accessibility and services availability	The high administrative burden of the enrolment procedure	Negative stigma associated with individual health status	Membership data inaccuracies		
1	2016	Noerjoedianto, D.														
2	2015	NTAPR														
3	2018	Agustina et al														
4	2017	Pisani, Kok, and Nugroho														
5	2019	Shreeshant <i>et al.</i>														
6	2019	Firdaus and Wondabio														
7	2019	Myint <i>et al.</i>														
8	2019	Deloitte Indonesia Perspectives														
9	2020	Dartanto et al.														
10	2015	Made <i>et al.</i>														
11	2015	Nopiyan <i>et al.</i>														
12	2017	Idris, Satriawan and Trisnantoro														
13	2016	Dartanto <i>et al.</i>														
14	2018	Dewi and Mukti														
15	2017	Putro and Barida														
16	2018	Andria and Kusnadi														
17	2019	Yustina														
18	2016	Vilcu I. et al.														
19	2019	Putri and Ernawaty														
20	2017	Ekawati <i>et al.</i>														
21	2015	Guinto <i>et al.</i>														

Putro and Barida (2017) found that an effective registration process of health insurance for the informal sector should be provided close to their workplaces. Nevertheless, Informal workers assume that time is money; they cannot leave their workplace only for queuing in the SSAH office. This study suggests the establishment of a district coordinator to collect premium fees and to open an office in the countryside so that informal workers and rural residents can register conveniently since typically, the SSAH office is located in the district's capital, away from the rural areas (Putro and Barida, 2017).

Another factor impacting enrollment is a negative stigma to JKN. People are less likely to obtain JKN due to negative media influences that provide misleading information (Ekawati et al., 2017). Individuals believe that participation in JKN is part of human rights (Guinto et al., 2015). Personal belief is influenced by external factors such as education, religion, and media information for example, a derogatory stereotype in a particular group against JKN initiatives. In 2015, the influential Muslim association MUI proclaimed that the SSAH is "haram" or forbidden because it does not conform with the values in Islamic banking; therefore, it makes people unsure whether to join the program (Pisani, Kok, and Nugroho, 2017). A system, educational and religious institutions strongly influence attitudes because they lay the foundations of understanding and moral concepts in individuals (Idris, Satriawan, and Trisnantoro, 2017). One study suggests that the SSAH should regularly discuss the importance of "*gotong royong*" value, a mutual collaboration to accomplish a shared objective in JKN, and build public awareness through positive framing (Putri and Ernawaty, 2019).

Membership data inaccuracies were also seen as an influential factor to the uptake of JKN. Andria and Kusnadi (2018) suggest that the SSAH should improve the data accuracy of people identified as poor that the government should cover as a non-contributing member. Moreover, numerous informal sector workers who remain uncovered live within the borders of the poverty line, and some of them are classified as poor or underprivileged. There would be overlapping in their group's definition, which might go to a non-contributing member or even be categorized as a contributing member. Therefore, the government needs to be clear about the issue of JKN membership categorization so that there will be no discrepancy in the membership data (Andria and Kusnadi, 2018).

Conclusion

Twelve major determinants have been identified influencing Indonesian to attain JKN. This study suggests the Indonesian government should consider the factors mentioned above that influenced the low participation in JKN. For instance, it is essential to prioritize health-related and other factors. In particular, the top three factors that were frequently identified in this study include lack of health insurance literacy, perceived inadequate healthcare service quality, and insufficient healthcare accessibility and service availability. These factors are more dynamic and can improve the uptake of the JKN program.

Moreover, this may allow the Indonesian government to achieve universal health coverage. However, there were some limitations to this review. While this study may summarize general findings, the result may not be summarized as a general conclusion. Although this study covered grey literature, publication bias

may still occur due to an under-reported risk of bias in some included studies. Further studies may explore the financial and service coverage factors, as indicated in the UHC framework.

Abbreviations

JKN: Jaminan Kesehatan Nasional (National Health Insurance); UHC: Universal Health Coverage; PRISMA: the Preferred Reporting Items for Systematic Reviews and Meta-Analyses; WHO: World Health Organisation; NHIS: National Health Insurance System; ASKESKIN: Asuransi Kesehatan Masyarakat Miskin (Health Insurance Scheme for the Poor); JAMKESMAS: Jaminan Kesehatan Masyarakat (Healthcare for the Poor Program); SSAH: The Social Security Agency for Health.

Declarations

Ethics approval and consent to participate

Not applicable.

Conflict of interest

None.

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REDUCING INFANT AND UNDER-5 MORTALITY RATE THROUGH GOVERNMENT HEALTH EXPENDITURE: A SYSTEMATIC REVIEW

Penurunan Angka Kematian Bayi dan Balita dengan Belanja Kesehatan Pemerintah: Systematic Review

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Abstract

Background: Although it has been globally reported that IMR and U5MR continue to decline every year, the rate disparities between urban and rural areas are still evident in various countries. The government is presumed to carry out efforts to reduce this disparity, such as by allocating the government's health expenditure.

Aims: This study systematically identifies the effectiveness, best practices, and positive impacts of government health expenditure allocation for IMR and U5MR, specifically in rural areas.

Methods: This systematic review study was conducted using the PICOS method to analyse data that were obtained from 3 online databases.

Results: The government health expenditure could reduce the gap in mortality rate indicators between urban and rural areas. Programs specifically proposed for rural communities can help decrease the gap between urban-rural IMR and U5MR. The effectiveness of government health expenditure to reduce mortality rates was strongly influenced by various factors, including supporting policies, field implementation in regions, and the collaboration between the central and local governments.

Conclusion: The local government plays a definitely crucial role in the implementation of the health program to ensure that the central government executes the program effectively in order to reduce IMR and U5MR in rural areas.

Keywords: Child Health, Government Health Expenditure, Infant Mortality Rate, Under-5 Mortality Rate.

Abstrak

Latar Belakang: Secara global, AKB dan AKBA terus menurun setiap tahunnya, akan tetapi disparitas antara perkotaan dan pedesaan masih terbukti terjadi di berbagai negara. Pemerintah memegang peranan yang krusial dalam menurunkan kesenjangan antara perkotaan dan pedesaan. Salah satu peranan tersebut adalah mengalokasikan dana pemerintah pada sektor kesehatan berupa belanja kesehatan pemerintah.

Tujuan: Studi ini bertujuan untuk mengkaji secara sistematis mengenai efektivitas, 'best practices', dan besarnya manfaat yang dihasilkan dari belanja kesehatan pemerintah terhadap AKB dan AKBA, utamanya di daerah pedesaan.

Metode: Studi ini merupakan Systematic Review dengan menggunakan PICOS Methodology dan sumber pencarian yang digunakan adalah 3 database online.

Hasil: Belanja kesehatan pemerintah dapat mengurangi kesenjangan indikator angka kematian anak antara perkotaan dan pedesaan. Program yang secara khusus ditujukan untuk masyarakat pedesaan dapat mempercepat penurunan disparitas AKB dan AKBA perkotaan-pedesaan. Pencapaian belanja kesehatan pemerintah dalam menurunkan angka kematian sangat dipengaruhi oleh berbagai faktor diantaranya kebijakan pendukung, implementasi di daerah, dan keselarasan usaha pemerintah pusat dan daerah.

Kesimpulan: Posisi pemerintah daerah sangat krusial pada setiap pelaksanaan program kesehatan, sehingga setiap upaya yang dikeluarkan pemerintah pusat dalam menurunkan AKB dan AKBA di pedesaan harus selaras dengan usaha pemerintah daerah dalam mewujudkan keberhasilan tersebut.

Kata kunci: Angka Kematian Balita, Angka Kematian Bayi, Belanja Kesehatan Pemerintah, Kesehatan Anak



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Introduction

IMR and U5MR are general indicators of health status of infants and under-5 children in certain areas. Currently, health issues among infants and children under-5 in rural areas continue to emerge globally. Although the mortality rate through the years has decreased, the gap of the rates between rural and urban areas is still considerable, inhibiting the success of child health programs (Kementerian PPN/ Bappenas and UNICEF, 2017). Babies living in rural Nigeria have a higher IMR compared to that of urban Nigeria (Adewuyi and Zhao, 2017). In China, IMR was found higher in inland and remote areas than in coastal areas (Wang *et al.*, 2012). This gap appears due to poor health systems, inadequate infrastructure, lack of skilled health personnel, socio-cultural factors, and difficulties to access health facilities in rural areas (Adewuyi and Zhao, 2017; Karki and Kittel, 2019). Furthermore, financial problems and parents' lack of knowledge about emergency health signs might also affect this gap in rural areas (Wang *et al.*, 2012).

Several recommendations have been proposed to address problems regarding infant and child mortality. These recommendations may vary, for examples, from government health programs in Indonesia (Hyre *et al.*, 2019; Pedrana *et al.*, 2019), or policies in India (Chaudhary, Rohilla, Kumar and Kumar, 2017; Gupta *et al.*, 2017) and Cuba (Bruns, Pawloski, and Robinson, 2019), or increasing health services and capacity (Russo *et al.*, 2019; Walker *et al.*, 2020), or conducting activities or programs that involve the community in certain areas (Houweling *et al.*, 2019; Nyqvist *et al.*, 2019; Pulkki-Brännström *et al.*, 2020).

These recommendations imply that the role of the government is definitely crucial in addressing high IMR and U5MR rates in rural areas. The government has been recommended to allocate government's health expenditure to improve the health status of infants and children. This fund can greatly improve public health including infants' and

children's health. The fund allocated by the government for the health sector is also called the government's health expenditure.

In the last ten years, some published systematic reviews have examined the effects of government financing and policy on the improvement of health services for infants and children in rural areas. Some other reviews also describe the effects of the health intervention on IMR and U5MR. However, among several systematic reviews mentioned above, none of them specifically addressed the effect of government health expenditure on health services to reduce IMR and U5MR.

This research systematically examined the effectiveness, best practices, and the benefits of government health expenditure on infant and under-5 mortality rates, especially in rural areas. Government health expenditure includes wide context as health programs and special funding allocations for health.

Method

This study employed comprehensive search using specific keywords. Data were retrieved from online databases that included PubMed, Scopus, and ProQuest. These three online databases were free to access through the library at Universitas Indonesia. Problems were identified using the PICOS framework. PICOS methodology employed in this study is explained as follows. **Population:** Rural Community; **Intervention:** Government Health Expenditure; **Comparison:** -; **Outcome:** IMR and U5MR; **Study Type:** All types of study except Systematic / Literature Review with/ without Meta-Analysis

After the PICOS had been compiled, the inclusion and exclusion criteria for the comprehensive search were determined (Table 1). It is important to note that this systematic review did not specify the location of the study since the researcher expected to analyze the characteristics of rural areas in various countries that have successfully allocated government health expenditure in reducing IMR and U5MR.

The keywords used were a combination of the following terms: (((spending) OR (expenditure)) AND ((government) OR (public))) AND (((((neonatal) OR (newborn)) OR (infant)) OR (child)) OR (under-5)) AND ((health) OR (mortality))) AND (rural). Manuscripts were selected journal articles, written in English and published between 2010-2020.

In the initial identification stage, a total of 54 journal articles were obtained, of which 17 were obtained from PubMed, 15 from Scopus, and 22 from ProQuest. The journal articles were then inserted to Mendeley Reference Manager to eliminate duplication of the same titles. The journal articles were manually sorted out again based on PICOS and inclusion criteria based on the title, abstract, and results. After the manual screening, a critical appraisal was carried out to assess the

data. The critical appraisal was done using *SIGN Methodology Checklist 6 for Economy Evaluation*. This checklist is useful to help maintain methodological accuracy and consistency in assessing a paper. *The SIGN Methodology Checklist 6 for Economy Evaluation was developed based on the BMJ requirements by academics in the economic field* (Drummond and Jefferson, 1996).

There were six articles that were synthesized and analyzed. All of the selection processes of the six studies are illustrated in Figure 1. Further analysis and discussion in this research were not done using meta-analysis due to differences in methodology and clinical terms. Another reason for not using meta-analysis was due to the diversity of the population, study design, interventions, and the results of several studies (Cochrane, 2021).

Table 1. Inclusion and Exclusion Criteria

	Inclusion	Exclusion
Source	PUBMED, SCOPUS, PROQUEST	Other online database sources
Dates	August 2010 – August 2020	Other
Study Types	Other types of Study	Systematic/Literature Review with/without meta-analysis
Language	English	Other languages
Intervention	Government Health Expenditure	Other interventions
Outcome	Effectivity, Key Policies, Challenges, Best	Other
Measure	Practices	
Population	Neonatal and Child Under-5 in Rural Area; and its Health Indicators	Other
Type of Publication	Academic Journal; Availability of Documents (free); Published through the area of Public Health	Other and paid-articles

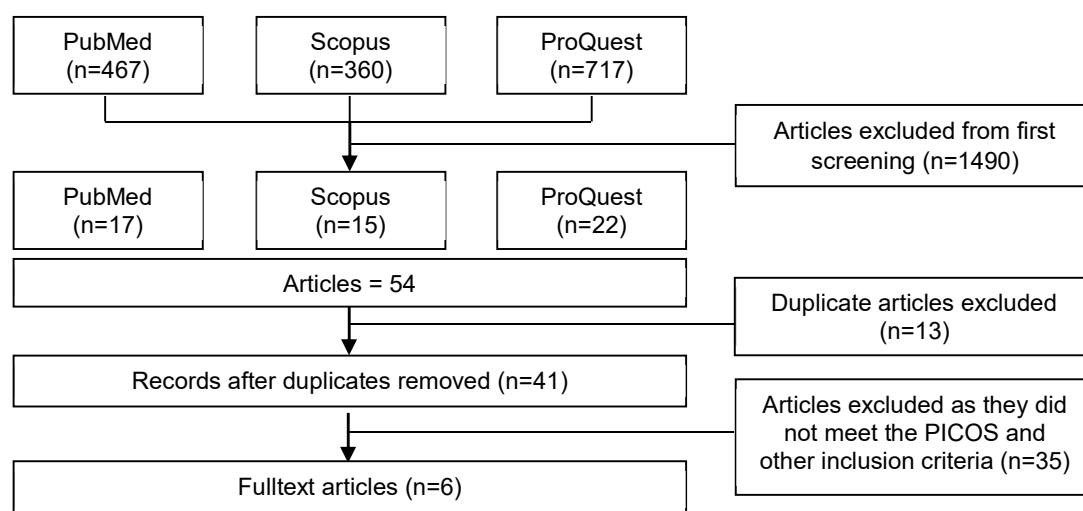


Figure 1. PRISMA Flowchart of the study

Therefore, the description of the results in this study was narrated in the tabulation. However, all of the articles in this study were included despite their insignificant results to reduce a possible publication bias for a systematic study.

Results and Discussions

The findings of this study are summarized in Table 3. In general, the findings describe the relationship between government health expenditure and IMR and U5MR in rural areas. Of the six articles identified, five studies on government health expenditure concerning health status for infants and under-5 in rural areas were published between 2016-2020, and only one was published in 2013. The studies were conducted in Peru, China, and India. There was also one study that regarded data from 67 countries. Most of these papers are quantitative studies, except for the second (conducted in Peru) and fourth (conducted in Odisha, India) studies which were carried out using a mixed method. All these studies were limited to government health expenditure topics concerning the reduction of IMR and U5MR although in each study the other variables were examined.

Findings

The first paper regarded data from 67 countries with different income averages. The statistical analysis showed that the government health expenditure reduced the U5MR in rural areas. Other variables such as the mother's educational background and household income were also taken into consideration. The government health expenditure effectively assured the health services for people with higher risks (Li and Yuan, 2019).

Although the first paper did not further analyze causative factors that made government expenditure reduce child mortality in rural areas, the study identified that the health systems in some low-income countries mainly rely on external assistance. Different sources of government health expenditure can affect

the effectiveness of health equity in the country (Li and Yuan, 2019).

The second and fifth studies were conducted in Peru. Peru is a country that is geographically divided into 3 regions : the Coast, Andes, and Amazon. This systematic review categorized Andes and Amazon as 'rural' areas since rural areas dominate the country, while poor populations mostly resided in these two areas.

The second paper analyzed the phenomena that occurred between 2000-2013. Based on its statistical analysis, the coverage of intervention in the Coast region was higher than that of the Andes and Amazon. However, the success of these 'rural' areas could be said to have increased significantly.

From 2000 to 2013, the Andes experienced the highest increase in intervention coverage compared to the Coast and Amazon. Furthermore, health indicators such as IMR and U5MR in the Andes experienced the most significant decline, followed by Amazon in the second place (Huicho, Segura, *et al.*, 2016).

Although the IMR and U5MR of the Coast remained the lowest, the intervention that had been done over the past 13 years by the government has narrowed the gap between the three regions. Peru has set various policies or programs to reduce maternal and child health disparities in urban and rural areas. Based on the analysis of qualitative data, a 'cash transfer' program started in 2005 namely JUNTOS was issued to help overcome intergenerational poverty by increasing access to education and health services. In its implementation, under-5 children were required to visit health and nutrition clinics to get vitamin A and iron supplementation as well as to undergo several services such as growth monitoring, regular immunizations, and deworming (Huicho, Segura, *et al.*, 2016). This program, which was targeted at poor rural residents, has increased the use of antenatal services for pregnant women (Díaz and Saldarriaga, 2019) and thus has given a positive effect on children's health (Huicho, Hernandez, *et al.*, 2018).

Meanwhile, the results of the bivariate analysis in the fifth paper implied that greater amounts of government health expenditure is associated with smaller IMR and U5MR. However, the results of the multilevel ecological analysis did not show any significant differences between the Coast, Andes, and Amazon. The study noted that there were variations in spending between regions from time to time, but this study was unable to determine which regions had better child health service activities due to inconsistent variations.

It was assumed that the main cause for the non-regional outcome differences was the Peruvian government's health expenditure. It explains why regions with most cases were not given the highest priority. Other causes were decentralization, and limited implementation of central policies (Huicho, Hernandez, *et al.*, 2018). Another research in Peru also suggested that increasing health expenditure was hand in hand with political support for maternal and child health focusing on the poorest groups of the population (Huicho, Huayanay-Espinoza, Hernandez, Niño de Guzman, and Rivera-Ch, 2018).

The third study conducted in China found that the per capita income of rural communities and the proportion of government health expenditure shared a significant negative relationship with IMR. It implies that additional per capita income for rural communities and the proportion of government health expenditure could help reduce IMR. One of the proportions of government health expenditure is the investment in the medical sector. This study where GWR and spatial clustering were employed also analyzed possible economic factors that affect IMR in areas with different levels of development and local policies. Although IMR in China was better compared to 2010, the disparity between urban and rural areas, especially areas with the lowest economic development, remained difficult to eliminate. This challenge requires enormous investment and resources in these areas (Wang and Wu, 2020)

The fourth and sixth studies took place in India and discussed the NRHM using different approaches. NRHM is a scheme created by the central government that aims to reduce IMR in India by strengthening delivery services at the village level (Pandey and Mohan, 2019). Other programs have been launched under this scheme. Some of which aim to strengthen primary and community health centers, certified social health workers, and establish new health financing mechanisms (Gopalakrishnan and Immanuel, 2018).

The fourth study was conducted in Odisha, India, measuring SGCE and SGRE to see the effect of NRHM on health indicators such as IMR. The results suggested that since the NRHM policy took effect in Odisha, both government capital expenditures and revenues could significantly reduce IMR. In addition, the results of interviews and focused discussions showed that health facilities such as health care buildings and medical equipment had improved in terms of quantity and quality. Additional medical and health support personnel were then added after NRHM was implemented (Patra, Murthy and Rath, 2013).

The sixth paper specifically discussed the comparison between IMR based on pre- and post-NRHM. The results suggested that NRHM in India succeeded in reducing the IMR gap between urban and rural areas. This time-series analysis further explained a decrease in IMR several years before the implementation of NRHM which helped accelerate it (Pandey and Mohan, 2019).

Best Practices

Health expenditure as an economic resource is necessary to realize better health conditions (Servan-Mori, Avila-Burgos, Nigenda and Lozano, 2016). To achieve this goal, some important factors must go hand in hand to support one another. The following part describes the factors that make government health expenditure effective in reducing IMR and U5MR.

Table 3. Articles related to Government Health Expenditure with IMR and U5MR in Rural Areas

No	Title	Location	Method	Findings	
				Unit Analysis	Results
1	Understanding the Effectiveness of Government Health Expenditure in Improving Health Equity: Preliminary Evidence from Global Health Expenditure and Child Mortality Rate	Up to 67 countries	Quantitative: Regression Analysis	Domestic general government health expenditure per capita (GHE) and External health expenditure per capita (EXT); Child mortality rate (neonatal, infant and under-5) - urban and rural areas	R ² value of GHE and EXT was higher in rural areas than urban, both the neonatal, infant, and under-5 mortality rate variables.
2	Child Health and Nutrition in Peru within an Antipoverty Political Agenda: a Countdown to 2015 Country Case Study	Peru	Mix Method: Descriptive Statistic, Lives Saved Tool (LiST); Indepth Interview and Focus Group Discussion	Health intervention coverage, neonatal (NMR) and U5MR, under-5 stunting in Coastal, Andes, and Amazon (2000-2013)	It shows higher health intervention coverage and mortality rate at the Coastal region than Andes and Amazon. However, progress on NMR and U5MR reduction was faster in the Andes from 2000 to 2013
3	Spatial Heterogeneity of the Associations of Economic and Health Care Factors with Infant Mortality in China Using Geographically Weighted Regression	China	Quantitative: Spatial Autocorrelation Analysis, Geographically Weighted Regression (GWR) Model with Spatial Clustering	Per capita income of rural residents, Engel's coefficient of rural residents, proportion of government health expenditure; IMR	Per capita income of rural residents, Engel's coefficient of rural residents, and proportion of government health expenditure have significant correlation with IMR
4	An Evaluation of the National Rural Health Mission (NRHM) in Odisha	India	Mix Method: Multiple Regression Analysis with In Depth Interview and Focus Group Discussion	SGCE and SGRE; birth rate, crude death rate, and IMR	Regression Model shows that a 1% increase in SGRE and SGCE on medical, healthcare, and sanitation could reduce the IMR by 0,12 and 0,27 points respectively
5	Understanding Drivers of Domestic Public Expenditure on Reproductive, Maternal, Neonatal, and Child Health in Peru at District Level: an Ecological Study	Peru	Quantitative: Bivariate Correlation and Ecological Multilevel Analysis	Public expenditure (reproductive, maternal, neonatal and child health); Maternal, IMR and U5MR, under-5 stunting and unmet basic need Coast, Andes, and Amazon department	Public expenditure increased in areas with lower income inequality. IMR and U5MR were significantly negative correlations with health expenditure on maternal, neonatal, and child. The final multilevel model did not show statistical difference between departments
6	The Role of National Rural Health Mission in Reducing Infant Mortality Rate in India	India	Quantitative: Interrupted Time Series Analysis; Regression Analysis, with Durbin-Watson	NRHM: Pre-Post Intervention Time; IMR in Urban and Rural	The IMR difference between urban and rural was declined by 4 units. There are greater reduction of IMR trends in rural after the implementation of NRHM

First, the improvement of government health expenditure effectiveness in improving the health status of areas with certain conditions has to be supported by good policies and political conditions. In Peru, when the recommendation was implemented, the IMR decreased by 50% between 2000-2013. Peru's success in reducing IMR shows that political transition and strong political will can encourage broad participation of various parties and also lead to the determination of sustainable macro policies. Thereby, such conditions will eventually affect the implementation of health and anti-poverty programs for reducing IMR and U5MR (Huicho, Segura, *et al.*, 2016). Moreover, political commitment and leadership along with strong community participation can be the key to lowering the gap between IMR and U5MR. Community participation contributes to the implementation of policies regarding health programs / interventions determined by the government (Huicho, Huayanay-Espinoza, *et al.*, 2016; Huicho, Segura, *et al.*, 2016).

Political policies and adequate support have a major influence on the use of the health budget. As stated in the first study, several challenges occur regarding the implementation of supporting policies. These issues can vary from different priority of political and public interests, pressure on implementing agencies, and transparency-related issues (Li and Yuan, 2019). Other studies also suggested that decisions or policies taken by local governments greatly affected health expenditure for improving infant and child health services (Gupta *et al.*, 2017; Huicho, Hernandez *et al.*, 2018; Jimenez Soto *et al.*, 2013).

Second, the success of infant and under-5 programs is greatly influenced by the implementation in local areas. As an example, the implementation of NRHM in Odisha, India brought major impacts. The decrease in IMR in the Odisha area could be attributed to the good implementation of NRHM supported by two other policies. These policies are **called the Patient Welfare Committee or Rogi Kalyan Samiti (RKS) and Safe Motherhood Program or Janani Suraksha Yojana (JSY)** (Patra *et al.*, 2013). RKS is a facility-based mechanism

created by the government to improve hospital management structure with greater autonomy in decision-making (functional, administrative, and financial) (Adsul and Kar, 2013; Nongdrenkhomba, Prasad, Baishya and Shome, 2015). Meanwhile, JSY helps increase the success of health institutions by reducing maternal mortality with a conditional cash transfer scheme (Mukhopadhyay *et al.*, 2018). The combination of different policies resulted in higher income and capital expenditures.

However, the implementation of NRHM in different regions suffered from some problems. Another research on NRHM in India determined issues related to underutilization and overutilization of health budgets in several regions. The reasons for the underutilization of health budgets include the late distribution of funds from the central government, poor program planning, differences in budget use priorities, and the inability of regions to use the budget effectively. On the other hand, the reason for the overutilization could be because of the flexibility of NRHM funds and the government choosing to provide additional funds from this set health budget (Gupta *et al.*, 2017). Based on these findings, it can be concluded that the same amount of health expenditure can have different impacts in different regions.

Third, the harmony between the central and local governments is crucial in the allocation of children's health funds. Peru is a good example in this regard. Although the implementation of health programs to reduce IMR and U5MR still finds obstacles in some local government authorities at the national level, it is clear that the outcomes of its health programs are evident as Peru is a country with one of the fastest decreases in IMR in the world (Huicho, Hernandez, *et al.*, 2018; Huicho, Segura, *et al.*, 2016). The key factor to this success is the fact that Peru has succeeded in reducing the poverty gap between regions, both urban and rural. The Peruvian government takes an equity lens approach, where it identifies high-risk populations in the Andes and Amazon, then carries out multi sectoral interventions on target populations such as the JUNTOS program. This reduction in the poverty gap

has a very important impact on the implementation of health programs due to the tendency for new health programs to outreach richer urban residents first before finally reaching the rest of the country (Huicho, Segura, et al., 2016). It can be concluded that an increase in child health expenditure can be supported by other mutual programs beneficial to the health sector.

Limitations

This study suffers from several limitations. First, most of the articles reviewed in this research were quantitative studies. Consequently, the discussion regarding the effectiveness and best practices were not thorough. Moreover, only three online databases were used. Second, based on the results, this study did not examine in detail the sources of funds obtained by the government. In addition, this systematic review did not discuss the different types of expenditure, such as revenue and capital health expenditure. Third, this study has not been able to ascertain the ideal amount of government expenditure that should be allocated for the health services for infants and under-5s in comparison to the total expenditure in a given region. Finally, the health systems analyzed in this review did not thoroughly describe the global conditions as this study was limited to six studies where four of which were only conducted in India and Peru. It is expected that these limitations can be addressed in future studies.

Conclusions

It is concluded that six studies on the reduction of IMR and U5MR with government health expenditure were included. The government health expenditure devoted to more vulnerable populations such as rural communities could effectively reduce IMR and U5MR. However, it should be emphasized that the effectiveness of central government health expenditure for children's health is affected by several factors. These factors can vary from policies-related factors and political conditions that are specifically relevant to the use of child health funds, local

government's responses to fund health activities in the regions, and consistent efforts between the central and local governments to reduce IMR and U5MR.

Referring to rural residents, the local government holds a crucial role since their geographical proximity allows them to have a more comprehensive understanding of the problems. These institutions should collaborate to successfully carry out the health programs to reduce IMR and U5MR and thus improve their health status. The findings of this systematic review could be references for developing countries to wisely use state health expenditures for public health measures.

Large expenditure budgets will not effectively reduce IMR and U5MR without proper distribution and management. The researcher strongly recommends future researchers to address some limitations of this study. At last, the researcher expects that this study makes valuable insights for stakeholders and policymakers in making efforts to reduce IMR and U5MR in rural areas.

Abbreviations

IMR: Infant Mortality Rate; UM5R: Under 5 Mortality Rate; PICOS: Population–Intervention–Comparison–Outcome–Study Type; NRHM: National Rural Health Mission; SGCE: State Government Capital Expenditure; SGRE: State Government Revenue Expenditure.

Declarations

Ethics Approval and Consent Participant
Not applicable

Conflict of Interest

This study does not conflict with anyone's interest.

Availability of Data and Materials

The availability of data and materials based on demand from journals and authors.

Authors' Contribution

ASP and ACS conceptualized the theme of the study; ASP did the Systematic Review

process, wrote, and edited the original draft. ACS reviewed the manuscript.

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SRI LANKA OXYGEN READINESS AND STRATEGIES ADAPTED FOR COVID-19 PATIENTS' MANAGEMENT

Kesiapan Oksigen Sri Lanka dan Strategi yang Diadaptasikan untuk Penanganan Pasien Covid-19

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Abstract

Background: Shortly after the Covid-19 oxygen crisis in India, the Sri Lanka Ministry of Health started investigating and analyzing gaps in oxygen production, supplies and demands.

Aims: This study aimed to evaluate the preparedness in Covid-19 cases management and recommend strategies to prevent oxygen crisis in healthcare facilities.

Methods: This study used information on oxygen source redundancy and delivery methods to assess whether a healthcare facility is prepared to provide the necessary oxygen demand for patients in need and to estimate the number of patients that can be treated with the currently available oxygen supplies. The predicted oxygen supplies and demands were assessed with a panel of experts using qualitative and quantitative methods. Data were collected using the Health Information Update System.

Results: Sri Lanka had 39,529 designated hospital beds including Intensive Care Unit and High Dependency Unit beds for Covid-19 patients. Even though an average number of patients were reaching 30,000, the actual oxygen demands were around 1,200 which were easily manageable with the current capacity of 80 tons per day.

Conclusions: Sri Lanka has made progress to increase access to oxygen by using novel methods to procure and increase oxygen availability, storing, and carrying capacity.

Keywords: COVID-19, oxygen, Case scenario, Sri Lanka, Ministry of Health

Abstrak

Latar belakang: Setelah terjadinya krisis oksigen pada kasus Covid-19 di India, Kementerian Kesehatan Sri Lanka mulai meneliti dan menganalisis kesenjangan produksi, ketersediaan, dan kebutuhan oksigen.

Tujuan: Kajian ini bertujuan untuk mengevaluasi kesiapan dalam penanganan kasus Covid-19 dan merekomendasikan strategi dalam mencegah adanya krisis di fasilitas kesehatan.

Metode: Kajian ini menggunakan informasi seputar ketidaktersediaan sumber oksigen dan metode pengiriman oksigen untuk mengevaluasi apakah fasilitas kesehatan siap untuk memenuhi kebutuhan oksigen yang penting untuk pasien yang sedang membutuhkan dan untuk memperkirakan jumlah pasien sesuai dengan ketersediaan oksigen saat ini. Estimasi ketersediaan dan kebutuhan oksigen dinilai oleh sekelompok pakar dengan menggunakan metode kualitatif dan kuantitatif. Data dikumpulkan menggunakan "Sistem Informasi Kesehatan Terkini".

Hasil: Sri Lanka memiliki 39,529 kasus pasien Covid-19 termasuk yang di ruangan ICU dan HDU. Meskipun jumlah rata-rata pasien mencapai 30.000, kebutuhan oksigen yang sebenarnya adalah 1.200, masih mudah ditangani dengan adanya kapasitas oksigen saat ini yang mencapai 80 tons per harinya.

Kesimpulan: Sri Lanka telah berproses untuk meningkatkan akses oksigen dengan menggunakan metode yang penting untuk menyediakan dan meningkatkan kapasitas produksi, penyimpanan, dan ketersediaan oksigen.

Keywords: COVID-19, oxygen, Case scenario, Sri Lanka, Ministry of Health



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Introduction

The immeasurable Covid-19 pandemic effect has globally been in place of health systems, economies, and societies. On January 27, 2020, Sri Lanka found its first imported Covid-19 patient, a 44-year-old Chinese woman from Hubei province, China (Colombo Page, 2020). As of July 15, 2021, a total of 288,202 positive cases were reported in the country, and 254,871 of them recovered from the disease. The Covid-19 related death toll has reached 3,661 (Epidemiology Unit Ministry of Health, 2021). The increasing Covid - 19 surge has warranted the rapid hospital expansion and has urged the Ministry of Health to reassess its hospital surge capacity in relation to predicted Covid-19 patient loads. The World Health Organization (WHO) mentioned in the Covid-19 preparedness guidelines that the health preparedness assessments must be conducted regardless of current transmission levels, and it is necessary to ensure that all facilities, including first point-of-care access points, are ready to provide basic acute care to critical Covid-19 patients (WHO, 2020b).

Sri Lanka, earlier known as Ceylon and officially the Democratic Socialist Republic of Sri Lanka, is an island nation in South Asia with a population of 21.8 million (Department of Census and Statistics of Sri Lanka, 2021). It is situated in the Indian Ocean and separated from the Indian subcontinent by the Strait of Polk. Sri Jayawardenepura Kotte is its legislative headquarters, and Colombo is its financial epicenter. Administratively, Sri Lanka is divided into nine provinces and twenty-five districts (University of Birmingham, 2021).

The health system of Sri Lanka provides inward care to all patients tested positive for Covid-19 through its 234 designated in-patient care centers. According to technical experts, about 40% of Covid-19 patients were symptomatic, and 20% of them were oxygen dependent. Out of all oxygen dependent patients, 4% required critical care (Secretary College of Anaesthesiologists and Intensivists of Sri Lanka, 2021). Furthermore, 2,400 patients out of 30,000 current inward Covid-19 patients required an oxygen therapy.

Viewing these issues as national concerns, this study aimed to predict the total oxygen demands of the country in the worst context of Covid-19 pandemic where the number of oxygen-dependent patients will reach up to 4,000 to 5,000 (University of Birmingham, 2021).

Covid-19 and oxygen usage

In June 2017, the WHO included oxygen in its model list of essential medicine (EML) during anesthesia because of its proven life-saving properties (WHO, 2021c). In addition to that, oxygen therapy has shown to be effective in treating Covid-19 patients and it is recommended for all severe and critical Covid-19 symptoms (Long *et al.*, 2021).

Flow rates for oxygen therapy range from low 1-2 L/min to 5 L/min to high 30-60 L/min. In Sri Lanka, different devices have been used for oxygen delivery and subdivided into low-flow oxygen devices to high-flow nasal oxygen delivery (HFNO) devices (Pinto *et al.*, 2020).

Method

This study used information on oxygen source redundancy and delivery methods to assess whether a healthcare facility is prepared to provide the necessary oxygen demands for patients in need and to estimate the number of patients that can be treated with the current oxygen production capacity and future demands in healthcare facilities of Sri Lanka.

The predicted oxygen supply and demand were assessed by the principal investigator with a panel of experts using qualitative and quantitative methods, adapting a pre-validated WHO's online tool (WHO, 2020b). The questionnaire was modified by the experts to collect data by using HIUS (Health Information Update System), which is an open-source, free data-collection tool. Timely data collection was done in contact with hospital coordinators from May 15 to July 15, 2021. Reminders to complete the HIUS were sent out twice a week during this period.

The current oxygen supply gaps for designated Covid-19 treatment centers were assessed by the medical supplies division (MSD) through the direct contact of

each healthcare center. DDG MS1 (Deputy Director General Medical Services I) and DDG BMES (Biomedical Engineering Services) provided the information on other oxygen supply gaps in other healthcare institutions. The first-hand experience of managing oxygen-dependent Covid-19 patients and perceived need for equipment were assessed through interviews held with clinicians as key informants. Further, selected on-site visits were made to verify the assessments.

Data were exported from the HIUS platform into an excel spreadsheet and subsequently imported into statistical software SPSS for data analysis. Qualitative data collected from the key informant interviews (KII) and focused group discussions (FGD) were recorded and transcribed with the consent of the participants. The data and testimonials were synthesized to confer to common statements and coded into thematic areas. Each thematic area was analyzed and transformed into information.

In this study, surge capacity was defined as the existing capacity designated to meet public health needs due to the Covid-19 pandemic (Cavallo *et al.*, 2020). This study was granted administrative clearance from the Sri Lanka Ministry of Health.

Result and Discussion

All Covid-19 management centers, including Level I to III, may need oxygen to treat Covid-19 patients (Sri Lanka Ministry of Health, 2021). There were 152 level I Intermediate Care Centers (ICCs) including 60 private hospitals and selected hotels. Initial management for asymptomatic and lower symptomatic patients especially with mild diseases had been done at this level, and 73 level II secondary care centers at base hospitals and some divisional hospitals with ICU and HDU facilities had become places for treating symptomatic oxygen-dependent or non-oxygen-dependent patients with moderate diseases. Besides, nine level 1 centers with specialized HDU and ICU were in place to treat severe or critical progressive oxygen-desaturation patients.

Surge capacity of hospital Covid-19 beds

Sri Lanka had 39,529 designated hospital Covid-19 beds across all sectors (public, semi-government, tri-forcers, and private sectors); further, it is expected to expand the number of total beds up to 49,527.

Table 1. Distribution of resources, mortality, and morbidity across Covid-19 three waves

	1 st Wave (27/01/2020 - 3/10/2020)	2 nd Wave (04/10/2020 - 14/04/2021)	3 rd Wave (15/04/2021 - up to now)
Centers			
Level I	-	37	153
Level II	8	37	73
Level III	2	9	9
Beds			
Level I	-	12,441	29,904
Level II	<1,000	2,750	5,963
Level III	400	1,550	1,550
Number of Patients	3,396	92,341	195,861
Number of Deaths	13	604	3,661
Case Fatality Rate *	0.38	0.64	0.97

*Case is defined as a laboratory confirmed patients

Table 2. Calculation of the number of patients treated with the current oxygen production (25 tons/day) and maximum oxygen production capacity (80 tons/day)

Oxygen	Current capacity/Day	Maximum capacity/Day
Total oxygen production	25 tons	80 tons
Total oxygen production in Kg	25,000 kg	80,000 kg
Total liquid oxygen (n kg/1.141)	21,910L	70,114 L
Total gaseous Oxygen (n L x 861)	18,864,510 L	60,367,293 L
Oxygen flow rate	Total number of patients who can be treated with the current oxygen production capacity	Total number of patients who can be treated with the maximum oxygen production capacity
10 L/min	1,310	4,192
30 L/min	436	1,397
60 L/min	218	698

Distribution of resources, mortality, and morbidity across all three Covid-19 waves

Understanding the resource distribution, mortality, and morbidity patterns locally across all three waves is important to take rational decisions and formulate recommendations on oxygen demand during the Covid-19 pandemic. Table 1 outlines the distribution of resources, mortality, and morbidity across the waves.

Current oxygen production capacity and demand

The current total oxygen consumption of the country was 25 tons per day, and current maximum oxygen production capacity was 80 tons per day (Manager oxygen world limited, 2021). The oxygen required for a Covid-19 patient with moderate to severe symptoms varies from 2 L/min to 60 L/min, respectively.

The daily requirement of oxygen is dramatically increasing with higher oxygen flow rates. At the flow rate of 10 L/min and 30 L/min liters, 14,400 L/day and 86,400 L/day of oxygen are respectively required to manage an oxygen-dependent patient. Table 2 demonstrates the current and maximum oxygen production capacity in Sri Lanka and the maximum number of

patients that can be treated with different oxygen production capacities at different flow rates. However, to produce the

Maximum capacity of oxygen, the suppliers (Ceylon Oxygen Limited and Gas world Limited) have to limit issuing of oxygen to industrial usage and reduce other industrial gas production.

The information in Table 2 shows that at the flow rate of 10 L/min, 1,310 and 4,192 patients can be treated with the oxygen production rate of 25 tons/day and 80 tons/day, respectively. However, with higher flow rates, the number of patients that can be treated rapidly declines. Table 6 assumes that the total production of oxygen is solemnly used for the management of Covid-19 patients. However, 20% of total hospital oxygen production must be spared for the routine medical care at hospitals, while the industrial need for oxygen must be entirely disregarded.

WHO (2020a) recently reported that out of all oxygen-dependent patients, 75% required an oxygen flow of 10L/min, and 25% required 30 L/min (WHO, 2020). Considering the facts and the current actual caseload in Sri Lanka (Figure 1), 2,400 oxygen-dependent patients should be manageable at Covid-19 treatment centers.

Table 3. Calculation of total oxygen capacity for 2,400 oxygen-dependent patients

Oxygen Flow Rates	10 L /min	30 L/min
Number of patients (2400)	1800 (75%)	600 (25%)
Daily gaseous oxygen need (L)	25,920,000 L/day	25,920,000 L/day
Daily liquid oxygen need (L) (n/861)	30,104 L	30,104 L
Daily liquid oxygen need (kg)(n) x 1.141)	34,349 kg	34,349 kg
Daily liquid oxygen need (tons)	34.4 tons	34.4 tons
Total oxygen capacity required to manage 2,400 oxygen-dependent patients	68.8 Tons	

Table 3 shows the amount of oxygen required to manage 2,400 patients with different oxygen flow rates. From Tables 2 and 3, the maximum oxygen production capacity in Sri Lanka is barely enough to manage approximately 3,000 oxygen-dependent Covid-19 patients. The results are supported by the statement made by clinicians during the interviews. They said, "The current maximum oxygen production is closer to bare the minimum patient requirements" (Secretary, College of Anaesthesiologists & Intensivists of Sri Lanka, 2021).

The global oxygen scenario during Covid-19 surges also shows the same high-level oxygen demand in Covid-19 patient management. The Centre for Global Development (2020) reported that the hospital oxygen consumption during the Covid - 19 pandemic increased by 158% in the US and 98% in Europe (Smith *et al.*, 2020). Data estimated by BBC using WHO figures demonstrated more than a three-fold daily oxygen demand increase for Covid-19 patient management in the third wave compared to the second wave in India (BBC, 2021).

To maintain an adequate oxygen supply for the upcoming challenges of Covid-19 variants, an expert committee was established to find best appropriate strategies to supply high quality, medical-grade oxygen efficiently and effectively to the government hospitals of Sri Lanka.

Are we ready to cater the oxygen demand amidst Delta or future variants?

Considering the ongoing mutations of Covid-19 virus and WHO predictions (Hafeez *et al.*, 2021), this study analyzed the oxygen surge capacity, hospital readiness to develop new strategies, and recommendations to deliver high quality medical-grade oxygen adequately to healthcare facilities. The oxygen surge capacity was analyzed using three possible case scenarios that have been adapted from WHO Living Guidance of Covid-19 management (WHO, 2021b) and interim guidance on oxygen sources and distribution for Covid-19 treatment centres (WHO, 2020a). Therefore, predicted oxygen requirement was calculated based on assumptions. For example, all the designated Covid-19 centers may need to treat oxygen-dependent patients with symptoms, and one-third of the bed capacity of level II and all level III institutes need to be supplied with wall oxygen ports to ensure the smooth delivery of oxygen.

Scenario 1: Current actual caseload and oxygen demand

Scenario 1 (Figure 1) analyzes the current actual inward patient load in Sri Lanka; it is equivalent to 30,000 patients. As per literature published up to July 15th 2021, out of all patients, 60% (n = 18,000) should be asymptomatic and 40% (n = 12,000) are symptomatic. Of total symptomatic patients, 20% (n = 2,400) would be oxygen-dependent, and 4% (n = 96) of oxygen-dependent patients looked for critical care.

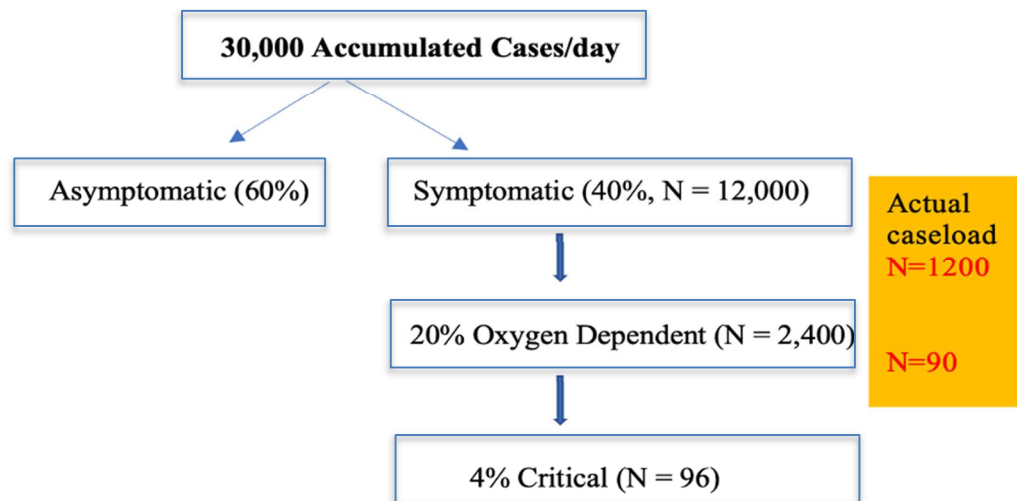


Figure 1. Current Covid-19 case load

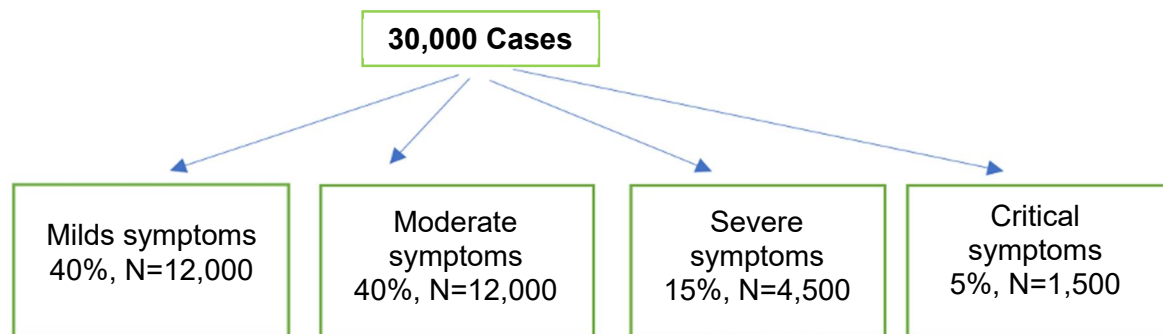


Figure 2. Calculation predicted cases per patient categories as per WHO data in 2021

However, the analysis of actual data obtained from hospitals showed a lesser number of total oxygen-dependent patients ($n = 1,200$) which were still way below the hypothetical number ($n = 2,400$) calculated. Further, all ICU and HDU patients were presumably oxygen-dependent in addition to inward oxygen-dependent patients. Hence at this point, the Ministry of Health did not face challenges in supplying oxygen requirements to inward patients.

Case scenario 2: Moderate level of oxygen dependency

The WHO Living Guidance on Covid-19 cases management updated on January 25, 2021 reported that of all symptomatic patients, 40% showed mild symptoms, and

another 40% showed moderate symptoms; the rest of all showed severe (15%) and critical (5%) symptoms (WHO, 2021b). Considering the total number of cases ($n = 30,000$), the calculation in Figure 2 can work out.

Under different transmission curve scenarios with possible Delta or future variants, the possibility of cases increased by 50 % than the more common alpha variant (Bhutta *et al.*, 2021); case load might increase up to around 50,000. In such situation, the number of projected Covid-19 oxygen-dependent patients in need for hospitalization may increase up to 10,000 cases, and oxygen requirement will increase by 3 times which will account for 286 tons (Figure 3).

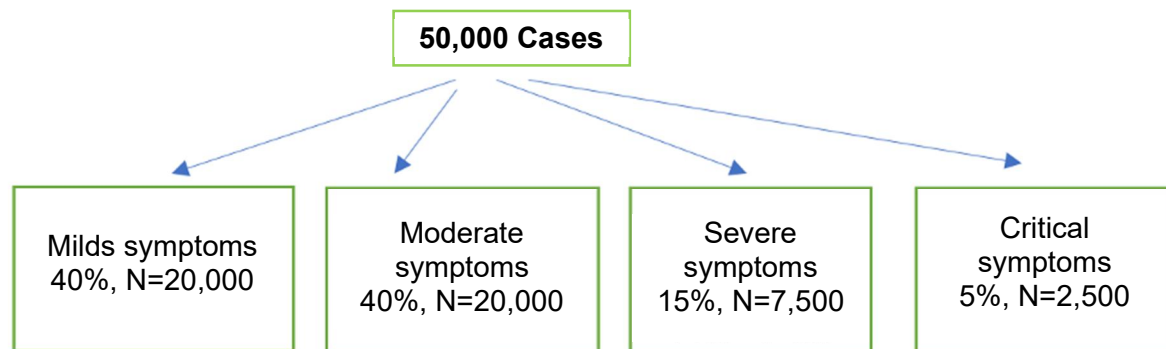


Figure 3: Calculation of predicted cases per patient categories for delta variant

Case scenario 3: High number of patients and oxygen dependence

This scenario was built up for new Covid-19 variants such as delta variant which has a more impact over 50% ($30,000 \times 150/100 = 45,000$).

Considering the above factors, adequate oxygen supplies should be available in government hospitals of Sri Lanka to mitigate the risk and overcome the challenges with measures and strategies that have reached the consensus of all expert committee members.

Strategies and measures to overcome challenges in high quality, medical-grade oxygen supplies

Enhancing oxygen production

The supply of oxygen to the healthcare institutions in Sri Lanka mainly depends on Ceylon Oxygen Ltd and Gas World Private Ltd. Most level II and III hospitals supplied oxygen through oxygen cylinders; level I hospitals are through both the cylinders and installed Vacuum Insulated Evaporators (VIEs) or liquid oxygen tanks. The oxygen suppliers and the Secretary of Health agreed to increase the oxygen production capacity up to 84 tons/day within the next few months.

Further, planned to establish Pressure Swing Adsorption (PSA) plants in identified hospitals. Currently, Sri Lanka has 11 PSA plants established mainly in the North-East region of the country with a capacity of 392,400 L/day (272L/min). Furthermore, the Ministry of Health has sought cabinet approval of establishment of 14 PSA plants which will enhance the

oxygen production capacity by around 9,015,000 L/day. The PSA plants in peripheries will increase oxygen production and reduce the transportation time and cost. Besides, it was decided to import bedside oxygen concentrators to mitigate the risk of cylinder-based oxygen scarcity at hospitals and to safeguard an uninterrupted supply of oxygen to both Covid-19 and non-Covid-19 patients. The cabinet approval was granted to procure 2,500 portable oxygen concentrators (100 units per district) based on the population density (Secretary to the State Ministry of Pharmaceutical Production, Supply and Regulation, 2021).

Rational use of oxygen at all levels

The standard use of oxygen was achieved through the revised treatment guidelines and protocols, clinical vigilance, and training of health care workers. Furthermore, it could be reduced by using a simple technology such as pulse oximeters and promoting the rational use of oxygen among health staff to reduce and mitigate the inappropriate usage of oxygen.

Improvement in oxygen storage capacity

An increase in the existing oxygen tanks at hospitals could happen as the current VIE or Liquid oxygen plants were strengthened efficiently and effectively through proper maintenance, phantomatic systems, supply chain management and so on. For example, there must be regular monitoring on the pressure adjustment of the regulators as required, and ensuring that the evaporators do not ice up excessively.

Besides, the Ministry of Health has already been establishing more than 25 VIE tanks covering all districts and importing liquid oxygen up to 120,000 liters (22-ton cryogenic ISO tanks). In the first stage, the Ministry of Health planned to establish 14 units and in the second stage other 11 units. Currently, the public health sector had 42 VIE tanks established at hospitals. The volume ranged from 1K to 30 K. During that period, to anticipate unforeseen sudden issues related to oxygen production, these ISO tanks may help as a contingency measure to secure continuous oxygen supply to state sectors.

Increasing oxygen production capacity

The importation of 15,000 oxygen jumbo cylinders in addition to available 6,962 jumbo cylinders would be made to secure the supply. Further, the Ministry of Health also planned to set medical oxygen cylinder manifolds at hospitals where wall oxygen supply systems are available. Manifolds are safe, convenient, and cost-effective systems at the point of use, and they can be used as backup systems for VIE tanks.

Improvement in oxygen delivery efficiency

This plan could be successful through the use of technology, C-pap, Bi-pap, nasal cannula, appropriate ventilators training on rational usage of these apparatus, reduction of wastage by using correct techniques in handling of cylinders, and training of health staff to identify and use stable methods. Besides, other ways to achieve this goal are through the establishment of wall oxygen outlets in hospital settings (establishment of high dependency units (HDU) with wall oxygen outlets on provincial basis (100 in each province) for the treatment of 900 critical Covid-19 patients in addition to available 6442 oxygen outlets in the country), development of norms for each Covid-19 treatment center for the distribution of equipment, and supply of necessary equipment for essential care.

Improvement in delivery process efficiency (Inter and intra hospitals)

Oxygen manufactures agreed to increase the number of reserve cylinders (efficient supply and delivery mechanism), maintain an adequate number of transport vehicles to increase the oxygen distribution capacity in the country, and reduce delays in filling and transport of oxygen to improve the delivery process.

In addition to the strategies and measures, expert groups suggested the strategies should be adapted only in the worst scenarios such as reduced usage of oxygen for other routine medical needs and non-medical needs.

The strategies will enable us to secure the continuous oxygen supply to state health sectors, especially hospitals, and meet the daily excess oxygen demand of 51 tons required for Covid - 19 patients management amidst rapidly spreading variants (Secretary of Production, Supply and Regulation of Pharmaceuticals state Ministry of Sri Lanka, 2021).

Conclusions

The continuous supply of oxygen to hospitals cannot be guaranteed during this unpredictable pandemic. Even though the capacity to produce an additional oxygen volume by the local factories is available, the production process is dependent on interlinked multifaceted factors. A breakdown of one linkage may end the health system up in a disastrous situation. Therefore, ensuring a reliable oxygen supply cannot be achieved only through establishing EIA/PSA plants. Hence, the implementation of multifaceted strategies to reduce oxygen wastage, enhance oxygen delivery and oxygen production capacity of hospitals is essential.

Emergency breakdowns are not often rare due to the fact that an adequate number of backup oxygen cylinders in place are of utmost importance to consider along with the liquid oxygen capacity expansion.

The availability of oxygen at hospitals does not ensure adequate delivery to those who need it most. Therefore, the improvement and expansion of oxygen delivery systems and making necessary equipment available at the sites are imperative.

Since capacity expansions have their own ceiling limits, reduction of the caseload is an essential measure to match the hospital bed capacity with the patient surge. In short, efforts to control the disease spread are much more important than any other measures.

Abbreviations

WHO: World Health Organization; EML: List of Essential Medicine; HFNO: High-Flow Nasal Oxygen; DDG: Deputy Director General; HIUS: Health Information Update System; ICC: Intermediate Care Centers; BBC: British Broadcasting Corporation; VIE: Vacuum Insulated Evaporators; PSA: Pressure Swing Adsorption;

Declarations

Ethics Approval and Consent Participant

Not applicable.

Conflict of Interest

The authors declare no conflict of interest in this article.

Availability of Data and Materials

Not applicable.

Authors' Contribution

DHL, MDAK, PNW, AKSBDA, PWCP, UAASP, and ISY conceptualized the study; created the methodology; wrote, reviewed, and edited the manuscript.

Acknowledgment

Not applicable.

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IMPLEMENTATION OF STUNTING PROGRAM IN INDONESIA: A NARRATIVE REVIEW

Implementasi Program Stunting di Indonesia: Kajian Naratif

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Abstract

Background: Stunting is one of the nutritional problems in the world, especially in Indonesia.

Aims: This study aimed to describe the implementation of stunting programs in Indonesia, Related to specific and sensitive nutrition interventions in particular.

Methods: This narrative review was conducted with a meta-synthetic approach. The literature search was done on Google Scholar, PubMed, Garuda Portal, and DOAJ. The critical appraisal checklist from the Joanna Briggs Institute (JBI) was used to assess the research quality.

Results: Thirteen research articles were analyzed, and some intervention programs most commonly carried out were the provision of iron supplement tablets for pregnant women, supplementary feeding for underweight toddlers, complementary foods for breastfeeding, vitamin A provision, provision of facilities, access to drinking water, and proper sanitation.

Conclusion: The stunting program has not been implemented optimally either inside or outside the health sector. Sufficient numbers of human resources, especially nutritionists, are required to realize stunting programs.

Keywords: Child, growth disorders, Indonesia, narrative review

Abstrak

Latar Belakang: Stunting merupakan salah satu permasalahan gizi di dunia, utamanya Indonesia.

Tujuan: Penelitian ini bertujuan untuk mengetahui pelaksanaan program stunting di Indonesia, khususnya yang berkaitan dengan intervensi gizi spesifik dan sensitif.

Metode: Kajian naratif dilakukan dengan pendekatan meta-sintesis. Kualitas studi dinilai dengan menggunakan critical appraisal checklist dari Joanna Briggs Institute (JBI).

Hasil: Tiga belas artikel sampel penelitian dianalisis. Program intervensi yang paling umum dijalankan ialah pemberian tablet tambah darah ibu hamil, pemberian makanan tambahan bagi balita dengan berat badan rendah, makanan pendamping ASI, pemberian vitamin A, penyediaan sarana, akses air minum, dan sanitasi yang layak.

Kesimpulan: Program stunting belum sepenuhnya dapat berjalan maksimal dikarenakan kendala dalam maupun di luar sektor kesehatan. Sumber daya manusia yang mencukupi utamanya tenaga gizi diperlukan dalam pelaksanaan program stunting.

Kata kunci: Balita, Indonesia, stunting, kajian naratif



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Introduction

Indonesia has faced nutritional problems impacting the quality of human resources (HR). One of the malnutritions with the high prevalence in Indonesia is stunting in toddlers. Malnutritions are influenced by both health and non-health problems (Indonesia Ministry of Health, 2017). The Integrated Toddler Nutrition Status Survey (SSGBI) by the National Institute of Health Research and Development of the Indonesian Ministry of Health in 2019 showed based on the TB/U indicator, the national prevalence of stunting in 2019 was at 27.67% which was above the WHO's threshold (20%) (Ri, 2020).

In 2010, the United Nations published the Scaling Up Nutrition (SUN) program to be free from food insecurity and malnutrition (zero hunger and malnutrition). In Indonesia, a similar project so-called the National Movement for the Acceleration of Nutrition Improvement (*Gerakan 1000 HPK*) was enacted in the Presidential Decree No. 42 of 2013 (Roshia *et al.*, 2016). Stunting prevention is carried out through two interventions: sensitive and specific nutrition interventions. Specific nutrition intervention tries to address direct causes of stunting in the health sector, and it contributes to 30% reduction in stunting (National Development Planning Agency, 2018). Meanwhile, sensitive nutrition interventions are aimed at addressing indirect causes in the health sector. The sensitive nutrition programs and policies contribute to 70% of stunting interventions (Indonesia Ministry of Health, 2018). The government has set a target to reduce stunting by 2024 to 14% and has taken various efforts to deal with stunting. However, the prevalence of stunting in Indonesia was still high (Khairuzzaman, 2019).

Previous research has discussed stunting programs, one of which is research by Hossain *et al.* (2017). However, there is little research evaluating the implementation of the stunting programs, and thus this study reviewed this issue.

Method

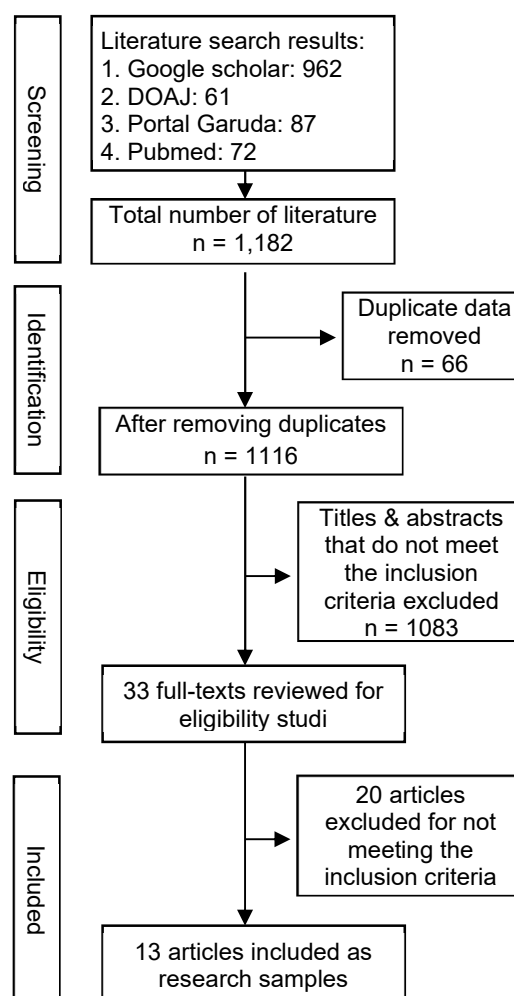


Figure 1: Literature selection phases

This study was a qualitative narrative review with a meta-synthetic approach. The focus of this research is finding out obstacles in the implementation of stunting programs. Literature search was conducted on Google Scholar, DOAJ, Garuda Portal, and PubMed using some keywords i.e., *implementasi, evaluasi, program stunting, intervensi gizi, stunting balita, penanggulangan stunting, indonesia, child nutrition disorders, stunted, growth disorders, and nutrition interventions* with Boolean operators (AND, OR) tailored for each database. Research articles were included if they were published in 2010-2020, conducted in Indonesian regions, aimed to qualitatively discuss the implementation of stunting programs in Indonesian, and written in English full text. Those which are not open access or paid

articles were excluded. The stages of literature selection follow the PRISMA diagram (Figure 1), and the research quality was assessed by two reviewers (SZ and SAP) using the critical appraisal checklist from the Joanna Briggs Institute (JBI).

A total of 1,182 articles were obtained, and 66 duplicates were removed. Those which did not meet the inclusion criteria were 1,083 titles and abstracts. The remainder, 33

studies were screened again, and there were three non-open-access articles, five non-research articles, one paid article, and 11 irrelevant articles with a different focus. The remainder, 13 research articles from 2010 to 2020, were assessed for their quality by two reviewers using the critical appraisal checklist from the Joanna Briggs Institute (JBI). Since they were scored above 50%, they were sampled in this study.

Table 1. Description of stunting program implementation

Authors	Stunting programs implemented	Categories
(Hermawati and Sastrawan, 2020) (Saputri, 2019) (Sugiyanto, Sumarlan and Hadi, 2020) (Yulyanti, Putri and Fauzi, 2018) (Muthia, Yantri and Edison, 2019) (Ridua, Miagina and Djurubassa, 2020) (Nurlatif and Priharwanti, 2019)	Distribution of iron (Fe) tablets to pregnant women	specific nutrition intervention
(Hermawati and Sastrawan, 2020) (Yulyanti, Putri and Fauzi, 2018) (Muthia, Yantri and Edison, 2019) (Khoeroh and Indriyanti, 2017)	Provision of iron supplement tablets for pregnant women with chronic energy deficiency	specific nutrition intervention
(Hermawati and Sastrawan, 2020) (Sugiyanto, Sumarlan and Hadi, 2020) (Muthia, Yantri and Edison, 2019) (Khoeroh and Indriyanti, 2017) (Maulina, 2020) (Ridua, Miagina and Djurubassa, 2020) (Nurlatif and Priharwanti, 2019) (Syafrina, Masrul and Firdawati, 2019)	Advocacy and counseling on breastfeeding (early initiation of breastfeeding and exclusive breastfeeding)	specific nutrition intervention
(Hermawati and Sastrawan, 2020) (Sugiyanto, Sumarlan and Hadi, 2020) (Yulyanti, Putri and Fauzi, 2018) (Muthia, Yantri and Edison, 2019) (Maulina, 2020) (Syafrina, Masrul and Firdawati, 2019) (Ridua, Miagina and Djurubassa, 2020) (Nurlatif and Priharwanti, 2019) (Soesanti <i>et al.</i> , 2020)	Provision of complementary foods for children	specific nutrition intervention
(Hermawati and Sastrawan, 2020) (Muthia, Yantri and Edison, 2019) (Ridua, Miagina and Djurubassa, 2020) (Rosha <i>et al.</i> , 2016) (Nurlatif and Priharwanti, 2019) (Saputri, 2019)	Provision of complete basic immunizations for children	specific nutrition intervention
(Hermawati and Sastrawan, 2020) (Sugiyanto, Sumarlan and Hadi, 2020) (Yulyanti, Putri and Fauzi, 2018) (Muthia, Yantri and Edison, 2019) (Khoeroh and Indriyanti, 2017) (Maulina, 2020) (Rosha	Distribution of complementary foods for underweight toddlers	specific nutrition intervention

et al., 2016) (Nurlatif and Priharwanti, 2019) (Saputri, 2019) (Syafriana, Masrul and Firdawati, 2019)		
(Hermawati and Sastrawan, 2020) (Yulyanti, Putri and Fauzi, 2018) (Muthia, Yantri and Edison, 2019) (Khoeroh and Indriyanti, 2017) (Maulina, 2020) (Rossha et al., 2016) (Nurlatif and Priharwanti, 2019) (Saputri, 2019) (Syafriana, Masrul and Firdawati, 2019)	Administration of vitamin A	specific nutrition intervention
(Hermawati and Sastrawan, 2020) (Muthia, Yantri and Edison, 2019) (Ridua, Miagina and Djurubassa, 2020) (Nurlatif and Priharwanti, 2019) (Saputri, 2019)	Zinc supplementation	specific nutrition intervention
(Sugiyanto, Sumarlan and Hadi, 2020) (Yulyanti, Putri and Fauzi, 2018) (Khoeroh and Indriyanti, 2017) (Maulina, 2020) (Ridua, Miagina and Djurubassa, 2020) (Rossha et al., 2016) (Nurlatif and Priharwanti, 2019)	Child growth monitoring	specific nutrition intervention
(Khoeroh and Indriyanti, 2017)	Taburia provision	specific nutrition intervention
(Hermawati and Sastrawan, 2020) (Muthia, Yantri and Edison, 2019) (Ridua, Miagina and Djurubassa, 2020)	Administration of medicine for deworming	specific nutrition intervention
(Hermawati and Sastrawan, 2020) (Probohastuti and Rengga, 2019) (Ridua, Miagina and Djurubassa, 2020) (Rossha et al., 2016) (Nurlatif and Priharwanti, 2019) (Syafriana, Masrul and Firdawati, 2019)	Environmental Interventions (Provision of proper drinking water and sanitation facilities and access)	sensitive nutrition intervention
(Hermawati and Sastrawan, 2020) (Probohastuti and Rengga, 2019) (Ridua, Miagina and Djurubassa, 2020) (Nurlatif and Priharwanti, 2019) (Rossha et al., 2016)	Increasing access to health services and reducing poverty	sensitive nutrition intervention
(Hermawati and Sastrawan, 2020) (Probohastuti and Rengga, 2019) (Ridua, Miagina and Djurubassa, 2020) (Rossha et al., 2016) (Nurlatif and Priharwanti, 2019)	Health education and nutrition education to the community	sensitive nutrition intervention
(Hermawati and Sastrawan, 2020) (Probohastuti and Rengga, 2019) (Nurlatif and Priharwanti, 2019)	Increasing access to nutritious food	sensitive nutrition intervention

They were then summarized into a table containing the author's name, year of publication, research design, objectives, targets, informants, and results. Table 1 shows the summary of the stunting programs according to types of intervention given. Further, Table 2 displays research articles with common obstacles in the stunting programs.

Result and Discussion

Overview of stunting program implementation

From the results of the analysis, several stunting prevention programs have been implemented and differentiated based on specific and sensitive nutrition interventions. The programs that have been summarized from each category can be seen in Table 1.

The studies brought two forms of programs: specific nutrition interventions and sensitive nutrition interventions. In the category of specific nutrition intervention, several programs are giving iron supplement tablets to pregnant women (seven articles), providing iron supplement tablets for pregnant women with chronic energy deficiency (four articles), breastfeeding advocacy and counseling (early initiation of breastfeeding and exclusive breastfeeding) (eight articles), giving complementary foods for toddlers (nine articles), giving complete basic immunizations to toddlers (six articles), giving complementary foods for underweight toddlers (10 articles), giving vitamin A (nine articles), zinc supplementation (five articles), child growth monitoring (seven articles), taburia administration (one article), and providing deworming medication (three articles). Meanwhile, the sensitive nutrition interventions include environmental interventions (providing facilities and access to proper drinking water and sanitation) (six articles), increasing access to health services and alleviating poverty (five articles), providing health education and nutrition education to children and the community (five articles), and increasing access to nutritious food (three articles).

Specific nutrition interventions

Specific nutrition interventions targeting pregnant women include giving iron supplement tablets (Fe) to pregnant women, providing supplementary food for pregnant women, and giving deworming drugs to pregnant women. However, the programs did not meet the strategic planning targeted. All programs are enacted in the government's regulation, addressing the minimum consumption of iron supplement tablets as many as 90 tablets during pregnancy (Indonesia Ministry of Health, 2014). In this study, the administration of Fe tablets was distributed properly based on the standard. However, no monitoring was carried out to confirm the intensity of tablet consumption. During the complementary feeding program, gifts such as biscuits and milk are given to participating mothers. However, some areas are difficult to reach and thus late in receiving complementary foods. The standards also do not recommend using the village budget on this matter.

Second, the program targets breastfeeding mothers and children aged 0-23 months through breastfeeding advocacy such as early initiation of breastfeeding and exclusive breastfeeding. Education for pregnant and lactating mothers is important to increase their knowledge about early initiation of breastfeeding and exclusive breastfeeding. This study found that the complementary feeding program has not fully been effective due to the lack of public knowledge about proper complementary feeding, such as feeding children above six months old with a proper frequency. Wrong assumptions about complementary feeding in babies also became the obstacle in the stunting prevention program. Besides, the other obstacles include the absence of anthropometry, trained personnel, and data on the administration of zinc to children.

Sensitive nutrition intervention

Sensitive intervention programs implemented include environmental intervention programs. In this study, some clean water and proper sanitation programs were carried out by the Environment Service (LH), the Public Development Office and the Housing, Settlement and

Transportation Service, and PAMSIMAS (water supply) program. Meanwhile, to overcome open defecation, the Community Sanitation (STBM/ *Sanitasi Total Berbasis Masyarakat*) program and fund allocation for latrines in villages were performed although the implementation was ineffective. Many people lack access to proper clean water, have poor hygiene behavior, knowledge, and economic status.

Increasing access to health services and reducing poverty are done through provision of access to family planning health services, National Health Insurance (JKN), and assistance for underprivileged families. However, these programs were not fully effective. For instance, the National Health Insurance appeared to have invalid participant data, covering non-targeted participants.

Table 2. Barriers in the stunting program implementation

Authors	Obstacles
(Hermawati and Sastrawan, 2020) (Sugiyanto, Sumarlan and Hadi, 2020) (Yulyanti, Putri and Fauzi, 2018) (Maulina, 2020) (Khoeroh and Indriyanti, 2017) (Probohastuti and Rengga, 2019) (Muthia, Yantri and Edison, 2019)	Lack of human resources
(Maulina, 2020) (Hermawati and Sastrawan, 2020) (Khoeroh and Indriyanti, 2017) (Yulyanti, Putri and Fauzi, 2018)	No special team and unclear main roles by competence
(Sugiyanto, Sumarlan and Hadi, 2020) (Yulyanti, Putri and Fauzi, 2018) (Syafrina, Masrul and Firdawati, 2019) (Probohastuti and Rengga, 2019) (Ridua, Miagina and Djurubassa, 2020)	Lack of public participation and awareness
(Ridua, Miagina and Djurubassa, 2020) (Probohastuti and Rengga, 2019) (Syafrina, Masrul and Firdawati, 2019) (Hermawati and Sastrawan, 2020)	Lack of socialization to the community
(Sugiyanto, Sumarlan and Hadi, 2020) (Yulyanti, Putri and Fauzi, 2018) (Khoeroh and Indriyanti, 2017) (Probohastuti and Rengga, 2019) (Maulina, 2020)	Limited availability of facilities and infrastructure
(Hermawati and Sastrawan, 2020) (Syafrina, Masrul and Firdawati, 2019) (Probohastuti and Rengga, 2019) (Muthia, Yantri and Edison, 2019)	Ineffective budget
(Saputri, 2019) (Ridua, Miagina and Djurubassa, 2020) (Syafrina, Masrul and Firdawati, 2019)	Incomplete data collection
(Sugiyanto, Sumarlan and Hadi, 2020) (Saputri, 2019)	Non-optimal program monitoring
(Hermawati and Sastrawan, 2020) (Ridua, Miagina and Djurubassa, 2020) (Sugiyanto, Sumarlan and Hadi, 2020)	Poor coordination between the program implementers
(Sugiyanto, Sumarlan and Hadi, 2020)	Unstrategic geographical conditions

Health education and nutrition education to the community, especially mothers, are usually done through maternal classes or during activities held by integrated health posts. In addition, the Toddler Family Development group (BKB/ *Bina Keluarga Balita*) which is integrated with pre-schools and integrated health posts revitalize the function of integrated health post, give premarital guidance to young couples, holds Youth Counseling Information Center (PIK-R/ *Pusat Informasi dan Konseling Remaja*) which provides Generation Planning (GENRE/ *Generasi Punya Rencana*) program. However, all of these services were not effectively conducted.

The Sustainable Food House Area (KRPL / *Kawasan Rumah Pangan Lestari*) program, moreover, was conducted by the Department of Agriculture and Food Security. However, obstacles sometimes still occurred. During the dry season, access to water becomes more difficult, and the quality of human resources is lacking.

Barriers in the Implementation of Stunting Programs

After synthesizing a sample of the found articles, several obstacles were found in the implementation of the stunting program, as shown in Table 2.

According to Table 2, stunting programs are hampered by some obstacles, i.e., lack of human resources (seven articles), absence of special team and unprecise main roles by competencies (four articles), lack of public participation and awareness (five articles), lack of community advocacy (four articles), limited facilities and infrastructure (five articles), Ineffective budget (four articles), Incomplete data (three articles), non-optimal program monitoring (two articles), poor coordination between implementers (three articles), and unstrategic geographical conditions (one article).

Human resources (HR), especially nutritionists are the major problem in stunting prevention measures. With an abundant workload, few staff could not perform well. More importantly, in a Balanced Nutrition Program, nutritionists

should be sufficiently available since they are the driving force of nutrition intake. Besides, a lack of public participation and awareness, low economic status, and education level are among the obstacles. Limited facilities, infrastructure, and budgeting hamper the programs as well. Budgeting allocated from the Special Allocation Fund (DAK / *Dana Alokasi Khusus*) has been regulated in the Indonesian Ministry of Health No. 12 of 2021. Incompatible roles by competence, lack of community advocacy, incomplete data, non-optimal monitoring program, poor cooperation between implementers, and unstrategic geographical conditions lead to ineffective stunting program implementation.

Conclusion

Some obstacles were found to distract the implementation of stunting programs. Specific nutrition interventions including the complementary feeding program, basic immunization, administration of vitamin A had inadequate quality and quantity in terms of human resources, facilities and infrastructure, and budget. Moreover, public knowledge affected the implementation as well. In the sensitive nutrition interventions, environmental interventions, health services, provision of education, food supply, coordination between implementers, public knowledge and awareness, and unstrategic geographical conditions were the main obstacles.

The government should hire more human resources, especially nutritionists, to be assigned in implementing stunting programs.

Abbreviations

SSGBI: Toddler Nutrition Status Survey, SUN: Scaling Up Nutrition, HPK: First Days Lived, JBI: Joanna Briggs Institute, STBM: *Sanitasi Total Berbasis Masyarakat*, JKN: *Jaminan Kesehatan Nasional*/ National Health Insurance, BKB: *Bina Keluarga Balita*/ Toddler Family Development group, KRPL: *Kawasan Rumah Pangan Lestari* / Sustainable Food House Area, HR: Human Resources, DAK: *Dana Alokasi Khusus* / Special Allocation Fund.

Declaration

Ethics approval and participation consent

This study has passed the ethics review from the Ethics Commission of Faculty of Public Health, Sriwijaya University. Number : 168/UN9.FKM/TU.KKE/2021.

Conflict of interest

There is no conflict of interest in this study.

Availability of data and materials

Data and materials are available upon request.

Author contribution

SZ for creating the study design and HI for writing the original draft of the manuscript.

Acknowledgment

Not applicable

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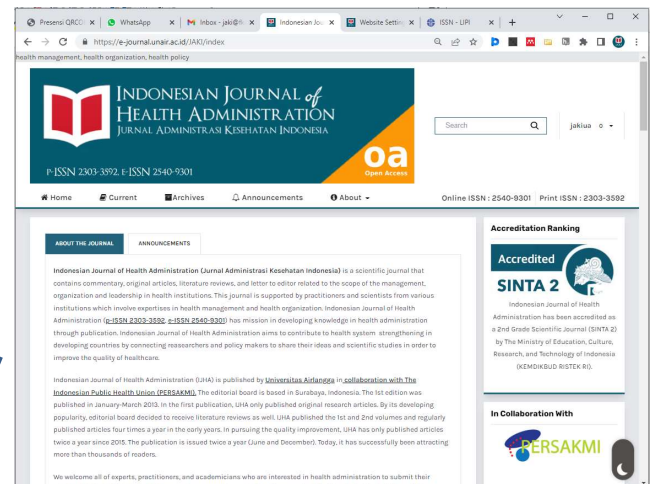
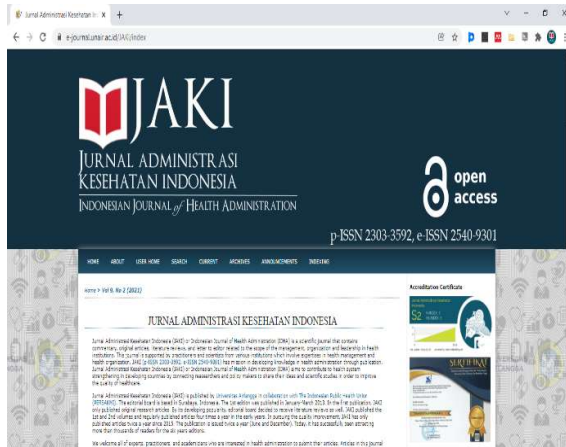
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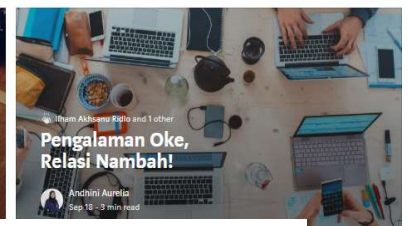
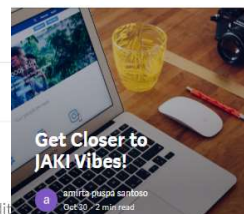
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