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Knowledge and Behavior regarding Consumption of Herbal Galactagogues among Breastfeeding Women in Mataram City

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A B S T R A C T

Mataram city occupied the region with the lowest coverage of exclusive breastfeeding in West Nusa Tenggara in 2022. One of the causes of the failure of exclusive breastfeeding is the lack of breast milk production. Galactagogues are substances that can increase breast milk production. A relatively safe alternative to support breast milk production is to consume herbs containing galactagogues. It is essential to trace local culture, knowledge, and behavior regarding herbal galactagogues to get insight into the types of galactagogues, their properties as well as side effects. Scientific studies are required to be used as a reference for breastfeeding women. This study aims to describe knowledge and behavior of breastfeeding women regarding the consumption of galactagogues. The study applied mixed-method design with a cross-sectional approach to conduct a survey on knowledge and behavior regarding consumption of herbal galactagogues. Data were collected by distributing questionnaires to respondents who were selected based on inclusion criteria, namely breastfeeding women with children aged 0 to 6 months, domiciled in the city of Mataram and registered at the Community Health Center in the city of Mataram, as many as 124 people. It was found that most of respondent had a poor level of knowledge by 62.1%, while 37.1% of them had good consumption behavior of herbal galactagogues. It can be concluded that generally, the people of Mataram City consumed herbal galactagogues more often based on empirical evidence from generation to generation. Thus, additional information regarding variations of other herbal galactagogues is required to support exclusive breastfeeding coverage.

Kota Mataram merupakan wilayah kabupaten terendah untuk capaian ASI eksklusif di Nusa Tenggara Barat pada tahun 2022. Salah satu penyebab kegagalan pemberian ASI eksklusif adalah kurangnya produksi ASI. Galaktogog adalah substansi yang dapat meningkatkan produksi ASI. Alternatif yang relatif aman digunakan dalam menangani produksi ASI yang kurang lancar adalah dengan mengkonsumsi herbal yang mengandung galaktogog. Kebudayaan dan pengetahuan perilaku setempat tentang galaktogog herbal, penting ditelusuri guna mendapatkan gambaran wawasan jenis galaktogog serta khasiatnya sekaligus efek samping dan kajian saintifik agar dapat digunakan sebagai referensi bagi ibu menyusui. Tujuan penelitian ini adalah untuk memperoleh gambaran tingkat pengetahuan dan perilaku ibu menyusui tentang konsumsi galaktogog Desain penelitian yaitu mixed method research. Pendekatan yang dilakukan yaitu dengan pendekatan cross-sectional untuk survei pengetahuan dan perilaku konsumsi galaktogog herbal yang dilakukan dengan membagikan kuesioner kepada responden dengan kriteria inklusi yaitu ibu menyusui dengan anak 0 s.d 6 bulan, yang berdomisili di Kota Mataram dan terdaftar di Puskesmas yang ada di Kota Mataram sebanyak 124 orang. Pengetahuan responden tentang galaktogog herbal tergolong pada kategori kurang (62,1 %) sedangkan perilaku konsumsi galaktogog herbal tergolong pada kategori baik (37,1%). Dari hal tersebut dapat disimpulkan bahwa umumnya masyarakat Kota Mataram lebih sering mengkonsumsi galaktogog herbal berdasarkan bukti empiris secara turun temurun,

sehingga perlu diberikan suatu tambahan informasi terkait variasi galaktogog herbal lainnya untuk mendukung capaian ASI eksklusif.

Introduction

Exclusive breastfeeding is given to babies until six months of age without any additional food or drinks. The American Academy of Pediatrics recommends the minimum duration of exclusive breastfeeding for six months, but optimally it should continue for at least one year. Mataram city occupied the region with the lowest coverage of exclusive breastfeeding in West Nusa Tenggara in 2022 by only 51.5%. In fact, NTB was the province in Indonesia with the highest exclusive breastfeeding coverage. This data could motivate the achievement of national coverage in accordance with Government Regulation number 33 of 2012 article 6, which states that the target for exclusive breastfeeding in Indonesia is 100%. Exclusive breastfeeding is a human right for both mother and baby. Arrangements regarding exclusive breastfeeding are regulated in Article 128 of Law no. 36 of 2009 concerning Health which states that every baby has the right to receive exclusive breast milk from birth for 6 (six) months, except for medical indications. Exclusive breastfeeding has benefits for both mother and baby. Inhibiting factors in EIB (Early Initiation of Breastfeeding) and exclusive breastfeeding include lack of knowledge about breastfeeding, lack of support from the environment, lack of media information, women who return to work, and psychological conditions of women and women who experience preterm birth. Non-pharmacological interventions are the first line of solutions to overcome the side effects feared by babies who consume breast milk, one of which is by consuming herbal galactagogues.

Galactagogues are synthetic compounds, foods or drinks, and herbs that function to trigger breast milk production (Antonia, Jennifer, & Lea, 2012). Galactagogues can exist in the form of foods such as banana flowers, lemon basil, Thai basil, chicken meat, fish meat, pumpkin, and others; drugs such as metoclopramide, domperidone, chlorpromazine, and sulpiride, as well as plants that have medicinal properties (Buntuchai, Pavadhgul, Kittipichai, & Satheannoppakao, 2017). Pharmacological medications such as sulpiride, metoclopramide, domperidone, and thyrotropin-releasing hormone are known to have side effects in long-term consumption. High doses of domperidone increase the risk of arrhythmias and heart attacks, while long-term use of metoclopramide will trigger maternal depression and tardive dyskinesia (Philip, 2013; Haase, Taylor, Mauldin, Johnson, & Wagner, 2015). Domperidone is effective as a prokinetic and antiemetic and has also been shown to increase milk production in breastfeeding women. Domperidone is the first choice compared to other synthetic galactagogues since there are no side effects on the baby, and side effects rarely occur in breastfeeding women. However, domperidone is still a concern for the FDA, especially for side effects related to heart rhythm disturbances. Side effects include stomach cramps, dry mouth, headaches, and additional side effects include constipation and depression (William & Carrey, 2022).

The public prefers herbal galactagogues because they have fewer side effects than chemical galactagogues. Galactagogue herbal tea was known for its efficacy in increasing breast milk production and newborn weight (Lopresti, 2017; Turkyılmaz et al., 2011). Jamu Uyup–Uyup, for example, is an

example of a galactagogue with Indonesian local wisdom, especially among Javanese people (Hayati et al., 2019). Examples of other herbal galactagogues include banana flower, fennel, fenugreek, ginger, moringa, palm dates, *katuk*, shatavari, silymarin, caraway, thyme, and mixtures that are usually made into teas and soups (Rizqi, Surtisminah, & Adyani, 2022). Chamomile was also found to increase milk production (Khorshidian et al., 2019; Silva, Dias, Costa, & da Garca Campos, 2018). Among these herbal galactagogues, some have been scientifically studied by determining daily doses for consumption. Particularly in NTB, there are several local plant names known for their efficacy as galactagogues, such as *turi* (*Sesbania grandiflora*), moringa (*Moringa oleifera*), spinach (*Amaranthus* sp.), and *katuk* (*Sauropus androgynus*). Aside from having potential benefits and efficacy, herbal galactagogues also have certain disadvantages regarding certain side effects (Foong et al., 2020; Shawahna, Qiblawi, & Ghanayem, 2018). Research on herbal galactagogues, both in terms of knowledge and behavior among breastfeeding women who consume herbal galactagogues, is urgently needed as an effort to support government programs to achieve exclusive breastfeeding target so as to create golden generation. This study aims to describe knowledge and behavior of breastfeeding women regarding the consumption of galactagogues.

Methods

The study applied mixed-method design with a cross-sectional approach to conduct a survey on knowledge and behavior regarding consumption of herbal galactagogues. Data were collected by distributing questionnaires to respondents. Samples were selected by using purposive sampling technique based on inclusion criteria, namely breastfeeding women with children aged 0 to 6 months, domiciled in the city of Mataram and registered at the Community Health Center in the city of Mataram, as many as 124 0f 180 people. Survey personnel were trained midwives with experience in research data collection. The characteristics of the respondents include age, education, and occupation. The survey instrument involved demographic data, use of herbal galactagogue, sources of herbal galactagogue, and opinions about the side effects or benefits. The knowledge and behavior questionnaire applied here had been validated and tested for reliability by the International Board-Certified Lactation Consultant® (Othman, Che Lamin, & Othman, 2014). According to Arikunto (2013), the results of knowledge assessment can be grouped into three categories, namely: Good (76%-100%), Moderate (56%-75%), and Poor (≤55%). As for the results of behavior assessment can be grouped into three categories, Very Good (81%-100%), Good (61%-80%), Moderate (41%-60%), Poor (21%-40%), and Very Poor (0-20%).

Results

Table 1. Distribution of Respondents'Characteristics

Characteristic	Variable	n	%
Age	a. < 20 years	4	3.23
	b. 20-35 years	104	83.87
	c. >35 years	16	12.90
	Total	**124**	**100**
Education Level	a. Elementary School	14	11.29

Characteristic	Variable	n	%
	b. High School	75	60.48
	c. Higher Education	35	28.22
	Total	**124**	**100**
Employment Status	a. Employed	31	25
	b. Unemployed	93	75
	Total	**124**	**100**
Breastfeeding Experience	a. < 6 months	96	77.41
	b. ≥ 6 months	28	22.59
	Total	**124**	**100**
Herbal Galactagogue Information	a. Yes	101	81.45
	b. No	23	18.54
	Total	**124**	**100**

Data presented in Table 1 indicated that most of respondents were in the healthy reproductive age range of 20-35 years (83.87%). Another characteristic that supported the respondents' knowledge, in this case, was the level of education. Most of respondents had a secondary educational background (60.48%). Regarding the employment status, most of respondents (75%) were unemployed (housewives). Furthermore, regarding breastfeeding experience, most of respondents breastfed for less than six months (77.41%). In such a situation, mothers should have time to find the processing of herbal galactagogue sources that can facilitate breastfeeding so as to encourage optimal exclusive breastfeeding. Moreover, it is supported by the condition that most of the respondents had exposure to information about herbal galactagogues (breastfeeding boosters) from generation to generation (81.45%).

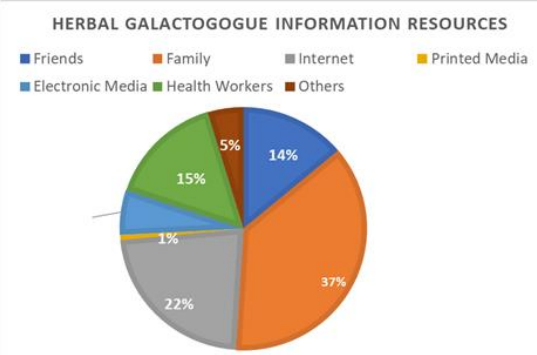

Figure 1. Sources of Information regarding Herbal Galactagogues

Based on the figure above, most of respondents obtained information about herbal galactagogues from relatives/family (37%), more that from friend, electronic media, health workers, internet, printed media and other (<37%)

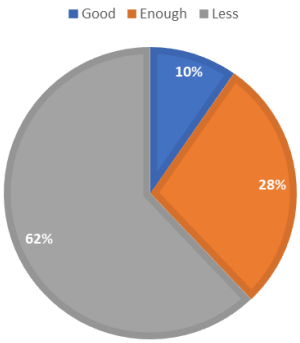

Figure 2. Distribution of Knowledge on Herbal Galactagogues

Based on Figure 2, it was shown that 62% of respondents had poor level of knowledge about Herbal Galactagogues, 28% of respondents had moderate level and 10% of respondents had good level of knowledge.

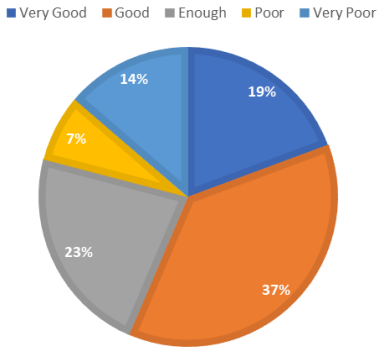

Figure 3. Distribution of Herbal Galactogogue Consumption Behavior

Based on Figure 3, it was shown that 37% of respondents had good behavior in consuming herbal galactagogues in their daily life.

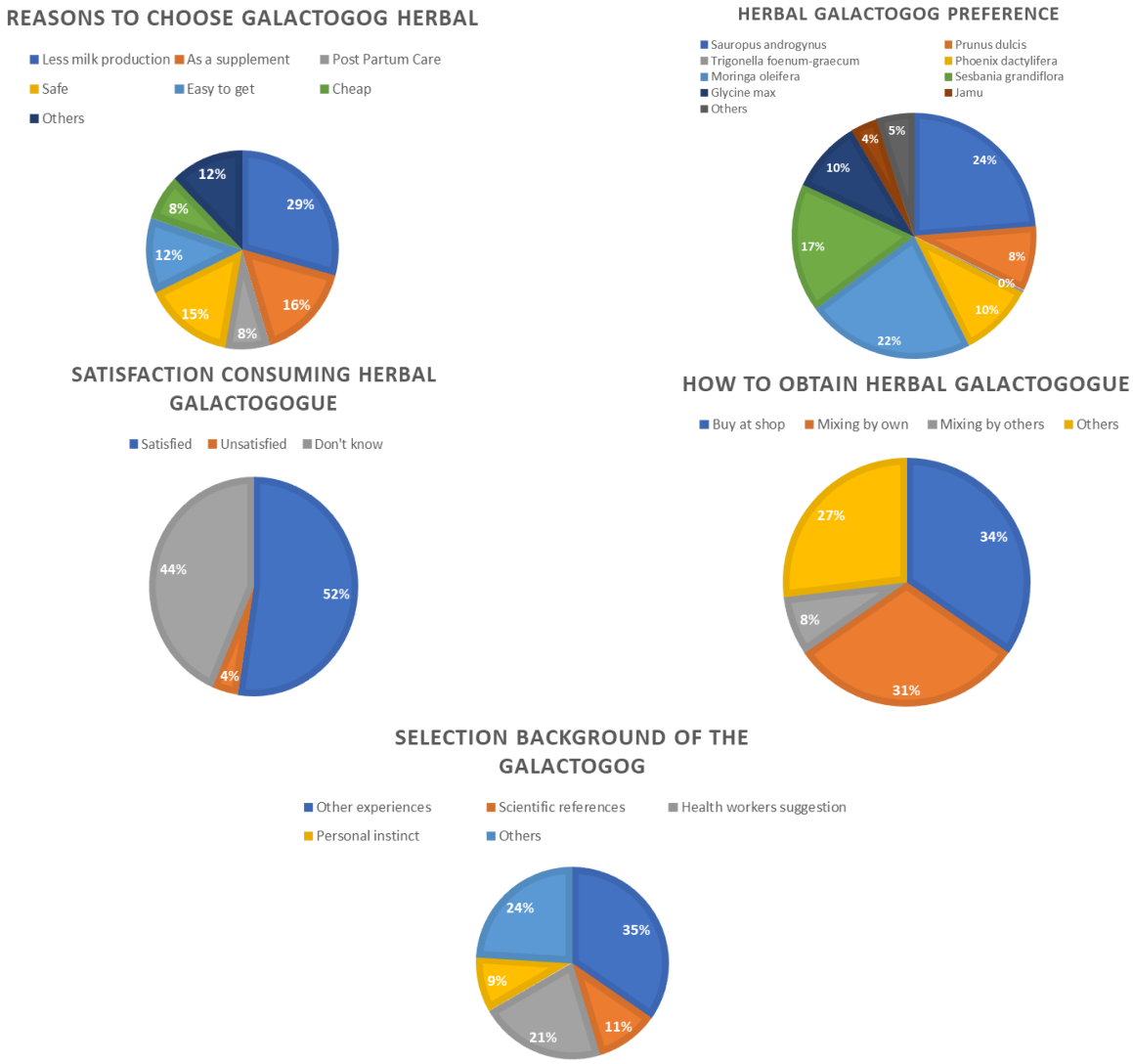

Figure 4. Respondents' Responses to the Consumption of Herbal Galactagogues

Based on Figure 4, it was revealed that most of respondents consume herbal galactagogues due to the lack of breastmilk production (29%). Herbal galactagogues often consumed by most of

respondents was *katuk* leaves (*Sauropus androgynus*) (24%). Furthermore, most of respondents bought such galactagogues at shop (34%) to obtain the herbal galactagogues and satisfied about the effect (52%). Most of respondents chose to consume herbal galactagogues due to motivation from other people's experiences (35%) compared from personal instinct, scientific references, healthcare worker recommendation and other.

Discussion

Data presented in table 1 showed that most of respondents were in the healthy reproductive age range of 20-35 years (83.87%), and were still included in the ideal marriage age category for women according to Marriage Law No. 1 of 1974. Age maturity was an essential factor that influenced a person's level of knowledge (Khairiah, 2017). Another characteristic that supported the respondents' knowledge, in this case, was the level of education. Most of respondents had a secondary educational background (60.48%). Consumption of herbal galactagogues was closely related to exclusive breastfeeding. By consuming herbal galactagogues, the exclusive breastfeeding target can be optimally achieved immediately. According to Assriyah, Indriasari, Hidayanti, Thaha, & Jafar (2020), factors that affected exclusive breastfeeding were maternal characteristics (knowledge, education, occupation, age, parity, and ethnicity), infant characteristics (birth weight and condition of infant health), environment (faith, family support, housing and socio-economic) and health services (pregnancy checkup, lactation counseling, birthplaces, birth attendants and policies). Regarding the employment status, most of respondents (75%) were unemployed (housewives). Furthermore, regarding breastfeeding experience, most of respondents breastfed for less than six months (77.41%) so that the respondents might have poor level of knowledge and behavior regarding the consumption of herbal galactagogues. In such a situation, mothers should have time to find the processing of herbal galactagogue sources that can facilitate breastfeeding so that exclusive breastfeeding becomes optimal. Moreover, it is supported by the condition that most of the respondents have received exposure to information about herbal galactagogues (breastfeeding boosters) from generation to generation (81.45%), most of which were obtained from relatives/family (37%). Knowledge or information obtained from relatives/family was generally hereditary knowledge passed down from generation to generation, so this becomes empirical evidence of the safety of herbal galactagogue consumption.

Based on the respondent's acknowledgment, it was found that the reason for the respondent to consume the herbal galactagogue was due to the lack of breast milk production. It meant that respondents knew that they must consume herbal galactagogue to facilitate optimal exclusive breastfeeding for their babies. However, from a holistic midwifery therapy perspective, there were several things to do to strive for good breast milk production non-pharmacologically, namely relaxation techniques (yoga, hypno-breastfeeding, aromatherapy, acupressure, spa therapy, acupuncture, oxytocin massage) as well as pharmacologically, namely consumption of synthetic galactagogue and other chemical drugs (Yuliani, Larasati, Setiwandari, & Nurvitriana, 2022).

Based on Figure 4, the herbal galactagogues often consumed by most of respondents was *katuk* leaves (*Sauropus androgynus*) by 24%. There was an effect of giving *katuk* leaves decoction on the production of breast milk among postpartum women (Dolang, Wattimena, Kiriwenno, Cahyawati, & Sillehu, 2021). The increase in the amount of breast milk production experienced by respondents was due to the contents of *katuk* leaves including protein, potassium, phosphorus, iron, and vitamins A, B1, and vitamin C. 100 grams of *katuk* leaves contain 239 mg of vitamin C, much more sufficient to meet the needs of breastfeeding women. *Katuk* leaves were suitable for facilitating breast milk production since they contain sesquiterpene acid. Besides being rich in protein, fat, and minerals, *katuk* leaves are enriched with vitamins A, B, and C, then tannins, saponins, and papaverine alkaloids. The content of alkaloids and sterols in *katuk* leaves can increase breast milk production since it can increase glucose metabolism for lactose synthesis that further increase breast milk production. The Australian Dietary Guidelines recommend consuming green vegetables, one of which is *katuk*, as a healthy food for breastfeeding women (Pattinson et al., 2021). In this study, it was found that respondents were satisfied with the efficacy of the herbal galactagogues.

Based on the data, it was found that, in general, most of respondents chose to consume herbal galactagogues due to motivation from other people's experiences compared from personal instinct, scientific references, healthcare worker recommendation and other. Someone believes more in empirical evidence than suggestions or references from other sources. Generally, the way to obtain these herbal galactagogues is by buying them in stores because these respondents wanted to consume them practically.

It was found that most of respondents had a poor knowledge on herbal galactagogues (fig.1). Most of respondents needed to learn more about the types of plants that are effective as herbal galactagogues, such as *katuk* leaves which are usually consumed by making soup. Even though many other plants have the potential as herbal galactagogues, including ginger, almond, date palm juice, fenugreek, cumin, fennel, moringa, *turi*, soybean, caraway, and many other types of plants, herbal galactagogues can be made into soup, tea, sweets, milk, juice or pills or capsules. Daily food or vegetables consumed can be classified as herbal galactagogues. Respondents also processed these herbal ingredients into food or drinks consumed for nutrition and medicine. The perception that breastfeeding was only applied for non-working women was still attached to the respondents' mindset. They generally stopped breastfeeding if there was poor breast milk production, they were sick or should back to work, or they did not have time. Exclusive breastfeeding can be pursued with the consumption of galactagogues to facilitate breast milk production. In addition, expressed breast milk can still be given when they were sick or working, and there was no time for breastfeeding since infants have the right to get breast milk.

In their daily life, most of respondents had good behavior in consuming herbal galactagogues (fig. 3). Respondents were included in the very good category if they performed routine exclusive breastfeeding, made every effort to provide exclusive breastfeeding to their babies, had heard information about herbal galactagogues and consumed herbal galactagogues regularly supported by other therapeutic efforts to support exclusive breastfeeding. Furthermore, respondents had investigated

the side effects of consuming herbal galactagogues before consuming them. In support of exclusive breastfeeding, respondents had made other efforts besides consuming herbal galactagogue, such as doing oxytocin massage or compressing the breasts even though they did not consumed galactagogue regularly (only when there was a decrease in breast milk volume). The moderate category indicated that respondents performed routine exclusive breastfeeding, made every effort to be able to provide exclusive breastfeeding to their babies, had heard information about herbal galactagogues, and applied knowledge about herbal galactagogues to achieve exclusive breastfeeding target. Such respondents did not search for the side effects of consuming herbal galactagogue before consuming it. In support of exclusive breastfeeding, the respondents also did not make other efforts besides consuming herbal galactagogues, such as doing oxytocin massage or compressing the breasts, even though they did not consumed galactagogue regularly (only when there was a decrease in breast milk volume). Furthermore, the poor category indicated that respondents performed routine exclusive breastfeeding, made every effort to be able to provide exclusive breastfeeding to their babies, had heard information about herbal galactagogues, and did not apply knowledge about herbal galactagogues to achieve exclusive breastfeeding target. Such respondents did not search for the side effects of consuming herbal galactagogue before consuming it. In support of exclusive breastfeeding, the respondents also did not make other efforts besides consuming herbal galactagogues, such as doing oxytocin massage or compressing the breasts, even though they did not consumed galactagogue regularly (only when there was a decrease in breast milk volume). The last of very poor category indicated that respondents did not perform routine exclusive breastfeeding, did not make every effort to be able to provide exclusive breastfeeding to their babies, had never heard of any information about herbal galactagogue, and did not apply knowledge about herbal galactagogue in order to achieve exclusive breastfeeding target. Such respondents did not search for the side effects of consuming herbal galactagogue before consuming it. In support of exclusive breastfeeding, the respondents also did not make other efforts besides consuming herbal galactagogues, such as doing oxytocin massage or compressing the breasts, even though they did not consumed galactagogue regularly (only when there was a decrease in breast milk volume).

Conclusions

Breastfeeding women in the city of Mataram still had insufficient knowledge about herbal galactagogues even though behavior regarding the consumption of herbal galactagogues in their daily lives was relatively good. The people of Mataram City consumed more herbal galactagogues based on empirical evidence from generation to generation. Therefore, it is necessary to provide additional information regarding variations of other herbal galactagogues to support the target achievement of exclusive breastfeeding. By knowing alternative methods of increasing breast milk production, it is expected that breastfeeding women and healthcare workers can have a better knowledge which further lead to successful campaign regarding exclusive breastfeeding. In addition, successful campaign regarding exclusive breastfeeding may provide a new perspective that there are no obstacles to

breastfeeding, except for people living with AIDS. The selection of appropriate herbal galactagogues is an effort that can be a good alternative in supporting the exclusive breastfeeding target.

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Knowledge on Health Protocols and Anxiety of Midwives in Delivery Assistance During the Covid-19 Pandemic

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A B S T R A C T

In 2021, 6 out of 45 midwives at the PMC Hospital of Jombang were exposed to COVID-19. This study aims to identify the correlation between knowledge on health protocols and anxiety in delivery assistance during the Covid-19 pandemic. This was an analytical-correlational study with cross sectional approach. The independent variable was the knowledge on health protocols and the dependent variable was the level of anxiety in delivery assistance during the Covid-19 pandemic. The study was conducted at PMC Hospital of Jombang on June 28, 2021 – July 12, 2021. The study population involved all midwives at PMC Hospital of Jombang as many as 45 respondents, with a sample size of 32 respondents, who were selected using a simple random sampling technique. Data collection tool used a questionnaire. Data were analyzed using the Chi Square test. The study findings showed that 68.8% of respondents had a good level of knowledge on health protocols. On the other hand, 87.6% of respondents had mild level of anxiety in delivery assistance during the mild COVID-19 pandemic. There was a correlation between the level of knowledge on health protocols and anxiety of midwives in delivery assistance during the Covid-19 pandemic. It was obtained a p-value of (0.000) <α= (0.05), r=0.596 which indicated moderate correlation level. The higher the level of knowledge, the lower the level of anxiety. Midwives are surely able to overcome anxiety they experience through good knowledge which can encourage good spirits, especially while providing obstetric support services to patients during the Covid-19 pandemic.

Pada tahun 2021, jumlah bidan yang terpapar COVID-19 adalah 6 dari 45 bidan di RS PMC Jombang. Tujuan penelitian ini adalah untuk mengidentifikasi hubungan antara pengetahuan kebidanan tentang protokol kesehatan dengan kecemasan pada bidan di masa pandemi Covid-19. Pendekatan cross sectional untuk desain penelitian analitik. Variabel bebas adalah pengetahuan bidan tentang protokol kesehatan dan variabel terikat adalah tingkat kecemasan bidan dalam kebidanan selama pandemi Covid-19. Penelitian dilaksanakan di RS PMC Jombang pada tanggal 28 Juni 2021 – 12 Juli 2021. Populasi yaitu seluruh bidan di RS PMC Jombang sebanyak 45 responden, dengan jumlah sampel 32 responden. Teknik sampling acak sederhana. Kuesioner berfungsi sebagai alat penelitian. Analisis data uji Chi Square. Hasilnya tingkat pengetahuan protokol kesehatan baik 68,8%. Tingkat kecemasan dalam pertolongan persalinan di masa pandemi ringan COVID-19 sebesar 87,5%. Ada hubungan antara tingkat pengetahuan tentang protokol kesehatan dengan kecemasan bidan dalam pertolongan persalinan di masa pandemi covid-19. P-value (0.000) <α = (0.05), r=0.596 tingkat hubungan sedang. Semakin tinggi tingkat pengetahuan, semakin rendah rasa takutnya. Bidan dapat mengatasi ketakutan yang dialaminya. Pengetahuan bidan yang baik tentang pandemi covid-19 dapat mempengaruhi semangat yang baik untuk tidak merasa takut, terutama dalam memberikan pelayanan penunjang kebidanan kepada pasien di masa pandemi covid-19.

Introduction

Extreme acute respiration syndrome coronavirus 2 (SARS-CoV-2) has resulted in an infectious disease called COVID-19. In delivery assistance services during the period January - March 2021, there were 6 out of 45 midwives at the Pelengkap Medical Center Hospital of Jombang who had been exposed to Covid-19. The high number of healthcare workers exposed to Covid-19 has led to suboptimal services provided to patients (Handayani et al., 2020; Iswandi & Roro, 2020; Putri, 2020).

Challenges faced while giving delivery assistance during the Covid-19 pandemic are related to: (1) Knowledge of women and families regarding Covid-19 and health services for women and newborns during a pandemic; (2) Not all midwives are isolated from MCH guidelines, family planning, and reproductive health services depend on the seriousness of the symptoms of Covid-19; (3) Within the time of the Covid-19 pandemic, health facilities must be fully prepared to provide PPE; (4) The security of delivery assistance specialists and patients must be ensured to avoid infection; (5) Access to primary health facilities or midwifery services in the Covid-19 pandemic era were changed to constrain administrations; (6) The high number of Covid-19 patients treated in referral health centers had an effect on the management of maternal and neonatal referral administrations (Simbolon et al., 2021; Sandhi & Dewi, 2021; Nurjasmi, 2020).

Based on data as of February 10, 2021, the maternal mortality rate worldwide was 21.89%, in the United States it was 2.3%. On the other hand, in Indonesia as of February 10, 2021 there were 1,183,555 confirmed cases of Covid-19 with a total death of 32,167 people and Indonesia became the 19th country with the highest confirmed cases of Covid-19 and East Java ranked the 15th in Indonesia with the highest confirmed cases of Covid-19 (Wahyuni, 2021; Coronavirus, 2021). Overall, the mortality rate due to Covid-19 was still lower when compared to extraordinary events by other sorts of coronavirus, namely Severe Acute Respiratory Syndrome-coronavirus (SARS-CoV) and Middle East Respiratory Syndrome-Coronavirus (MERS-CoV) by 10 % and 40%, respectively (Aziz, 2020). Based on data derived from the PONEK Department of the Pelengkap Medical Center Hospital of Jombang for the period June-December 2020, there were 6 spontaneous deliveries and 16 Caesarean Section deliveries with suspected and confirmed Covid-19. In January 2021, there were 3 spontaneous deliveries and 13 Caesarean Section deliveries with suspected and confirmed Covid-19. In February 2021, there were 7 spontaneous deliveries and 9 Caesarean Section deliveries with suspected and confirmed Covid-19. Furthermore, in March 2021, there were 1 spontaneous delivery and 5 Caesarean Section deliveries with suspected and confirmed Covid-19.

Maternity care administrations are a form of proficient benefit which is a necessarily portion of the wellbeing care framework provided by delivery assistance specialists in autonomous, collaborative, and/or referral manners. Midwifery practice is an activity of providing services performed by midwives in the form of midwifery care (Erawati et al., 2019; Telaumbanua, 2019). In the era of the Covid-19 pandemic, all individuals are required to carry out activities in accordance certain guidelines to ensure patient wellbeing. Delivery assistants as the agents are profoundly prioritized for clear information so as not to influence their mindsets (Noer et al., 202 C.E.; Priyanto & Ag, 2020).

Protocols or guidelines for delivery assistance performed by midwives during the Covid-19 pandemic include: (1) If there are signs of labor, patient should immediately contact the midwife by telephone/WA, the midwife will screen for risk factors including the risk of Covid-19 (Lailiyah & Daniyanti, 2021). If there are risk factors for Covid-19, the patient should be immediately referred to the Hospital according to standards; (2) Thorough assessment should be performed according to standards with Covid-19 precautions, the midwife can coordinate with the head of RT/RW/Village regarding the status of the women whether she is in independent isolation (People Under Monitoring (ODP)/Patients Under Supervision (PDP)/ positive for Covid-19); (3) Delivery assistance should be performed according to Normal Delivery Guideline standards, IUD insertion should use level 2 PPE and there should be implementation of protocols for preventing transmission of Covid-19 to women who are not PDP, patients and a maximum of 1 companion should wear a mask; (4) If unable to provide delivery assistance, midwife should immediately collaborate and refer to hospital according to standards; (5) Family/companion and all teams in charge should implement the Covid-19 transmission prevention protocol; (6) There should be planned delivery referrals for women with risks including ODP/PDP/ Covid-positive by standards (Nurjasmi, 2020).

Based on previous study conducted by Mawarni at Laburan Baji Hospital, it was found that 68.6% of respondents had good knowledge about how to provide delivery assistance to patients within the period of the Covid-19 pandemic. Such condition was influenced by difference in the level of knowledge of each person. Based on previous study, it was found that there was a significant correlation between knowledge and the anxiety level of respondents in providing assistance to patients during the Covid-19 pandemic (Khotimah, 2020; Marwani, 2021; Noor & Haryati, 2021).

Based on previous study conducted by Khotimah at Dharmasraya Regency, West Sumatra, it was found that 65.7% of respondents had a moderate level of anxiety in delivery assistance during the Covid-19 pandemic. It was influenced by the different emotional levels of each individual. Anxiety are divided into 3 types, namely: objective anxiety, neurosis anxiety, and moral anxiety. Signs and side effects of patients with anxiety are uneasiness, stress, awful sentiments, fear of possess contemplations and crabbiness, tense, eager and startle. In addition, patients said that they were perplexed of being alone or in a crowd and numerous individuals, had poor sleep quality, restless and disturbed by nightmares (Khotimah, 2020).

A good level of knowledge can overcome anxiety in delivery assistance during the period of the Covid-19 pandemic. Without anxiety, oneself can receive all forms of knowledge or information more openly (Khotimah, 2020; Nurkidam et al., 2020; Angraini et al., 2020). Covid-19 pandemic is a new thing for all healthcare workers, so there is a need for readiness among healthcare workers, especially midwives that is supported by a good level of knowledge. Anxiety can disrupt the midwife's role in providing health services to patients, which leads to suboptimal services. Therefore, good knowledge regarding proper delivery assistance is required during the Covid-19 pandemic to continuously provide optimal service.

Endeavors ought to be made to decrease the number of staffs in the delivery room and the unit ought to create a specific arrangement indicating the staff to be involved in treatment. Only one person (spouse/family member) can accompany the patient. The companion must be informed of the risk of transmission and they must wear appropriate PPE while accompanying the patient. The Infection Prevention and Control strategy to prevent or break the chain of transmission of Covid-19 infection in health care facilities can be achieved by applying the principles of preventing and controlling the risk of transmission of Covid-19, among others: Application of Isolation Precautions, coughing or sneezing etiquette, environmental hygiene, linen management, waste management, disinfection of patient care equipment by type, safe injecting practices, precautions based on transmission (droplet, contact and airborne) (Handayani et al., 2020; Wicaksono, 2020; Kostania et al., 2021; Ertiana et al., 2020).

Actualization of wellbeing conventions to anticipate the transmission of Covid-19 should be maintained so as to prevent transmission among healthcare workers and patients. Isolation of healthcare workers with appropriate PPE and management of isolation of babies from mothers with suspected/contact/confirmed Covid-19 are the main focus in the management of delivery assistance. In addition, there should be a distance of at least 1 meter (when there is no medical action required).

Methods

This study aims to identify the correlation between knowledge on health protocols and anxiety in delivery assistance during the Covid-19 pandemic. This was an analytical-correlational study with a cross sectional approach. The independent variable was the knowledge on health protocols and the dependent variable was the level of anxiety in delivery assistance during the Covid-19 pandemic.

There were 45 midwives working at the Pelengkap Medical Center Hospital of Jombang, with a sample size of 32 respondents, who were selected using a simple random sampling technique. The study samples from 45 respondents were randomly selected using excel to get 32 people as the study respondents based on the inclusion criteria (midwives who worked at the Pelengkap Medical Center Hospital of Jombang, performed delivery assistance, were willing to be examined and filled out informed consent, had been working >6 months) and the exclusion criteria (midwives who were not actively working at the Pelengkap Medical Center Hospital of Jombang and/or did not assist deliveries at the Pelengkap Medical Center Hospital of Jombang). Data were collected by distributing questionnaires (primary data) regarding knowledge on health protocols and anxiety of midwives using the DASS. The researcher asked several questions to respondents to fill out the questionnaire. The researcher rechecked the answers for each questions so that nothing was left behind and in accordance with the instructions for filling. Data were analyzed using the Chi Square correlation test.

Results

Table 1. Level of knowledge on health protocols at Pelengkap Medical Center Hospital of Jombang

Level of Knowledge	F	%
Poor < 56	1	3.1
Moderate 56-75	9	28.1
Good 76-100	22	68.8
Total	32	100

Most of respondents (68.8%), namely 22 out of a total of 32 respondents had a good level of knowledge on health protocols.

Table 2. Level of anxiety in delivery assistance during the Covid-19 pandemic at Pelengkap Medical Center Hospital of Jombang

Level of Anxiety	F	%
Normal	2	6.25
Mild	28	87.5
Moderate	2	6.25
Rather Severe	0	0
Severe	0	0
Total	32	100

Of a total sample of 32 respondents, 2 respondents (6.25%) had normal anxiety, 28 respondents (87.5%) had mild anxiety, and 2 respondents (6.25%) had moderate anxiety. There are several factors of the level of anxiety, one of which is negative experience in viewing the development of Covid-19 pandemic. In addition, anxiety can be due to non-conducive environment.

Table 3. Cross-tabulation on the correlation between midwives' knowledge of health protocols and anxiety in childbirth assistance during the Covid-19 pandemic at the Pelengkap Medical Center Hospital of Jombang.

Level of Knowledge	Level of Anxiety						Total	
	Normal		Mild		Moderate			
	N	%	N	%	N	%	N	%
Poor	0	0	0	0	1	3.1	1	3.1
Moderate	0	0	8	88.9	1	11.1	9	28.1
Good	2	9.1	20	90.9	0	0	22	68.8
Total	2	6.2	28	87.5	2	6.2	32	100
p-value= 0.000; r= 0.596								

Based on the table above, 22 of 32 respondents (68.8%), had a good level of knowledge. Meanwhile regarding the anxiety level, most of respondents had a mild level of anxiety as many as 28 respondents (87.5%).

Discussion

Based on table 1 it was known that 22 respondents (68.8%) had a good level of knowledge, 9 respondents (28.1%) had moderate level of knowledge, and 1 respondent (3.1%) had a poor level of knowledge. Information could be a learning material that can be influenced by inside variables such as inspiration and outside variables within the frame of accessible data and socio-cultural conditions. Thus, good knowledge can also alleviate one's anxiety. Therefore, it is necessary for someone to increase knowledge both from online media and socialization provided by the government through designated healthcare workers.

Based on previous study, it was found that 68.6% of respondents had good level of knowledge on how to provide delivery assistance to patients during the Covid-19 pandemic era. This level of knowledge can be caused because each respondent has a different level of absorption or understanding of knowledge about health protocols for each individual. In this study, most of the respondents had a good level of knowledge, and this is a pretty good thing. There are 6 levels of knowledge, namely: (1) Know, (2) comprehension, (3) application, (4) Analysis, (5) Synthesis, and (6) Evaluation. The factors that influence knowledge include internal factors (education, work, age), environmental and socio-

cultural factors. The category of knowledge can be interpreted on a qualitative scale, namely: good, moderate, and poor (Khotimah, 2020; Nurlailiyah et al., 2015).

According to previous study, it was found that 37 of 45 respondents (82.2%) had moderate level of knowledge, 8 respondents (17.8%) had good level of knowledge and 81.1% had good behavior. The results of the chi square test obtained a p-value of 0.037<α (0.05) (OR=7.143), which meant that there was a correlation between knowledge and behavior of pregnant women in performing antenatal care during the Covid-19 pandemic. Women with good level of knowledge had the opportunity of 7.143 times to perform antenatal care/ANC compared to those with moderate level of knowledge during the Covid-19 pandemic (Ariestanti et al., 2020).

An increase in the level of knowledge among healthcare workers regarding the use of PPE during delivery and the concept of delivery during the Covid-19 pandemic should be achieved. Such increase can be achieved through training about proper use of PPE and the concept of delivery assistance during the Covid-19 pandemic.

Based on table 2, it was known that of a total sample of 32 respondents, 2 respondents (6.25%) had normal anxiety, 28 respondents (87.5%) had mild anxiety, and 2 respondents (6.25%) had moderate anxiety. There are several factors of the level of anxiety, one of which is negative experience in viewing the development of Covid-19 pandemic. In addition, anxiety can be due to non-conducive environment.

Based on previous study conducted by Khotimah at Dharmasraya Regency, West Sumatra, it was found that 65.7% of respondents had a moderate level of anxiety in delivery assistance during the Covid-19 pandemic. It was influenced by the different emotional levels of each individual. Anxiety are divided into 3 types, namely: objective anxiety, neurosis anxiety, and moral anxiety. Signs and side effects of patients with anxiety are uneasiness, stress, awful sentiments, fear of possess contemplations and crabbiness, tense, eager and startle. In addition, patients said that they were perplexed of being alone or in a crowd and numerous individuals, had poor sleep quality, restless and disturbed by nightmares (Vikawati et al., 2021; Ningrum, 2021).

According to a previous study on anxiety among healthcare workers, it was found that the majority of respondents did not experience anxiety by 70%. 17.5% of respondents experienced mild anxiety, and most of respondents experienced moderate level of anxiety. The anxiety among healthcare workers is due to the lack of PPE use because some are very limited in number. However, the availability of PPE at the health care facility as the study site was good and complete. Such condition can affect the feelings of being more protected among healthcare workers, so that the majority of respondents experienced mild anxiety. Furthermore, anxiety will cause low visits. Everyone has anxiety within themselves, including healthcare workers, even though they understand the importance of maintaining health. However, when they have to face a pandemic that threatens their lives, it is possible that they will feel tense and anxious since it can threat him as well as his family and the surrounding environment. (Hakiki et al., 2022; Musyarofah et al., 2021; Syahruni, 2020).

During the Covid-19 pandemic, healthcare workers were at the forefront of dealing with such cases. Therefore, there is a lot of challenges faced by healthcare workers, wherein many healthcare

workers died because of Covid-19. The availability of PPE, personal and family history of comorbidities, work background are some of the factors that might cause symptoms of anxiety. Other variables that cause anxiety involve negative encounters within the past and nonsensical contemplations. The level of anxiety is divided into 4, namely: normal, mild, moderate, severe and very severe. In an effort to reduce the level of anxiety, defense, projection, identification, relationships, repression, substitution are required.

Based on the results of the statistical test using the Chi Square correlation, it was obtained shows a p-value of (0.000) <α = (0.05). Thus, Ho was rejected and H1 was accepted, which indicated that there was a correlation between the level of knowledge on health protocols and the level of anxiety of midwives in delivery assistance during the Covid-19 pandemic with a moderate significant level of r=0.596. The correlation was positive, meaning that the higher the level of information, the lower the level of anxiety. Such finding is in line with the previous study which obtained a p-Value of 0.000 <0.05, which implied a correlation between information and the respondent's level of anxiety in providing assistance to patients during the Covid-19 pandemic. A good level of knowledge can overcome anxiety in delivery assistance during the period of the Covid-19 pandemic. Without anxiety, oneself can receive all forms of knowledge or information more openly (Khotimah, 2020). Covid-19 pandemic is a new thing for all healthcare workers, so there is a need for readiness among healthcare workers, especially midwives that need to be supported by a good level of knowledge. When patients come to health facilities, this is a special moment for healthcare workers, especially midwives, who are required to always be on standby if a patient has a maternal emergency. So that while providing delivery assistance during the Covid-19 pandemic, midwives must remain in a healthy condition to be able to provide optimal services.

Based on the results of the study, it can be seen that 10 respondents aged 12 respondents aged 31-36 years 24-30 years had a good level of knowledge. Furthermore, by education, 20 respondents with DIII of Midwifery education and 2 respondents with DIV of Midwifery education had a good level of knowledge. It can also be seen that 5 respondents who had ever been exposed to Covid-19 and 17 respondents who had never been exposed to Covid-19 had a good level of knowledge. In addition, by the years of service, 2 respondents with a working period of 1-3 years and 20 respondents with a working period of >3 years had a good level of knowledge. Based on table 3 regarding correlation between the level of knowledge about health protocols and the level of anxiety in delivery assistance during the Covid-19 pandemic, it was found that 22 respondents (68.8%) had a good level of knowledge, wherein 20 of them (90.9%) had a mild level of anxiety. Furthermore, 9 respondents (28.1%) had a moderate level of knowledge, wherein 8 of them (88.9%) had a mild level of anxiety as many as. In addition, 1 respondent (3.1%) had a poor level of knowledge.

Based on Table 2, it can be seen that there are 20 respondents with a mild level of anxiety. This is already a good thing, considering that respondents had ever received information about Covid-19 and the application of knowledge on health protocols was quite optimal. Based on table 1, it can be seen that there was 1 respondent with poor level of knowledge and a moderate level of anxiety. This is in

accordance with previous study which showed that moderate levels of anxiety made an individual focused on things that were imperative to the prohibition of other perspectives so that an individual entered a state of particular consideration but could still do certain things in a more coordinated way.

Based on the results of the statistical test using the Chi Square correlation, it was obtained shows a p-value of (0.000) <α = (0.05). Thus, Ho was rejected and H1 was accepted, which indicated that there was a correlation between the level of knowledge on health protocols and the level of anxiety of midwives in delivery assistance during the Covid-19 pandemic with a moderate significant level of r=0.596 (Khotimah, 2020).

Based on theory, it can be concluded that a good level of knowledge can overcome anxiety in delivery assistance during the period of the Covid-19 pandemic. Without anxiety, oneself can receive all forms of knowledge or information more openly (Khotimah, 2020). Covid-19 pandemic is a new thing for all healthcare workers, so there is a need for readiness among healthcare workers, especially midwives that need to be supported by a good level of knowledge. When patients come to health facilities, this is a special moment for healthcare workers, especially midwives, who are required to always be on standby if a patient has a maternal emergency. So that while providing delivery assistance during the Covid-19 pandemic, midwives must remain in a healthy condition to be able to provide optimal services.

Conclusions

Some of respondents at Pelengkap Medical Center Hospital of Jombang, namely 22 respondents (68.8%) had a good level of knowledge. Furthermore, some of respondents at Pelengkap Medical Center Hospital of Jombang, namely 28 respondents (87.5%) had a mild level of anxiety. It can be concluded that there was a relationship between the information provided and the level of anxiety among delivery assistants during the Covid-19 pandemic. Based on the results of the statistical test using the Chi Square correlation, it was obtained shows a p-value of (0.000) <α = (0.05). Thus, Ho was rejected and H1 was accepted, which indicated that there was a relationship between the level of knowledge on health protocols and the level of anxiety of midwives in delivery assistance during the Covid-19 pandemic with a moderate significant level of r=0.596.

Healthcare workers, especially midwives, should continue to improve compliance with health protocols that have been implemented in accordance with Covid-19 guidelines. Furthermore, they should provide education on health protocols to other colleagues who do not understand certain health protocols. Future researchers are recommended to involve more samples and optimize the time and materials needed in a study so as to gain better information regarding the relationship between knowledge on health protocols and anxiety in delivery assistance during the Covid-19 pandemic at other health facilities.

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Effect of Upright Position on Pain and Duration of the Active Phase of the First Stage of Labor among Women in Labor in the Work Area of Tasikmalaya TPMB

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A B S T R A C T

Prolonged labor is one of causes of maternal and infant death. Several causes of prolonged labor are inefficient uterine contractions, presentation or position of the fetus, inadequate pelvic bones or abnormalities of maternal soft tissues, which result in failure to progress in labor and an increase in the incidence of Caesarean section delivery. The upright position will encourage stronger and more efficient contractions, wherein gravity will occur to keep the baby's head pressed towards the lower uterine segment so as to help cervical dilation and shorten the duration of labor. Upright positions in the first stage of labor include walking, standing, sitting, half-sitting, kneeling, and crawling positions. This study aims to determine the effect of upright position compared to supine position on the level of pain and the duration of the active phase of the first stage of labor among primigravida women in labor. This was a quasi-experimental study with a post-test only design. There were 100 study samples who were assigned in the control group and the intervention group, consisting of 50 respondents, respectively. The study was conducted at the Tasikmalaya TPMB. Data collection was carried out for approximately 6 months on March-August 2022. The results showed that primigravida women in the active phase of the first stage of labor with upright position had a shorter duration of labor compared to those with supine position. Independent t test results obtained a p value = 0.000 ($p< 0.05$). Such finding indicated a statistically significant difference. Based on the results of the data analysis, it can be concluded that there was a significant difference in the duration of the active phase of the first stage of labor between upright position and supine position among women in labor in the Work Area of Tasikmalaya TPMB.

Persalinan lama merupakan penyebab penting dari kematian ibu dan bayi, penyebabnya salah satunya yaitu kontraksi uterus yang tidak efisien, presentasi atau posisi janin, tulang panggul yang tidak adekuat atau kelainan jaringan lunak ibu, yang mengakibatkan persalinan menjadi tidak maju dan meningkatkan kejadian persalinan dengan operasi caesar. Posisi upright *atau tegak akan membuat kontraksi lebih kuat dan lebih efisien, dimana akan terjadi gravitasi untuk menjaga kepala bayi ditekan ke arah perut bawah sehingga membantu dilatasi serviks dan waktu persalinan menjadi lebih cepat. Posisi* upright *dalam kala I persalinan meliputi berjalan, berdiri, duduk, setengah duduk, berlutut, dan posisi merangkak. Tujuan penelitian ini yaitu mengetahui pengaruh posisi upright dibanding berbaring terhadap rasa nyeri dan lamanya kala I fase aktif persalinan pada ibu primigravida. Metode penelitian menggunakan metode quasi experimen dengan rancangan* posttest only, *sampel yang diperoleh yaiu 50 responden untuk kelompok kontrol dan kelompok intervensi. Penelitian dilakukan di TPMB Kota Tasikmalaya, pengambilan data dilakukan selama kurang lebih 6 bulan Maret-Agustus 2022. Hasil uji t Independent didapatkan nilai p = 0,000 (p< 0,05). Hal ini secara statistik menunjukkan bahwa terdapat perbedaan yang signifikan posisi* upright *terhadap lama persalinan kala I fase aktif pada ibu inpartu primigravida.*

Introduction

Labor is a physiological or normal process which involves various physical and psychological factors. However, in certain cases, there are problems that require the intervention of healthcare workers, one of which is in the case of prolonged labor (Iravani et al., 2015; Lawrence et al., 2013).

Prolonged labor is one of causes of maternal and infant death. Several causes of prolonged labor are inefficient uterine contractions, presentation or position of the fetus, inadequate pelvic bones or abnormalities of maternal soft tissues, which result in failure to progress in labor and an increase in the incidence of Caesarean section delivery (Lawrence et al., 2013; *WHO*, 2014).

The World Health Organization (WHO) states that prolonged labor is a direct cause of complications during labor, accounting for 69,000 deaths, or 2.8% of all maternal deaths worldwide. Furthermore, data shows that one-third of women experience dystocia during the first time of delivery. The prevalence of dystocia is 4.8% to 21% of vaginal deliveries and 60% of Caesarean section delivery (Deliktas & Kukulu, 2018; Lawrence et al., 2013; Ondeck, 2019). Indonesian Health Demography Survey in 2017 reported that prolonged labor occupied the highest rate of complication by 40%. In West Java it was reported that prolonged labor contributed as much as 0.5% of the causes of maternal death (Annisya, 2020).

Certain impacts of prolonged labor for women include intrauterine infection, postpartum hemorrhage, postpartum infection, trauma and injury to the birth canal. Meanwhile, in infants it can cause fetal distress due to lack of oxygen, intracranial hemorrhage, sepsis, cerebral palsy and seizure disorders. Thus, it is important to perform appropriate management for women in labor so as to prevent prolonged labor (Dwiarini et al., 2022). It is very important to ensure that labor and delivery have a normal progress.

Normal delivery is directly proportional to the proper and effective delivery management carried out by the delivery assistance so as to prevent prolonged labor or dystocia and the negative impact on the baby. Discomfort that is often faced in the active phase of the first stage of labor is the presence of labor pain. Women in developing countries including Indonesia with limited health facilities usually lie in bed during the delivery. In addition, supine position also facilitates examination of uterine contractions, examination of the fetus and vaginal examination performed by healthcare workers (Dwiarini et al., 2022; Gross et al., 2015).

Supine position puts a load on the uterus so that the blood vessels are hypotensive and the abdomen and contractions will be less strong. In contrast with upright position which can trigger effective contraction which further support cervical dilation and the descent of the fetal head into the pelvic floor (Ibrahim et al., 2020). Therefore, so upright position is recommended by WHO during the active phase of the first stage of labor.

The upright position will encourage stronger and more efficient contractions, wherein gravity will occur to keep the baby's head pressed towards the lower uterine segment so as to help cervical dilation and shorten the duration of labor (Deliktas & Kukulu, 2018). During the first stage of labor, upright positions include walking, standing, sitting, half-sitting, kneeling, and crawling (Emam & Al-Zahrani, 2018).

A study conducted by Emam & Al-Zahrani (2018) revealed a statistically significant difference between the upright and supine groups regarding an increase in the duration, frequency, and intensity of uterine contractions, cervical dilatation, and fetal head descent, as well as a decrease in the interval between the two groups/five respondents were in the upright group. On the other hand, there was a less progress in the supine group. Moreover, respondents in the supine group expressed higher pain scores, had longer duration of the 1st, 2nd, 3rd stage of labor than those in the upright group. Furthermore, there was a statistically significant difference in APGAR scores of the neonates during both the first and the fifth minute. In addition, women in the upright group had higher satisfaction scores compared to those in the supine group ($p < .001$).

This study aims to determine the effect of upright position compared to supine position on the level of pain and the duration of the active phase of the first stage of labor among primigravida women in labor.

Methods

This was a quantitative study with a quasi-experiment method and a post-test only design. The study samples were selected based on inclusion criteria. The study was conducted at Tasikmalaya City TPMB. Data collection was carried out for approximately 6 months on March-August 2022. The instruments used in this study were (1) G-form was used as a filling sheet for collecting characteristics of respondents (2) a partograph was used to record the progress of labor and (3) a Numeric Rating Scale was used for pain assessment. Instruments (2) and (3) are already standard forms that have been tested for validity and reliability.

The population in this study involved primigravida women in the active phase of the first stage in labor as many as 100 women spread across 10 TPMB work areas in Tasikmalaya city. The study samples were selected using total sampling technique based on inclusion criteria, namely primigravida, term pregnancy, single pregnancy, Occiput presentation and cephalic position, active phase of labor, no complications and willing to be respondents. Respondents were assigned into 2 groups, namely 50 respondents in the intervention group (upright position) and 50 respondents in the control group (supine position).

Respondents in the intervention group performed upright positions such as standing, sitting, crawling, squatting or walking for 20-25 minutes every 1 hour starting from the cervical dilation of 4 cm to 10 cm in the active phase and those in the control group performed the supine positions such as supine, half supine, and tilting on the bed. Data obtained were analyzed using SPSS statistics version 21. Data were analysed descriptively and analytically using using chi square and paired t tests.

Results

Selection of the study sample obtained 100 primigravida women labor who met the inclusion criteria. The samples were assigned in the control group and the intervention group, consisting of 50 respondents, respectively.

Table 1. Frequency Distribution of the Characteristics of Study Samples (n=50 for each group)

Variable	Upright (n=50)		Supine (n=50)		X^2	p
	F	%	F	%		
Age (years)						
20-< 25	3	6	2	4		
25-<30	24	48	28	56	0.93	0.86
30-35	23	46	20	30		
Mean	4.08=26.18		25.24=4.09			
Level of Education						
Elementary School	4	8	3	6		
Junior High School	20	40	18	36	2.04	0.56
Senior High School	24	48	27	54		
University	2	4	2	4		
Employment Status						
Unemployed	9	18	6	12	0.77	0.40
Employed	41	82	44	88		
Gestational age						
37-38 Weeks	27	54	30	60	1.96	0.16
39-41 Weeks	23	46	20	40		

Table 1 presents the characteristics of study samples. It was revealed that most of respondents in the upright group (48%) and the supine group (56%) in the age group of 25-30 years with a mean age of 26.18 ± 4.08 and 25.24 ±4.09, respectively. Regarding the level of education category, most of respondents in the upright group (48%) and the supine group (54%) were graduated from Senior High School. Furthermore, most of respondents in both groups were unemployed or housewives. There were no statistically significant differences between the two groups related to their age, level of education, employment status, and gestational age.

Table 2. Differences in the Level of Pain in the Active Phase of the First Stage of Labor between the Upright Group and the Supine Group

Pain Scale	Group				X^2	p
	Upright		Supine			
	F	%	F	%		
Before						
Mild pain	0	0	0	0	0.77	0.5
Moderate pain	5	10	7	14		
Severe pain	45	90	43	86		
After						
Mild pain	46	92	33	66	14.46	0.001
Moderate pain	4	8	13	26		
Severe pain	0	0	4	8		

Table 2 revealed women in the upright group had a higher reduction in the pain scale compared to the supine group among primigravida women in labor. Independent t test obtained a p value = 0.001 ($p< 0.05$). Such finding showed that there was a statistically significant difference in the level of pain during the active phase of the first stage of labor between upright position and supine position.

Table 3. Comparison of Duration of the Active Phase of the First Stage of Labor between the Upright and Supine Groups

Duration	Group				X^2	p
	Upright		Supine			
	F	%	F	%		
2-< 4 hours	4	8	0	0		
4-< 6 hours	46	92	33	66	23.14	0.000
>6 hours	0	0	17	34		

Table 3 showed that primigravida women in the active phase of the first stage of labor with upright position had a shorter duration of labor compared to those with supine position. Independent t test results obtained a p value = 0.000 ($p< 0.05$). Such finding showed that there was a statistically significant difference in the duration of the active phase of the first stage of labor between upright position and supine position.

Discussion

This study aims to determine the effect of upright position compared to supine position on the level of pain and the duration of the active phase of the first stage of labor among primigravida women in labor. Based on the results of previous study and literature review, it was known that the upright position upright position which can trigger effective contraction which further support cervical dilation and the descent of the fetal head into the pelvic floor. Therefore, labor pain can also be relieved.

The active phase of the first stage of labor is a very important phase during the progress of labor. Therefore, every delivery assistant must be able to control and supervise the delivery process so as not to enter into pathological condition. To avoid harmful conditions of the mother and fetus during the delivery process, especially during the active phase of the first stage of labor, healthcare workers must be able to assess the labor progress with reference to the descent of the fetal head and the progress of the cervical dilation which is strongly influenced by perfect contractions. Labor contractions are unique considering that there are physiological muscle contractions that cause pain (WHO, 2013).

The aftereffects of this study are upheld by the assessment of Marzouk & Eid (2020) which states that labor process physiologically causes pain during the first stage. Such pain is mainly caused by an increase in uterine contractions duration and frequency, cervical dilation progress, fetal head pressure, and amniotic fluid on the lower segment of the uterus that causes uterine ischemia. Labor pain can be experienced more severely when accompanied by anxiety and fear. Pain is generally described as a subjective feeling of distress and discomfort. In addition, the feeling of pain at the time of uterine contractions is also very subjective. It not only depends on the intensity of uterine contractions but also depends on the mental state of the women in labor (Deliktas & Kukulu, 2018)

Previous studies showed that ambulation with a specific rhythm could increase tolerance for labor pain during uterine contractions. Furthermore, changes in position could reduce pain, facilitate blood flow to the uterus, uterine contractions, fetal decline, and personal control (Marwiyah & Pusporini, 2017; Emam & Al-Zahrani, 2018). Upright position is expected to reduce labor pain since it is known that position in labor can affect the duration of labor process. Women who move a lot and are allowed to choose the desired position will experience a short labor process and reduced pain. Therefore, women

in labor should be given the freedom to choose the position that feels most comfortable, unless there is a contra indication (Ibrahim et al., 2020; Lawrence et al., 2013).

Supine position is preferred by women in labor because it can provide comfort to the mother, increase contractions, the flow of oxygen circulation in the blood which will be transferred to the fetus. In addition, supine position makes it easier for healthcare workers to conduct examinations (Ibrahim et al., 2020; Kumud et al., 2013). On the other hand, upright position helps cervical dilatation and the descent of the fetal head into the pelvic floor due to the force of gravity and effective contractions that pushes the baby down. As a result, the incidence of dystocia may be decreased and encourage the shorter progress of labor (Makvandi et al., 2019; Lawrence et al., 2013).

Conclusion

Based on the results of the data analysis, it can be concluded that there was a significant difference in the duration of the active phase of the first stage of labor between upright position and supine position among women in labor in the Work Area of Tasikmalaya TPMB.

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Prenatal Yoga to Relief Back Pain among Pregnant Women

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A B S T R A C T

Back pain is a kind of discomfort that frequently develops during pregnancy, especially among pregnant women in late pregnancy or those with a history of back pain in previous pregnancy. Prenatal yoga can relief back pain discomfort since it promotes good posture and stretch the spine's central nervous system. This study aims to determine the effect of yoga exercise on back pain among pregnant women in the third trimester.This was a pre-experimental study with one group pretest posttest design. The current study involved 30 pregnant women in the third trimester, who were assigned into the treatment group (participated in prenatal yoga exercise) and the control group (did not participate in prenatal yoga exercise), consisting of 15 samples, respectively. The study instrument applied here was Faces Pain Scale-Revised a questionnaire (FPS-R). It was found that there was a significant effect of prenatal yoga exercise to relief back pain among pregnant women in the third trimester ($p<0.05$). It can be concluded that prenatal yoga was beneficial for relieving back pain among pregnant women in the third trimester. Thus, prenatal yoga technique is considered an appropriate method for supproting the succes of pregnancy.

Keluhan berupa nyeri di bagian punggung merupakan ketidaknyamanan yang sering terjadi pada kehamilan, terutama dengan usia kehamilan lanjut atau ibu hamil yang sebelumnya mempunyai nyeri di bagian punggung pada kehamilan sebelumnya. Keluhan di bagian punggung saat hamil tersebut bisa dikurangi dengan melakukan yoga prenatal yang bermanfaat untuk: menjaga bentuk postur tegak tubuh, meregangkan sistem saraf pusat di tulang belakang. Penelitian ini bertujuan untuk mengukur pengaruh prenatal yoga pada nyeri punggung yang di rasakan ibu hamil di trimester akhir. Penelitian ini menggunakan jenis pre-experimental dengan one group pretest posttest design. Penelitian ini melibatkan 30 ibu hamil trisemester III yang terbagi menjadi 15 kontrol (tanpa pemberian senam prenatal yoga) dan 15 yang mendapatkan prenatal yoga. Instrumen penelitian menggunakan kuesioner Faces Pain Scale-Revised (FPS-R). Hasil dan kesimpulan signifikan menurunkan nyeri punggung pada ibu hamil trimester III ($p<0,05$). Disimpulkan bahwa prenatal yoga pada ibu hamil trimester III bermanfaat untuk mengurangi nyeri punggung. Dengan demikian, teknik prenatal yoga dapat menjadi metode untuk mendukung keberhasilan dan keselamatan ibu hamil.

Introduction

Pregnancy is a natural condition for every woman. Changes that occur during pregnancy can be divided into three categories, namely physical, emotional, and physiological changes, which are due to changes in hormones during pregnancy (Jiang, Q., Wu, Z., Zhou, L., Dunlop, J. & Chen, 2015). Back pain is one of many discomforts that pregnant women experience, especially in the third trimester of pregnancy. Lumbosacral discomfort is a common symptom of back pain during pregnancy. Since a change in body posture and the center of gravity induce back pain, this discomfort typically gets worse

with age (Avin et al., 2018). Pregnant women may experience pain in the back due to improper posture since it causes the body to stretch and become more exhausted, especially in the spine area (P & R. Urip Purwono, 2018).

Back pain during pregnancy usually occurs due to bone stretching in the waist area as the gestational age increases. Frequent back pain occurs because the maternal point and balance change from its original state (Cunningham, F.G., Mac Donald, P.C., Gant, N.F., Leveno, K.J., Gilstrap, L.C. & G.D., 2010). If such back discomfort is not appropriately managed, it can have a negative impact on the quality of life of pregnant women. According to the course of gestational age, this condition may become a persistent injury or continually manifests in a worse condition (Suryani & Ina Handayani, 2018).

35 to 60 percent of pregnant women have back pain. It was found that 47–60% of pregnant women reported having back discomfort between the first and fifth months of their pregnancies (Putri & Kusumastusti, 2021). Furthermore, more than 50% of pregnant women in the United States, Canada, Iceland, Turkey, Korea, and Israel also reported having back pain (Suryani & Ina Handayani, 2018). The prevalence of spine pain during pregnancy in Indonesia was only obtained from the study conducted by Suharto 2001 which explained that 47% of 180 pregnant women involved experienced spine pain. In addition, it was estimated that 65% of all pregnant women in East Java Province had back pain (Hidayati, 2019).

Back pain is typically treated with pharmaceutical therapy, oral therapy, and non-pharmacological therapy. Yoga exercise is a type of non-pharmacological pain management (Hidayati, 2019). In fact, yoga is a practical way to unify the body, mind, and spirit. Such exercise has the benefit of helping to develop firm body posture, flexible and strong muscles, and support the spine's central nerve system (Bonura, 2014; Rahayu & A, 2021). In a previous stud, pregnant women who practiced yoga throughout the third trimester of their pregnancy might experience fewer complaints, including back discomfort (Suryani & Ina Handayani, 2018). The initial goal of the study was to determine whether yoga has any impact in reducing back pain in expectant mothers.

Methods

The research design used in this study is quasy experimental with a pre-experimental approach (one group-pre-test-posttest design. The current study involved 30 pregnant women in the third trimester, who were assigned into the treatment group (participated in prenatal yoga exercise) and the control group (did not participate in prenatal yoga exercise), consisting of 15 samples, respectively. The population in this study was pregnant women in the third trimester who participated in prenatal yoga before the birth process. The samples were selected using purposive sampling technique based on inclusion criteria namely pregnant women in the third trimester, had back pain complaint, had performed prenatal yoga at least 4 times during pregnancy. Yoga during pregnancy was implemented to pregnant women at least 4 times assisted by a certified yoga instructor. Yoga movements performed included: warming up, janu sirsana, child pose, ardha uttanasana, virabhadrasana, happy baby pose. The study

instrument applied Faces Pain Scale-Revised a questionnaire (FPS-R) to assess the pain level. FPS-R is a pain intensity assessment tool that is considered the most effective and efficient to be applied in health researches and clinical settings. FPS-R is generally presented in the form of a horizontal line with the score range of 0-10. Each score indicates the intensity of pain experienced by the patient. The Mann-Whitney statistical test was applied to determine the difference, and Spearman's rho test was applied to determine the pre and post correlation. Statistical tests were conducted using IBM **SPSS** Version 23 Software. This study was approved by the ethics committee of the Faculty of Health Sciences, Jenderal Achmad Yani University, Yogyakarta, Indonesia (Number Skep/0253/KEPK/IX/2021).

Results

Table 1. Characteristics of Respondents

Characteristic		Treatment group		Control group	
		Frequency	**Percentage**	**Frequency**	**Percentage**
Age					
	<20	0	0	2	13%
	20-35	13	87%	12	80%
	≥36	2	13%	1	2%
Total		**15**	**100**	**15**	**100**
Gravida					
	Primigravida	10	67%	11	73%
	Multigravida	5	33%	4	27%
	Grand-multigravida	0	0	0	0
Total		**15**	**100**	**15**	**100**

Based on table 1, most of respondents in the treatment group aged 20-35 years 13 (87%), and were primigravida 10 (67%). On the other hand, most of respondents in the control group aged 20-35 years, 13 (87%), and were primigravida 11 (73%).

Table 2. Cross-Tabulation Results Regarding the Effect of Prenatal Yoga on Back Pain Level

Sample	Characterization			
	No Pain (%)	**Mild pain (%)**	**Moderate pain (%)**	**Severe pain (%)**
Control group	1 (3.3%)	4 (13.3%)	9 (6%)	1 (3.3%)
Treatment group	5 (16.6%)	10 (33.3%)	0 (0%)	0 (0%)

Table 2 presents the cross-tabulation results regarding the level of pain among all respondents. 9 respondents who did not participate in prenatal yoga (6%) experienced moderate back pain. In contrast, 10 respondents (33.3%) who participated in prenatal yoga only experienced mild back pain.

Table 3. Analysis Results through Non-Parametric Statistical Test of Mann-Whitney

Sample	P value
Control group (N=15) Treatment group (N=15)	0.000 < 0.05

The Mann Whitney test obtained a significance value of $p = 0.000 < 0.05$, which indicated a significant difference in pain level between pregnant women who participated in yoga and those who did not participate in yoga. Thus, yoga exercise was very effective for relieving the level of back pain.

Discussion

Discomfort in lumbar region is referred to as back pain. Back pain is a frequent condition, especially among pregnant women with preexisting medical history. Another possibility is that it can be experienced for the first time in pregnancy. Back pain is very common discomfort in pregnancy, thus

described as one of the minor discomforts in pregnancy. Pregnant women will experience an increase in weight distribution to the breast and stomach which leads to changes in spinal curvature and lower back pain (Crow et al., 2015).

A non-pharmacological therapy that can relief back pain is yoga. Yoga is a practical approach to balancing the mind, body, and soul. Its benefits include improving posture, developing flexible and strong muscles, and supporting the spine's central nervous system. Prenatal yoga as a form of preparation for labor can be very helpful since it teaches a woman to recognize cues from her body and maximize her potential natural (Curtis, K., Weinrib, A. & Katz, 2012).

Based on the study findings presented in table 3 and table 4 through non-parametric statistical tests of Spearman Rank and Mann Whitney, the study hypothesis can be accepted. The more often pregnant women participate in prenatal yoga, the more the pain level will decrease. Such finding is in line with a study conducted by Curtis, K., Weinrib, A. & Katz (2012) which found that the pain scores were considerably lower in the experimental group (practiced yoga) than in the control group (did not practice yoga) in deliveries, despite the fact that pain scores grew with time in both groups. Additionally, the study finding demonstrated that women who participated in the yoga intervention experienced considerably shorter labor duration overall and throughout the initial stage of labor (Rahayu & Ariningtyas, 2022).

The pain of labor can be intense, followed by tension, anxiety, and fear which can worsen the maternal condition. Many women wish to experience normal labor without any medication, or invasive methods such as an epidural. Currently, women turn to complementary therapies to help reduce pain intensity during delivery and improve the delivery experience (Smith C, Hancock H, Black-Mortimer J, 2007). As women look for alternatives to conventional medical techniques such as analgesics and anesthetics, which can be invasive and occasionally have negative side effects for both mother and baby, relaxation therapy for pain management in labor is also growing in popularity (Smith C, Hancock H, Black-Mortimer J, 2007).

Yoga is a relaxation technique to relief. Yoga relaxation method might encourage the body to release substances that block pain namely endorphins and encephalitis. Yoga can relief pain by relaxing endometrial muscles that experience spasm and ischemia due to increased prostaglandins resulting in vasodilation of blood vessels (Eni et al., 2018). This causes an increase in blood flow to area that experience spasm and ischemia so as to relief pain experienced. In addition, yoga can change the pattern of acceptance of pain to a more calming phase so that the body can gradually recover from its main discomfort of pain (Rafika, 2018). Routine movements in yoga can also change blood circulation to become smooth so as to ease pain. Yoga can be practiced for 30 minutes, two to three times each week (Tharida & Yoga, 2022).

The results of the study conducted by Balnthakodi et al (2018) revealed that yoga was a medicine for mind and body that was non-invasive, easy to learn, and effective in relief back pain. Yoga is also beneficial at easing the uncomfortable side effects of pregnancy and childbirth. Yoga is practiced by about 35% of women between the ages of 28 and 33, making it crucial to assess how it affects labor and

delivery outcomes as well as how well women manage stress, anxiety, pain, and discomfort (C Bolanthakodi, C Raghunandan, A Saili, S Mondal, 2018).

Conclusions

It can be concluded that prenatal yoga was beneficial for relieving back pain among pregnant women in the third trimester. Thus, prenatal yoga technique is considered an appropriate method for supproting the succes of pregnancy. Furthermore, there was a difference in pain levels between pregnant women who performed yoga exercise and those who did not perform yoga exercise. Yoga was very effective for relieving the pain level of pregnant women. Health workers can use simple yoga movements to relief back pain among pregnant women such as janu sirsana, child pose, ardha uttanasana, virabhadrasana, and happy baby yoga pose.

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Antibacterial Activity Test of Mahkota Dewa Fruit (*Phaleria macrocarpa*) Extract against *Escherichia Coli* Bacteria

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A B S T R A C T

Exposure *to Escherichia coli* during pregnancy may cause serious problems such as anemia, premature birth and an increased risk of inflammation of the lining of the brain in the fetus. Mahkota Dewa (*Phaleria macrocarpa*) is a medicinal plant that is widely known and used to treat allergies and chronic diseases. One of the compounds contained in Mahkota Dewa is flavonoids. There is certain mechanism of action of flavonoids in inhibiting bacteria namely by damaging the cytoplasmic cell wall in bacteria. This study aims to analyze the antibacterial properties of various flavonoid concentrations of Mahkota Dewa fruit (*Phaleria macrocarpa*) extract against *Escherichia coli* bacteria through a laboratory experimental study design by testing the antimicrobial potency of the well method, namely 10%, 20%, 40%, 60%, 80% and 100%. Statistical analysis using One-Way Anova Test showed a significant difference between changes in the concentration of flavonoids in Mahkota Dewa fruit extract and the inhibition zones towards the growth of *Escherichia coli* bacteria ($p<0.05$). Pearson correlation test showed a very strong relationship with a positive direction ($r=0.874$) which indicated that the higher the concentration of flavonoids in Mahkota dewa fruit extract, the stronger the antimicrobial effect. Based on the study findings, it can be concluded that the flavonoid extract in Mahkota Dewa fruit extract had an antimicrobial potential against *Escherichia Coli* in vitro.

Paparan Escherichia coli pada ibu hamil menimbulkan masalah serius seperti anemia, ISK, kelahiran prematur dan meningkatnya resiko radang selaput otak pada janin. Penyakit alergi ataupun penyakit kronis banyak memanfaatkan buah Mahkota dewa (Phaleria macrocarpa) sebagai alternatif pengobatannya. Senyawa yang terkandung pada buah mahkota dewa salah satunya yaitu flavonoid. Pada pemberian flavonoid dinding sel sitoplasma akan rusak, hal tersebut yang akan menghambat perkembangan bakteri. Tujuan penelitian ini mendapatkan analisis antibakteri ekstrak buah mahkota dewa atas Escherichia coli menggunakan desain penelitian eksperimental laboratorium dengan uji potensi antimikroba metode sumuran. Uji efektivitas flavonoid ekstrak mahkota dewa dari beberapa konsentrasi yaitu 10%, 20 %,40%, 60%, 80% dan 100%. Perbedaan signifikan ditunjukkan dalam analisa statistik memakai One-Way Anova Test pada perubahan konsentrasi flavonoid ekstrak buah Mahkota Dewa terhadap zona inhibisi perkembangan bakteri Escherichia coli ($p<0,05$). Jalinan yang sangat kuat melalui arah positif di tunjukkan pada uji korelasi Pearson ($r=0,874$) maka dari itu diartikan semakin bertambahnya konsentrasi flavonoid ekstrak buah Mahkota Dewa, maka semakin kuat efek antibakterinya. Berlandaskan penelitian ini, secara in vitro dapat diartikan bahwa flavonoid ekstrak buah Mahkota Dewa mempunyai potensi sebagai antimikroba atas bakteri Escherichia coli.

Introduction

There are several types of diseases that can arise due to bacterial infections, one of which is *Escherichia coli* bacteria. *Escherichia coli* or abbreviated *E. coli* is able to infect the human body and tend to exist around everyday life that we should be aware of (Denamur et al., 2020). *Escherichia coli* belongs to *Enterobacteriaceae* family, which is involved in the group of coliform bacteria. *Enterobacteriaceae* are called enteric bacteria because they are able to survive in the digestive tract (Bruyand et al., 2019) (Vihta et al., 2018). *Escherichia coli* is a natural flora in the human body in the form of rods that are Gram-negative, facultative anaerobes, and do not grow spores (Lindsey et al., 2017). Some of it bacterial strains are pathogenic and some provide benefits to humans, for example preventing the colonization of pathogenic bacteria in the human digestive system (Cassini et al., 2019). Pathogenic *Escherichia coli* was first identified in 1935 as a cause of diarrhea (Downing et al., 2017).

Escherichia coli is divided into 3 major groups based on its interaction with the host (human), namely non-pathogenic (commensal), intestinal pathogenic (in the digestive tract), and extra-intestinal pathogenic (outside the digestive tract). This classification is mainly based on the detection of DNA regions that are often associated with certain pathotypes. Sanitation and hygiene indicator bacteria is another name for bacteria *Escherichia coli*, which means that the low level of sanitation applied indicates the presence of these bacteria in a food product (Touchon et al., 2020). Most of *Escherichia coli* bacteria live in the intestines of humans and animals so that the presence of these bacteria is often associated with a state of contamination originating from feces. Therefore, processes that come into contact with feces indicate the presence of these bacteria. In many developing countries, regarding food safety, many cases of enteric disease in children are caused by *Escherichia coli*. The main etiologic cause of diarrhea is *Escherichia coli* (Adibi et al., 2017). Symptoms of haemolytic uraemic syndrome (HUS) occur in some cases which can lead to kidney failure. The infection can even result in death (Eko and Zahriani, 2016).

Antibiotics are the main treatment in the management of infectious diseases. Antibiotics are microorganisms that produce chemical compounds mainly by fungi or synthetic products that can inhibit or kill the development of bacteria and other organisms (Adelberg, Jawetz, & Melnick., 2017). There is no need to doubt the benefits of antibiotics. However, the use of most antibiotics can result germ resistance to antibiotics, thereby reducing the benefits of antibiotics (Halden, 2016). Bacterial resistance, especially multi-drug resistance, is a problem that is difficult to overcome. This problem results from the use of antibiotics with inaccurate doses, types, and duration of administration, causing germs to become resistant (Yusuf et al., 2020).

Many people switch to using plants for alternative medicine due to the increase in the incidence of antibiotic resistance. Many researchers are interested to study herbal ingredients as alternative treatment for infections caused by microorganisms (Rahmawati and Retnaningrum, 2022). One of herbal ingredients that can be used to treat infectious diseases is Mahkota dewa (*Phaleria macrocarpa*) (Okzelia et al., 2017; Cordita, 2019). Mahkota dewa fruit lives in the tropical region. The compounds in Mahkota Dewa fruit are alkaloids, flavonoids, tannins, polyphenols and saponins. Alkaloids,

terpenoids, polyphenols, flavonoids and resin compounds are the group of compounds in plants that are related to anti-cancer and antioxidant activities (Retnaningrum et al., 2021). Saponins, alkaloids, flavonoids and tannins are the active compounds in Mahkota dewa that are effective as antibacterial (Addo et al., 2018; Rahmawati et al., 2020).

A previous study on the effect of young Mahkota dewa extract showed an inhibitory effect on Klebsiella pneumonia with a concentration of 1–25% (Adelberg, Jawetz, & Melnick., 2017). In the current study, the authors are intended to know whether the extract of the Mahkota dewa fruit also showed an inhibitory effect on the growth of diarrheal infection-causing bacteria. This study aims to analyze the antibacterial properties of various flavonoid concentrations of Mahkota Dewa fruit (*Phaleria macrocarpa*) extract against *Escherichia coli* bacteria.

Methods

This study applied an in vitro laboratory experimental research design. This study aims to analyze the antibacterial properties of various flavonoid concentrations of Mahkota Dewa fruit (*Phaleria macrocarpa*) extract against *Escherichia coli* bacteria. Extraction of mahkota dewa fruit applied maceration method using 96% ethanol solvent. The result was further partitioned to get flavonoid extract in paste form using n-hexane and ethanol solvents. Then it was put in an oven to get pure flavonoid extract. Effectiveness test towards flavonoid in mahkota dewa extract was performed for several concentrations, namely 10%, 20%, 40%, 60%, 80% and 100%. In addition, the negative control treatment was also given in the form of 0% extract and positive control in the form of BAP media. *Escherichia Coli* bacterial isolates used in this study came from the Microbiology Laboratory of the Faculty of Medicine, Brawijaya University. The anti-microbial test was conducted through the well diffusion method to determine the diameter of the inhibition zones of the flavonoid compounds in Mahkota dewa fruit extract. Data were collected from the measurement of the inhibition zones around the well holes using a caliper in millimeters (mm). Data analysis applied One-Way Anova Test and Pearson correlation.

Results

The diameter of inhibition zones of flavonoids in the Mahkota dewa extract against *Escherichia coli* bateria were obtained from the results of the well diffusion test using a ruler. The results of the calculation of the effect of each concentration of flavonoids in Mahkota Dewa fruit extract on the inhibition zones created around the well holes can be seen in Table 1. Meanwhile, the graph regarding the effect of the concentration of flavonoids on the diameter of the inhibition zones formed is presented in Figure 1.

Table 1. Diameter of Inhibition Zones against *Escherichia coli*

Concentration	Repetition of diameter of the inhibition zone				Rate (mm)	Description
	I	II	III	IV		
Control -	0	0	0	0	0	Weak
Control +	0	0	0	0	0	Weak
10%	5	5	4	6	5	Medium

Concentration	Repetition of diameter of the inhibition zone				Rate (mm)	Description
	I	II	III	IV		
20%	7	8	7	8	7.5	Strong
40%	14	16	15	16	15.25	Strong
60%	17	18	17	18	17.5	Strong
80%	19	19	18	20	19	Strong
100%	20	20	20.8	20.5	20.325	Strong

Note: Results of observation on inhibition zones on the plates for 18-24 hours at room temperature showed that the largest zone of inhibition was at a concentration of 100%. Treatment effect became better along with the increase in concentration.

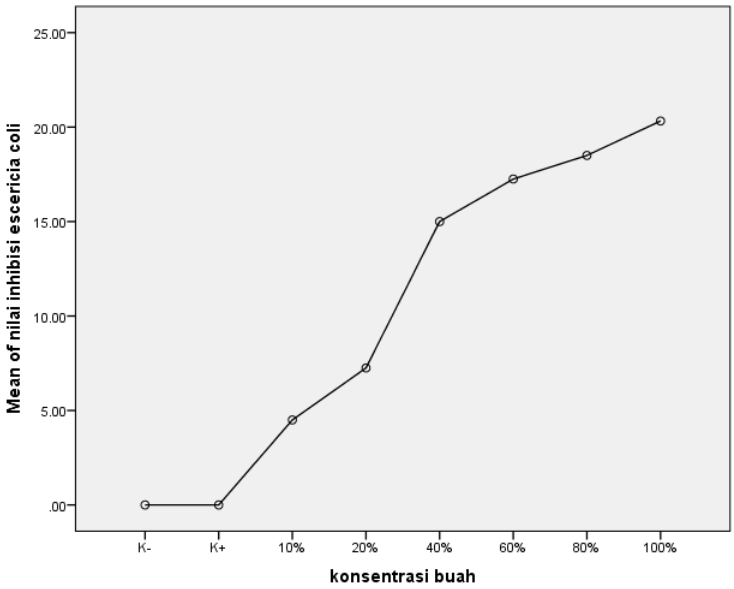

Figure 1. Mean Inhibition Zones Formed Around Well Holes After Treatment using Various Flavonoid Concentrations of Mahkota Dewa Fruit Extract.

The results of normality and homogeneity tests showed that the samples were normally distributed and had homogeneous variations so that one way ANOVA test could be performed with a significance value of 0.000 ($p<0.5$).

Discussion

This study aims to analyze the antibacterial properties of various flavonoid concentrations of Mahkota Dewa fruit (*Phaleria macrocarpa*) extract against *Escherichia coli* bacteria in vitro. Well diffusion method was applied by using Brain Heart Infusion Agar (BHIA) media. Such method was used to determine the concentration of flavonoids in Mahkota dewa fruit extract which have the potential to inhibit growth of *Escherichia coli* bacteria by measuring and observing the diameter of the inhibition zones formed around the well holes. Mahkota dewa fruit (*Phaleria macrocarpa*) is the test material used in the current study, wherein flavonoid compounds were used as the active substances. The method of extracting flavonoid compounds from the Mahkota dewa was carried out in 2 stages. First, the maceration process was performed using 96% ethanol solvent followed by partitioning with n-hexane solvent. In fact, a previous study found the antifungal and antibacterial effects of flavonoid compounds (Ananda *et al*., 2017; Clermont et al., 2019).

Well diffusion was applied in this study for several concentrations of 10%, 20%, 40%, 60%, 80% and 100% to determine the effective concentration. After that, there were 4 repetitions for each

concentration. Given the concentration of flavonoids in the Mahkota dewa fruit extract, inhibition zones were created at 10% concentration of 5 mm, at 20% concentration of 7.5, at 40% concentration of 15.25, at 60% concentration of 17.5, 80% concentration of 19 and at 100% concentration of 20.325, as well as in the positive control. In contrast, and inhibition zone was not found in the negative control. It can be concluded that an increase in the concentration of Flavonoids in Mahkota dewa fruit (*Phaleria macrocarpa*) extract led to an increase in the diameter of the inhibition zone created in the well holes. The strength of the antibacterial substance can be seen from the diameter of the inhibition zone that was categorized into 4 groups, namely very strong (> 20mm), strong (11-20 mm), medium (6-10 mm) and weak (<5mm) (Halden, 2016). In this study, the potential of flavonoids in Mahkota dewa fruit extract was categorized as strong. Based on the results of statistical test, it can be concluded that flavonoids in Mahkota dewa fruit extract were effective as antimicrobials against the growth of *Escherichia coli* (Dewi, 2020). Such finding is in line with a similar previous study on the effect of Mahkota dewa fruit extract on the growth of *Escherichia coli.* The difference was the tube test method applied in the current study.

The existence of antibacterial power in mahkota dewa fruit against Escherichia coli is due to the content of active substances that act as antibacterial substances. One of the chemical contents contained in mahkota dewa fruit is polyphenols which are thought to have a function as antibacterial substances. Flavonoids are phenolic group compounds that interact with bacterial cells through an absorption mechanism, involving hydrogen bonds with phenol groups. At low levels, a protein complex is formed in the bacterial cell wall with phenol which is weakly bound and immediately undergoes decomposition. It is further followed by penetration of phenol into the cell which causes precipitation and denaturation of plasma proteins. At high levels, phenol affects the permeability of the cell membrane, causing leakage and loss of intracellular compounds (Suryani, 2007).

The statistical analysis applied here was the One-Way Anova Test, which showed a significant difference between changes in the concentration of flavonoids in Mahkota Dewa fruit extract and the inhibition zones towards the growth of *Escherichia coli* bacteria ($p<0.05$). The Pearson correlation test proved a very strong effect in the positive direction ($r=0.874$) which indicated that the higher the concentration of flavonoids in the Mahkota dewa fruit extract, the stronger the antimicrobial effect. Based on this study, it can be perceived that the flavonoids in Mahkota Dewa fruit extract in vitro had antimicrobial potential against *Escherichia Coli* bacteria.

Conclusions

Flavonoids content in Mahkota dewa fruit (*Phaleria macrocarpa*) extract in vitro had antibacterial potential against the growth of *Escherichia coli*. An increase in the concentration of Flavonoids in Mahkota dewa fruit (*Phaleria macrocarpa*) extract led to an increase in the diameter of the inhibition zone created in the well holes. The larger the diameter of the inhibition zone formed, the lower the growth of *Escherichia coli* bacteria.

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Effect of Routine Consumption of Turmeric-Tamarind Herb on Dysmenorrhea among Adolescent Girls

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A B S T R A C T

Puberty in adolescents is identified by the sign of monthly menstrual period. Although it occurs naturally, many adolescent girls suffer from dysmenorrhea. Dysmenorrhea affects daily activities and even causes absence from school. Herbal medicine is still an alternative therapy for dysmenorrhea among adolescent girls. Non-pharmacological therapy using turmeric-tamarind herb is easy to obtain and has no side effects. This study aims to determine the effect of routine consumption of turmeric-tamarind herb on dysmenorrhea among adolescent girls in Pondok Meja Village. This was an observational analytical study with cross-sectional design. The population in this study involved all adolescent girls in Pondok Meja Village, with a total sample of 76 adolescent girls, who were selected using a purposive sampling technique based on inclusion and exclusion criteria. Data was collected using online questionnaires from December 2021 to April 2022. Data collected were analyzed using Chi-Square test. Results showed that there was an effect of routine consumption of turmeric-tamarind herb on dysmenorrhea among adolescent girls. Adolescent girls who did not routinely consume turmeric-tamarind herb had a 0.035 times higher probability of experiencing primary dysmenorrhea than those who routinely consume turmeric-tamarind herb. Adolescent girls who routinely consumed turmeric-tamarind herb did not experience dysmenorrhea.

Pubertas pada remaja putri dikenali dengan tanda menstruasi setiap bulan, meskipun terjadi secara alami banyak yang menderita dismenorea. Dismenorea mempengaruhi aktivitas sehari-hari bahkan ketidakhadiran di sekolah. Jamu masih menjadi terapi alternatif bagi remaja putri dalam mengatasi dismenorea. Terapi non farmakologi jamu kunyit asam mudah didapatkan dan tidak memiliki efek samping. Penelitian ini bertujuan untuk mengetahui pengaruh kebiasaan minum kunyit asam terhadap dismenorea pada remaja putri di Desa Pondok Meja. Penelitian ini merupakan studi observasional analitik dengan rancangan cross-sectional. Populasi dalam penelitian ini adalah seluruh remaja putri di Desa Pondok Meja, dengan jumlah sampel sebanyak 76 remaja putri, menggunakan teknik purposive sampling sesuai kriteria inklusi dan tidak termasuk kriteria ekslusi. Data dikumpulkan memakai kuesioner daring pada bulan Desember 2021 sampai April 2022. Data yang terkumpul dianalisis dengan uji Chi-Square. Hasil menunjukkan terdapat pengaruh kebiasaan minum kunyit asam terhadap dismenorea pada remaja putri. Remaja putri yang tidak memiliki kebiasaan minum kunyit asam mempunyai kemungkinan mengalami dismenorea primer sebesar 0,035 kali lebih besar daripada remaja putri yang memiliki kebiasaan mengkonsumsi kunyit asam. Remaja putri yang memiliki kebiasaan minum kunyit asam tidak mengalami dismenorea.

Introduction

Puberty in adolescent girls is characterized by a monthly menstrual period which lasts 5 to 7 days. Menstrual period is a natural and natural event, although in reality many adolescent girls experience

mild to severe dysmenorrhea since each woman has a different level of pain. Psychologically, dysmenorrhea will greatly interfere with physical activity even causes absence from school (Mustikawati, 2020).

Dysmenorrhea is the most common problem that occurs among adolescent girls and adult women which usually experienced before menstrual period for 48 to 72 hours. The pain is felt radiating to the thigh. Physical symptoms include complaints of cramps, dizziness, diarrhea, fatigue and excessive sweating (Sharghi et al., 2019). In addition, other symptoms of dysmenorrhea may include mood swings, stomach cramps, headaches, backaches, nausea and vomiting (Rahman et al., 2020).

Hormonal imbalance such as prostaglandins imbalance become the cause of an increase in uterine contractions which leads to dysmenorrhea. The arachidonic acid contained in PGs is able to assist the homeostatic function and pathogen mechanisms in responding to inflammation. Prostaglandins cause contraction and relaxation in the uterus to form a thick layer of luteal phase which will be released by the uterus. Pain arises from PG-induced myometrium (especially PGF2a) derived from the secretory endometrium. High levels of PG can cause stronger uterine contractions resulting in pain (Rahman et al., 2020).

Prevalence rate of dysmenorrhea worldwide is estimated to be high although it varies greatly, with incidence ranging from 45 to 97% among women of childbearing age and the highest rate was reported to occur among adolescent girls (Petraglia et al., 2017). Prevalence of dysmenorrhea in Indonesia reaches 98.8%, which generally occurs among late adolescents (mean age of 17.7 years) along with intermittent pelvic pain complaint which affects daily activities (Kartilah et al., 2020).

Losses caused by dysmenorrhea in the United States due to cases of absence from school and work reach 600 million hours per year or the equivalent of 2 billion (Sharghi et al., 2019). Dysmenorrhea symptoms generally affect daily activities both physically and emotionally in terms of school attendance, concentration during class hours, academic achievement, socialization or social and family relationships. Productivity of the company will be affected if women are absent from work due to dysmenorrhea. Dysmenorrhea surely have negative impact the life quality of adolescent girls (Kartilah et al., 2020).

Complementary medicine therapy is still widely used by people to relieve dysmenorrhea. Herbs, yoga, relaxation, psychotherapy, massage, hypnosis, acupressure and acupuncture are types of complementary medicine that are often applied. Herbs such as turmeric, ginger, fennel, cinnamon, aloe vera are most often consumed to help relieve dysmenorrhea (Sharghi et al., 2019). Many adolescent girls think that dysmenorrhea can be overcome by lying down or sleeping, taking medicine or herbs, and applying warm compresses (Kartilah et al., 2020). Some respondents (33.3%) experienced a relief in dysmenorrhea by doing activities, drinking warm water, drinking milk, while a small percentage of respondents (6.06%) experienced a relief in dysmenorrhea by drinking water (Rahayu & Nujulah, 2018). Alternative therapies of herbal medicine or herbal drinks, warm compresses with bottles filled with warm water are still used by some adolescent girls to relive dysmenorrhea. Turmeric-tamarind herb as a non-pharmacological therapy is easy to obtain and has no side effects (Priyadi et al., 2018).

Turmeric and tamarind are the main raw materials that have been used in many researches in Indonesia as a treatment for dysmenorrhea. Antioxidants, anti-inflammatories, and analgesics are the active ingredients in turmeric. Antioxidant, anti-inflammatory, antipyretic and sedative are the active ingredient in tamarind. The benefits of turmeric-tamarind herb have been proven in many studies based on the results of statistical analysis. The results of a previous study showed a relief in dysmenorrheal pain after being given herbal medicinal intervention. There was also a recommendation from the previous study to consume herbs or herbal drinks before and during menstrual period to relieve dysmenorrhea (Rahman et al., 2020).

Habit is defined as a series of actions of a person that are done repeatedly in the same way or something that is commonly done. Besides, it is also interpreted as a pattern that a person does repeatedly in certain situations. When experiencing dysmenorrhea, adolescent girls who routinely consume turmeric-tamarind herbal tend to take repeated actions to consume turmeric-tamarind herb so as to avoid dysmenorrhea. Routine consumption of turmeric-tamarind herb carried out by adolescent girls could reduce the symptoms of primary dysmenorrhea (Sugiharti & Febriana, 2021).

Pondok Meja Village is one of the 15 villages in Mestong District. The people of Pondok Meja Village develop turmeric cultivation under the newly planted rubber tree stands, to utilize and at the same time clear the land in their respective gardens. The turmeric harvest area of Mestong District in 2017-2018 has increased, from 16,000 m^2 to 51,500 m^2 (Statistics Muaro Jambi District, 2021). Tamarind trees also grow as wild plants in the gardens of the Pondok Meja Village residents. In 2015, Pondok Meja Village also welcomed youth from Canada in a youth exchange program. On that occasion, the youth of Pondok Meja Village succeeded in developing processed turmeric plant products, one of which was herbal medicine.

Based on the results of interviews with adolescent girls in Pondok Meja Village on September 26, 2021, of the 10 adolescent girls, 7 of them (70%) said they always experienced dysmenorrhea during menstrual period. Through this interview, it was also revealed that 4 out of 7 adolescent girls who experienced dysmenorrhea treated it by taking drugs purchased at pharmacies, 2 people coped with it by resting or sleeping while rubbing eucalyptus oil and drinking warm water, and 1 person consumed turmeric-tamarind herb made by their parents. In addition, 8 out of 10 adolescent girls said they did not know that turmeric-tamarind herb has properties to treat dysmenorrhea.

The existence of natural development and potential possessed by adolescent girls in Pondok Meja Village becomes a great potential. Adolescent girls are able to take advantage of the existing potential properties, namely turmeric-tamarind as first aid in treating dysmenorrhea. Based on the background above, the authors are interested in conducting a study entitled “Effect of routine consumption of turmeric-tamarind herb on dysmenorrhea among adolescent girls in Pondok Meja Village”.

Methods

This study is an analytical observational study with a cross-sectional design. The population in this study was all adolescent girls in Pondok Meja Village, Muaro Jambi District, Jambi Province,

totaling 301 people. The total sample of the study was 76 adolescent girls, who were selected using a purposive sampling technique based on inclusion and exclusion criteria. The inclusion criteria included: 1) adolescent girls who lived in Pondok Meja Village; 2) adolescent girls aged 12-21 years, or less than 12 years who were already had menstrual period; 3) adolescent girls who had or had no routine consumption of turmeric-tamarind herb; 4) adolescent girls who were willing to be respondents; 5) adolescent girls who had smartphones (internet users). Meanwhile, the exclusion criteria included: 1) adolescent girls who experienced a disease or abnormality of the reproductive organs; 2) adolescent girls with mental disorders; 3) adolescent girls who were taking analgesic drugs; 4) adolescent girls who could not read and write. The data collection instrument was an online questionnaire containing questions about routine consumption of turmeric-tamarind herb and dysmenorrhea using Menstrual Symptoms Questionnaire (MSQ) which was distributed through a Google form to be accessed via a smartphone. Data collection was carried out from December 2021 to April 2022. Data were analyzed using Chi-Square test and processed using SPSS version 16.0.

Results

Table 1. Distribution of Respondents' Characteristics by Age, Menarche Age, Menstrual Frequency, Length of Menstrual Period, Routine consumption of Turmeric-Tamarind Herb, Dysmenorrhea

Characteristic	Sum (%)	
	N = 76	%
Age (Years)		
14	9	12
15	20	26
16	40	53
17	7	9
Menarche Age (Years)		
10	13	17
11	43	57
12	17	22
13	3	4
Menstrual Frequency (Times)		
46-50	50	66
51-55	0	0
56-60	16	21
61-65	4	5
66-70	0	0
71-75	6	8
Length of Menstrual Period (Days)		
5	4	5
6	19	25
7	40	53
8	13	17
Routine consumption of Turmeric-Tamarind Herb		
Good	38	50
Bad	38	50
Dysmenorrhea		
Had Primary Dysmenorrhea	46	61
No Primary Dysmenorrhea	30	39

Source: Primary data

Table 1 shows that 53% of respondents aged 16 years, 57% of respondents had their first menarche at the age of 11 years, most of respondents (66%) had menstrual frequency of 46-50 times, 53% of respondents experienced 7 days in a menstrual cycle, 50% of respondents had routine

consumption of turmeric-tamarind herb and 50% of respondents did not have routine consumption of turmeric-tamarind herb. 61% of respondents experienced primary dysmenorrhea and 39% of respondents did not experienced primary dysmenorrhea.

Table 2. Effect of Routine Consumption of Turmeric-Tamarind Herb on Dysmenorrhea among Adolescent Girls

Routine Consumption of Turmeric-Tamarind Herb	Primary Dysmenorrhea	No Primary Dysmenorrhea	Sum	p-value	OR 95% CI
Yes	11	27	38	0.001	0.035 (0.09-0.138)
No	35	3	38		
Total	43	33	76		

Source: Chi-square test primary data

Table 2 showed that there was an effect routine consumption of turmeric-tamarind herb on dysmenorrhea among adolescent girls. The Chi-Square test obtained a level of significance of p=0.001 <α 0.05. Adolescent girls who did not routinely consume turmeric-tamarind herb had a 0.035 times higher probability of experiencing primary dysmenorrhea than those who routinely consume turmeric-tamarind herb. Adolescent girls who routinely consumed turmeric-tamarind herb did not experience dysmenorrhea.

Discussion

Table 1 shows that 53% of adolescent girls in Pondok Meja Village aged 16 years. Primary dysmenorrhea occurs when a woman has her first menstrual period, increases during a woman's age of 15-17 years and will reach its highest level in 20-24 years then stops when the woman becomes pregnant and gives birth (Indahwati et al., 2017). A study conducted by Rahayu et al (2018) showed that the mean age of respondents who experienced dysmenorrhea was 20 years with the mean length of menstrual period of 7 days. In this study, 57% of respondents experienced the first menarche at the age of 11. The first menstrual period experienced by a woman or what is called menarche is usually experienced in the age range of 10-16 years (middle adolescence). A study conducted by Larasati et al (2016) found that women who experienced menarche less than 12 years tended to be 23% more likely to experience dysmenorrhea than women who experienced menarche at the age of 12-14 years. Furthermore, regarding the menstrual frequency, most of respondents (66%) had 46-50 times of menstrual period. Primary dysmenorrhea usually occurs 6 to 12 months after menarche and generally lasts 8 to 72 hours. The more a woman have menstrual period after the first menarche, the dysmenorrhea pain will continue to increase (Larasati, T. A. & Alatas, 2016). In addition, 53% of adolescent girls in Pondok Meja Village experienced 7 days in a menstrual cycle. Women with Menstrual Period of more than 5-7 days had 1.9 times the tendency to experience dysmenorrhea (Larasati, T. A. & Alatas, 2016).

This study revealed that 50% of adolescent girls in Pondok Meja Village routinely consumed or had a habit turmeric-tamarind herb. Habit is defined as a series of actions of a person that are done repeatedly in the same way or something that is commonly done. Besides, it is also interpreted as a pattern that a person does repeatedly in certain situations (Sugiharti & Febriana, 2021). Of all adolescent girls in Pondok Meja Village who routinely consumed turmeric-tamarind, 58% of them consumed it 1 time per day, 16% of them consumed it 2 times a day, and 26% of them consumed it 3 times a day, with an approximately 150 ml in volume each time they consumed. Such herb was taken 2 days (46%), 4

days (20%), 6 days (34%) during the menstrual cycle. In addition, 82% of them consumed it in the 1 day before until the 3rd day of menstrual period, and 18% of them consumed it in 2 days before until the 2nd day of menstrual period.

A similar study was conducted by Fatmawati et al (2020) among 35 adolescent girls aged 12-18 years who were not married and had experienced menstrual period. The intervention was administration of turmeric-tamarind herb therapy 1 time a day for 4 days as much as 150 ml which was carried out 2 days before until the 2nd day of menstrual period. Furthermore, menstrual pain was assessed 1 hour after being given intervention. It was found that some respondents experienced mild pain before the turmeric-tamarind herb therapy. Meanwhile, after turmeric-tamarind herb therapy, most of the respondents had no pain (Fatmawati et al., 2020).

Adolescent girls who routinely consumed turmeric-tamarind herb were those who consumed it repeatedly and regularly, at least ten times in a certain period of time. It was carried out under the awareness of the goal, with no personal analysis and specific consideration when doing so (Sugiharti & Febriana, 2021). In this study, out of 50% of adolescent girls who consumed turmeric-tamarind herb, all consumed it for more or equal to 10 times (100%) to relieve dysmenorrhea. Such finding indicated that the adolescent girls consumed turmeric-tamarind herb at least in 10 periods or 10 menstrual cycles repeatedly and regularly. The turmeric-tamarind herb was consumed by the adolescent girls before the menstrual period which was known based on the calendar.

The turmeric-tamarind herb consumed by 50% of adolescent girls in Pondok Meja Village was obtained from herbal medicine depots (21%), stalls/supermarkets (34%), itinerant herbalists (26%), and homemade (18%). Pondok Meja Village developed turmeric cultivation under newly planted rubber tree stands, to utilize and at the same time clear the land in their respective gardens. In addition, the youth of Pondok Meja Village have succeeded in developing processed turmeric plant products, one of which is herbal medicine. It should be considered that the existing potential can be utilized to make turmeric-tamarind herb as an alternative for relieving dysmenorrhea.

Dysmenorrhea is the medical term for menstrual pain due to uterine contractions caused by an increase in the levels of prostaglandin hormone. The existing theory explains that dysmenorrhea is divided into two, one of which is primary dysmenorrhea, which is generally harmless, does not cause complications and is not due to disease, although the complaints it causes can interfere with daily activities (Kartilah et al., 2020). The current study showed that most of adolescent girls in Pondok Meja Village (61%) experienced primary dysmenorrhea. Primary dysmenorrhea can be caused by several risk factors including age, menarche age, menstrual frequency, and length of menstrual period.

Table 2 revealed that most of adolescents who routinely consumed turmeric-tamarind herb did not experience dysmenorrhea. Chi-Square obtained a p-value of $0.001<\alpha=0.05$. Such finding indicated that there was an effect of routine consumption of turmeric-tamarind herb on dysmenorrhea among adolescent girls in Pondok Meja Village. Furthermore, based on the OR calculation, it was revealed that adolescent girls who did not routinely consume turmeric-tamarind herb had a 0.035 times higher probability of experiencing primary dysmenorrhea than those who routinely consume turmeric-tamarind

herb. In other words, it can be said that adolescent girls who did not routinely consume turmeric-tamarind herb had a primary dysmenorrhea probability of 1/0.035 = 27.168 times = 27 times higher than those who routinely consumed turmeric-tamarind herb.

Turmeric contains curcumin that function as antioxidants, anti-inflammatories, and analgesics. On the other hand, tamarind fruit contains flavonoids as antioxidants, anti-inflammatory, anti-pyretic and sedative. Turmeric rhizome has the highest antioxidant content compared to the other parts. Certain parts used in the manufacture of turmeric-tamarind herb are the tamarind fruit or leaves. Turmeric-tamarind herb with a 5% turmeric extract formula has a fairly high antioxidant content of 0.123%, vitamin C 0.688 mg/100 g (Mulyani et al., 2014). A previous study (Kusteja et al., 2019) was conducted among 88 high school students who were assigned into 2 groups, both received interventions namely ginger drink and turmeric-tamarind herb. It was found that consuming turmeric-tamarind herb was more effective in relieving primary dysmenorrhea compared to ginger drink. Another study (Marsaid et al., 2017) also proved that turmeric-tamarind extract was effective in relieving dysmenorrhea among adolescent girls.

This study found a significant difference in the incidence of primary dysmenorrhea between adolescent girls who routinely consumed turmeric-tamarind herb and those who did not routinely consume turmeric-tamarind herb. The study finding supported the hypothesis that routine consumption of turmeric-tamarind herb could relieve the symptoms of primary dysmenorrhea. This is in accordance with the theory which states that turmeric-tamarind herb with analgesic, anti-inflammatory, antipyretic, and sedative properties is able to respond to sympathetic nerve stimulation from the stressful state of adolescent girls due to its activities. The ability of active ingredients in turmeric rhizomes and tamarind fruits which were then processed into turmeric-tamarind herb was able to inhibit the action of cyclooxygenase enzymes so as to reduce inflammation that occurs due to the release of prostaglandins during menstrual period. It further suppresses autonomic nervous activity and excessive uterine contractions and reduces emotional stress. Thus, adolescent girls who routinely consumed turmeric-tamarind herb did not experience primary dysmenorrhea (MoH, 2015).

Conclusions

Analysis results revealed that there was an effect of routine consumption of turmeric-tamarind herb on dysmenorrhea among adolescent girls in Pondok Meja Village. Adolescent girls who did not routinely consume turmeric-tamarind herb had a 27 times higher probability of experiencing primary dysmenorrhea than those who routinely consume turmeric-tamarind herb. It is expected that adolescent girls can seek information about dysmenorrhea as well as non-pharmacological therapies to manage the symptoms of dysmenorrhea, as well as get used to consume turmeric-tamarind herb as an alternative for relieving dysmenorrhea that can interfere with daily activities.

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Effect of Endorphin Massage on The Level of Anxiety among >36 Weeks Pregnant Women

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A B S T R A C T

The weeks leading up to delivery are always anxiety-provoking for pregnant women. Pregnant women may have negative effects from anxiety such as prenatal attachment, the term used to describe the bonding between both mother and baby. Such condition can lead to poor uterine contraction, prolonged labor, uterine atony, bleeding wounds, infections, maternal exhaustion and shock, while also increasing the likelihood of premature birth and low birth weight. A non-pharmacological therapy named endorphin massage may stimulate the body to release endorphins. Such hormone may minimize anxiety and promote maternal and fetal well-being. This study aims to determine the effect of endorphin massage on the level of anxiety among >36 weeks pregnant women at Private Practice Midwife Listiorini in 2022. This was a pre-experimental study with a one group, pre-test post-test design. The current study was conducted on March 20-April 20 at Private Practice Midwife Listiorini. The accident sampling approach was applied to select the study samples, which consisted of 30 >36 weeks pregnant women who performed ANC visits at Private Practice Midwife Listiorini and met the inclusion criteria. The instruments used were the HARS Scale and the Endorphin Massage SOP. In accordance with the results, there was a decrease in the median anxiety levels of pregnant women after receiving the endorphin massage intervention by 8.17. The Wilcoxon statistical test result showed a p-value of 0.000 (<0.05), which indicated that endorphin massage intervention had an effect on the level of anxiety among pregnant women in the third trimester. The study finding is expected to help pregnant women lowering their anxiety levels before delivery.

Wanita hamil sering mengalami kecemasan menjelang persalinan. Pengaruh kecemasan pada ibu hamil dapat mempengaruhi hubungan antara ibu dan janin yang disebut dengan prenatal attachment dan dapat menyebabkan melemahnya kontraksi rahim, yang dapat menyebabkan persalinan lama, atonia uteri, perdarahan robekan, infeksi, kelelahan ibu, dan syok, serta pada bayi dapat meningkatkan risiko kelahiran prematur dan berat badan lahir rendah. Pijat endorfin adalah terapi non-obat yang merangsang tubuh untuk melepaskan endorfin. Hormon ini meminimalkan kecemasan dan menciptakan rasa sejahtera. Tujuan penelitian ini adalah untuk mengetahui pengaruh endorphin massage terhadap tingkat kecemasan pada ibu hamil dengan BPM Listiorini > 36 minggu tahun 2022. Metodologi penelitian menggunakan pendekatan pra-eksperimen dan seperangkat desain pra-tes pasca-tes. Penelitian di BPM Listiorini dari tanggal 20 Maret hingga 20 April. Sampel penelitian ini adalah ibu hamil berumur lebih dari 36 minggu yang melakukan wawancara ANC di BPM Listiorini dan memenuhi kriteria inklusi dengan metode accident sampling sebanyak 30 responden. Instrumen yang digunakan adalah skala HARS dan SOP endorphin massage. Hasil penelitian menunjukkan bahwa median tingkat kecemasan ibu hamil menurun sebesar 8,17 sesudah dilakukan intervensi endorphin massage. Hasil uji statistik Wilcoxon diperoleh nilai p-value 0,000 (p-value<0,05), yang berarti pemberian intervensi endorphin massage berpengaruh terhadap kecemasan pada ibu hamil lebih dari 36 minggu. Temuan penelitian

ini diharapkan dapat membantu ibu hamil mengurangi kecemasan menjelang persalinan..

Introduction

Pregnancy and childbirth are life events waited for by women and their o families. There are physical and psychological changes experienced by women during pregnancy and childbirth (Maesaroh, 2019). According to WHO report in 2017, 295,000 women died during pregnancy and childbirth. Anemia, malaria, and heart disease are indirect causes of maternal morbidity and mortality in addition to bleeding, infection, high blood pressure, abortion, and obstructed labor. Actually, most maternal deaths are avoidable through prompt care management by qualified healthcare professionals (WHO, 2020). However, the success of treatment depends on more than just reducing complication and impairment; it also depends on enhancing health and well-being, including psychological well-being (L. L. Sari, 2022).

Being in good mental health during pregnancy is essential since it has a significant impact on both the mother's and the unborn child's wellbeing. Mental health issues that manifest during pregnancy might lead to dangerous complications throughout pregnancy and childbirth (D. Sari, 2022). One of the psychological issues and emotional reactions is anxiety that persists up until delivery, which raises the possibility of a obstructed and prolonged labor as well as the likelihood of maternal and newborn mortality. In developed countries, the prevalence of anxiety and depression ranges from 7 to 20%, while it is almost 20% in developing countries (Arianti, 2019a).

Anxiety is a state of confusion or fear that can be brought on by something, as well as by unreliable judgment and a sense of powerlessness as the outcome of an evaluation of an object (Hastuti, 2019). Anxiety can occur during pregnancy and childbirth. It is a condition in which a person is unable to act bravely and sensibly and is at danger of experiencing prolonged labor (Yanti, 2022). According to IDHS (2012), anxiety accounts for 5% of maternal mortality and is one of the reasons of prolonged labor and fetal death. Pregnant women who are anxious may have higher levels of the progesterone hormone, which can make them feel agitated and exhausted and increase the risk of antepartum bleeding (Abdulah, 2021).

Pregnant women with low socioeconomic class may have anxiety events more frequently due to the factors of poverty, low income, and lack of prenatal care. In order to prevent postpartum depression among women before and throughout pregnancy, it is crucial to address depression and anxiety symptoms as soon as they arise (Adina, 2022).

According to Stuart (2012) in Anjani, there are a number of strategies for helping pregnant women deal with their anxiety before labor, including the use of pharmacological and non-pharmacological therapies. Non-pharmacological therapies can be used to relieve anxiety, such as relaxation, acupuncture, warm water compresses, and massage. Pharmacological treatment can be performed by administering drugs, although administration of drugs to pregnant women needs to be restricted (Anjani, 2022). Previous studies showed that pregnant women often chose non-pharmacological treatment than

pharmacological treatment because the latter puts the unborn child at risk (Callanan, Tuohy, Bright, 2022).

Massage technique to relieve anxiety can help women feel more refreshed, relaxed, and comfortable. Massage is one way to relieve fatigue, improve blood circulation, stimulate the body to remove toxins, and improve mental health (Sukmaningtyas, 2016). Endorphins are local opioid neuropeptide chemical compounds and peptide hormones that make a person feel happy and can increase the body's immunity (Samsugito, 2022)

Endorphin massage is a type of therapeutic light touch massage that is beneficial for pregnant women at 36 weeks of gestation. When such massage is performed, the body releases endorphins as the natural painkillers. Previous study conducted in the city of Padang by Arianti (2019) revealed that there was a difference in the level of anxiety in the experimental group before and after endorphin massage (Arianti, 2019b). After the therapy was administered, most of respondents had mild level of anxiety. Furthermore, according to a study conducted by Qomari et al. in 2020, there were significant differences in the level of anxiety among pregnant women treated with ROP, endorphine massage, and without intervention (Control) (Qomari, N et al, 2020).

Five pregnant women at 36 weeks of gestation participated in a preliminary study at Private Practice Midwife (BPM) Listiorini. After conducting interview to determine whether the women felt anxious during labor, it was found that the women felt more relaxed and experienced a decrease in the level of anxiety. The background led to the formulation of the study's problem, whether endorphin massage affects the level of anxiety among >36 weeks pregnant women. This study aims to determine the effect of endorphin massage on the level of anxiety among >36 weeks pregnant women at BPM Listiorini, South Bengkulu District.

Methods

This was a pre-experimental study with a one-group pre-test-post-test design to compare pre-test and post-test outcomes. The dependent variable in this study was the level of anxiety among >36 weeks pregnant women, while the independent variable was endorphin massage. This study covered all pregnant women at BPM Listiorini who were at >36 weeks of gestation who visited between March 20 and April 20, 2022. An unintentional sampling method was applied to obtain a total sample of 30. This study included pregnant women at >36 weeks of gestation, had single pregnancy, had cephalic presentation, and were willing to taking part as the study samples. This study excluded pregnant women with major psychological conditions and back disorders.

Interviews were used to collect primary data, including the respondent's age, education, employment status, family income, and parity characteristics. Secondary data were obtained from knowledge of the coverage of K4 medical records at BPM Listorini. The Hamilton Anxiety Rating Scale (HARS) questionnaire with 14 items was used to assess respondents' levels of anxiety before and after receiving endorphin massage. Respondents were observed and given a score between 0 and 4. There are

four categories of anxiety namely physical, emotional, social, and vocational (Intanwati, Mardiyono, 2022).

Standard operating procedures in (Aprilia, 2010) were applied in this study as the implementation tool for endorphin massage. For three consecutive days, a midwife performed endorphin massage for 30 minutes. The first implementation was performed at BPM Listiorini, and the second and third implementations were performed at the respondent's house. The univariate analysis was described by the characteristics of respondents and the independent variable (endorphin massage). In addition, the Shapiro-Wilk analysis was performed to assess whether the data regarding dependent variable (level of anxiety among >36 weeks pregnant women) were normally distributed. The statistical test applied a 2-group paired parametric test with a numerical comparative hypothesis. Since all variables were significant at 0.05 and the data were not normally distributed, the bivariate analysis employed a Wilcoxon test. The SPSS 26 software was used to process the statistical analysis.

Results

Table 1. Frequency Distribution of General Characteristics of Respondents at BPM Listiorini in 2022

General Characteristic	Frequency	(%)
Age		
< 20 years	3	10
20-35 years	20	66.7
>35 years	7	23.3
Education		
Elementary school	2	6.7
Junior High School	7	23.3
Senior High School	18	60
College	3	10
Employment Status		
Unemployed	20	66.7
Employed	10	33.3
Family Income		
<IDR 1.000.000	3	10
IDR 1.000.000-2.000.000	16	53.3
>IDR 2.000.000	11	36.7
Parity		
Primigravida	7	23.3
Multigravida	23	76.7

Based on table 1, it was known that most of respondents aged 20-35 years (66.7%), had a senior high school education as many as 18 respondents (60%), were unemployed as many as 20 respondents (66.7%), had family income of IDR 1,000 000-2000000 as many as 16 respondents (53.3%), and were multigravida as many as 23 respondents (76.7%).

Table 2. Results of Normality Test

Variable	p-value	Distribution
>36 weeks pregnant women before endorphin massage	0.009	Not Normal
>36 weeks pregnant women after endorphin massage	0.035	Not Normal

Based on the results of the normality analysis using Shapiro Wilk test, it was known that the levels of anxiety among >36 weeks pregnant women before and after endorphin massage obtained a p value

of <0.05. Such finding indicated that all variables were not normally distributed, so the bivariate test should apply the non-parametric test, namely the Wilcoxon alternative test.

Table 3. Analysis of the Anxiety Scale for Pregnant Women > 36 Weeks Before and After Being Given an Endorphin Massage at BPM Listiorini in 2022

Variable	N	Mean	SD	Median (Min-Max)
>36 weeks pregnant women before endorphin massage	30	19.60	6.110	21.25 (6-26)
>36 weeks pregnant women after endorphin massage	30	12.04	4.409	10.20 (3-18)

Table 2 indicated that there was a decline in the mean (from 19.67 to 12.07) and median scores on the level of anxiety after an endorphin massage (from 20.50 to 11.50).

Table 4. Analysis on the Effect of Endorphin Massage on the Level of Anxiety among >36 weeks Pregnant Women at BPM Listiorini in 2022

Variable	N	Mean	SD	Median (Min-Max)	*p-value*
>36 weeks pregnant women before endorphin massage	30	19.60	6.110	21.25 (6-26)	0,000
>36 weeks pregnant women after endorphin massage	30	12.04	4.409	10.20 (3-18)	

Based on Table 3, it was found that the Wilcoxon statistical test resulted in a p-value of 0.000 (< 0.05). Such finding indicated that the Endorphin Massage intervention had an effect on the level of anxiety among >36 weeks pregnant women at BPM Listiorini in 2022. It is expected that endorphin massage can be an effective intervention to help lower the level of anxiety among >36 weeks pregnant women.

Discussion

According to the study finding, the majority of respondents (66.7%) aged between 20 and 35. At this age range, the respondents were mature and prepared to become pregnant, especially to face psychological issues like anxiety often experienced during pregnancy and childbirth. Similarly, women at this age will prioritize their own health and be more receptive to learning, especially when they have a higher level of education (Rinata, 2018). Higher knowledge and problem-solving skills are associated with higher levels of education (Handayany, 2020).

It was found that 18 of 30 respondents (60%) had a senior high school education. It seems that the women would find it simpler to learn information based on the more knowledge they had, especially regarding health education. Education and counseling can help pregnant women prepare for childbirth without anxiety and they should enhance their knowledge during antenatal care visits. Preventing or managing maternal psychological stress may support the welfare of the mother and fetus as well as encouraging the physiological process of labor (Ernawati, 2016).

It was further found in the characteristics of respondents that the majority of women were unemployed as many as 20 respondents (66.7%). A study conducted by Murdayah (2021) claimed that there was a relationship between maternal employment status and level of anxiety. Employment may increase social interaction, so it could lower the level of anxiety. If a woman works, she will socialize more frequently and find it simpler to process information on pregnancy and childbirth. (Murdayah, 2021).

Furthermore, 16 respondents (53.3%) reported a monthly family income of IDR 1,000,000 - 2,000,000. A relationship between family income and the level of anxiety among primigravida women was found in a study conducted by Said et al. (2015). If the family income was high enough, the women wouldn't experience anxiety during pregnancy and childbirth because pregnancy requires certain budget such as costs for ANC visits, nutritious food for pregnant women and infants, labor costs, clothing, and other needs (Said, 2015).

23 respondents (76.7%) were multigravida, making up the majority of the samples. Anxiety during motherhood can occur in both primigravida and multigravida women due to fear, tension, and confusion. Women may feel anxious due to the shadow of the pain to be experienced during childbirth (Rinata, 2018).

A normality test was conducted on the dependent variable, which represented the level of anxiety among >36 weeks pregnant women before and after receiving endorphin. It was known that the levels of anxiety among >36 weeks pregnant women before and after endorphin massage obtained a p value of <0.05. Such finding indicated that all variables were not normally distributed, so the bivariate test should apply the non-parametric test, namely the Wilcoxon alternative test (Norfai, 2021).

According to the univariate analysis table, the median value of the respondent's anxiety level before the intervention of Endorphin Massage was 19.60 with a range of 6-26 among 30 respondents under study. Furthermore, the median value of the respondent's anxiety level after the intervention of Endorphin Massage was 12.04 with a range of 3-18. An assessment on the median and minimum-maximum scores in the study variables showed that there was a difference in the anxiety level of pregnant women between before and after the intervention.

The level of anxiety among pregnant women tends to increase in the second and third trimesters, or at 18 and 32 weeks of gestation, respectively. At this moment, anxiety screening is a crucial action. Anxiety in pregnancy can be exacerbated by past pregnancy losses, a lack of family support, and a lack of financial support. One method to reduce a pregnant woman's anxiety is pregnancy classes offered by midwives (Bastard, 2009). The risk of preterm birth, low birth weight, and intrauterine growth retardation is increased by postpartum depression, which is a risk factor for prenatal mental health disorders (Zhao, Ma, Wang, Zhoe, Meng, Li, 22 C.E.).

The study found that the Wilcoxon statistical test resulted in a p-value of 0.000 (< 0.05). Such finding indicated that the Endorphin Massage intervention had an effect on the level of anxiety among >36 weeks pregnant women at BPM Listiorini in 2022. Such finding is consistent with a study conducted by Arianti (2019) which claimed that endorphin massage had an effect on maternal level of anxiety since it could cause the body to release endorphins. Endorphins act by regulating heart rate, relieving pain, regulating feelings of tension, and fostering sensations of comfort and body relaxation. Endorphin massage induces a sense of well-being via the skin's surface.

Similarly, a study conducted by Wulandara, et al (2022) showed a difference in the levels of anxiety before and after endorphin massage. Endorphin massage could provide comfort to women, and

there was also interaction between healthcare workers and women about the benefits and goals of doing massage to relieve anxiety during pregnancy and childbirth (Wulandara, 2022).

By generating positive emotions at the skin's surface, endorphin massage treatment is applied to relieve labor pain and promote relaxation. Pregnant women at >36 week of gestation can apply such approach. Due to the fact that the husband can also apply this endorphin massage at home, this approach also encourages deep relaxation techniques and fosters relationships between the mother, husband, and fetus (Aprilia, 2010).

Conclusions

The level of anxiety among pregnant women with >36 weeks gestation at BPM Listiorini in 2022 was significantly lowered by endorphin massage with a p-value of 0.000 (<0.05). Since endorphin massage was found to be effective to manage maternal anxiety, it is expected that pregnant women can apply it up to the time of delivery.

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Health Education Using Booklet to Increase Knowledge on Anemia among Adolescent Girls

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A B S T R A C T

Iron deficiency is one of the healthful issues in Asia, remembering for Indonesia. Young women often consume risky foods such as fast food, snacks and soft drinks. Such condition is due to lack of education among adolescent girls. This study aims to determine the effect of health education using booklet media on the increase in knowledge on anemia among adolescent girls. This was a pre-experimental study with a One-Group Pre-Test-Post Test Design approach. The population involved in this study was adolescent girls in State JHS of Gorontalo City, with a total sample of 132 respondents. The samples were selected using the Simple Random Sampling technique. Data on knowledge were derived from questionnaires that had been tested for validity and reliability. The study was conducted in February to March 2021. Data analysis was performed using the Wilcoxon test. The results showed that there was an effect of health education using booklet media on the increase in knowledge on anemia among adolescent girls with p-value = 0.000. It is expected that healthcare workers can provide health services in the form of education to young women using booklet media so that adolescents are interested in listening to information and the information can be easily understood.

Anemia merupakan salah satu masalah gizi utama di Asia termasuk di Indonesia. Remaja putri sering mengkonsumsi makanan berisiko seperti fast food, snack dan soft drink, hal ini terjadi karena kurangnya edukasi pada remaja putri. Tujuan penelitian ini adalah untuk mengetahui pengaruh pemberian edukasi menggunakan media booklet terhadap peningkatan pengetahuan pada remaja putri tentang anemia. Penelitian ini yaitu penelitian pre-eksperimen dengan pendekatan One-Group Pre-Test-Post Test Design. Populasi pada penelitian ini adalah remaja putri di SMP Kota Gorontalo, dengan jumlah sampel sebanyak 132 orang. Sampel yang didapat dengan menggunakan teknik Simple Random Sampling. Data pengetahuan didapat dari kuesioner yang telah diuji validitas dan reliabilitas. Penelitian dimulai pada bulan Februari sampai Maret 2021. Analisis data dilakukan dengan uji Wilcoxon. Hasil penelitian terdapat pengaruh pemberian edukasi menggunakan media booklet terhadap peningkatan pengetahuan pada remaja putri dengan nilai p-value = 0,000. Dari hasil penelitian ini diharapkan tenaga kesehatan dapat memberikan pelayanan kesehatan seperti edukasi pada remaja putri menggunakan media sehingga remaja tertarik dalam mendengarkan informasi dan mudah dipahami oleh remaja putri.

Introduction

Iron deficiency (Fe) is one of the healthful issues in Asia, remembering for Indonesia. Southeast Asia occupies the highest prevalence of anemia among children by 60% (Khobibah et al., 2021; Kusnawati & Rokhanawati, 2016; Sari et al., 2022).

According to the World Health Organization (WHO) cited in a study conducted by Kurniati (2010), the incidence of anemia in developing countries was about 53.7% of adolescent girls. Anemia often attacks adolescent girls due to stress, menstruation, or late eating. The rate of iron deficiency anemia in Indonesia was 72.3%. Iron deficiency in adolescents results in paleness, weakness, fatigue, dizziness, and decreased concentration on learning (Kurniati, 2020). The causes of anemia among adolescent girls include the level of parental education, economic level, level of knowledge about anemia, poor Fe intake, vitamin C, and duration of menstruation. The number of adolescents (10-19 years) in Indonesia was 26.2% consisting of 50.9% men and 49.1% women. (Afa, 2017; Suryadinata et al., 2022)

Girls in adolescence are more likely to have anemia than adolescent boys since adolescent girls have monthly menstrual cycles and wrong eating habits such as eating fast food, snacks and soft drinks. In addition, there is a high desire of adolescent girls to look slimmer like Princess which can lead to poor intake of nutritious food including sources of Fe (Febria & Kurniasari, 2022; Mufa, 2021). Anemia has a devastating impact on adolescent girls because it can cause delayed physical growth as well as behavioral and emotional disorders (Khoirunisa dan Nugraheni, 2017).

Knowledge will has an effect on most adolescent girls aged 11-18 years who had junior and senior high school education. Therefore, the possibility of having good knowing on anemia is quite a lot, especially from the sources of information such as subject materials and mass media for a higher access to information. Poor knowledge of anemia will result in a lack of consumption of animal protein source foods (Imanuna et al., 2020; Kusuma, 2022; Nasruddin et al., 2021).

Basic Health Research data (2020) revealed that the prevalence of anemia among Women of Childbearing Age (15 years and over) was 22.7%, while in pregnant women it was 37.1%. According to the Central Statistics Agency of Gorontalo Province, there were 54,885 adolescents aged 10-14 years and 56,140 adolescents aged 15-19 years (Basic Health Research, 2020).

Based on the results of a survey conducted by researchers, there were 313junior high school students had anemia. This is due to the lack of knowledge on anemia among adolescents. Furthermore, based on the interview with several adolescents, many of them consumed ready-to-eat food and rarely consumed vegetables. This situation needs to be considered due to the enormous impact of anemia which can decrease the quality of human resources. Thus, it is better to overcome anemia early before pregnancy, so that the physical condition of adolescents is ready to become a healthy mother (Gorontalo Province Health Office, 2020). This study aims to determine the effect of health education using booklet media on the increase in knowledge on anemia among adolescent girls.

Methods

This was a Pre-Experimental study with One-Group Pre Test-Post Test design. The population in this study was the VII graders of State JHS of Gorontalo City in the 2021/2022 school year, with a total sample of 132 respondents. The samples were selected using the Simple Random Sampling technique. Data on knowledge were derived from questionnaires that had been tested for validity and reliability.

The r value of the Corrected item-Total Correlation was higher than the r table value (r=0.514). The study was conducted in February to March 2021. At the initial stage, respondents filled out questionnaires (pre-test) and were given booklets containing material on anemia, including causes of anemia, signs and symptoms of anemia, and how to prevent anemia. The further stage was to fill out the same questionnaires (post-test). This study has been approved by the Research Ethics Committee, Gorontalo Health Polytechnic No. LB.01/KEPK/22/2020. Data analysis was performed using the Wilcoxon test since the data were non-parametric or not normally distributed.

Results

Table 1. Distribution of Respondents by Age

Age	Sum	Presentation
10-12 years	88	67
13-15 years	44	33
16-19 years	0	0
Total	132	100

The table above showed that most of respondents were in the age range of 10-12 years as many as 88 respondents (67%).

Table 2. Distribution of Respondents by the Level of Knowledge Before and After Intervention

Knowledge	Before	Presentation	After	Presentation
Good 76-100	13	10	132	100
Moderate 56-75	53	40	0	0
Poor <55	66	60	0	0
Total	132	100	132	100

Based on the data in the table above, it was shown that before being given a booklet on anemia, most of respondents had poor knowledge as many as 66 respondents (60%) and a small part of respondents had good knowledge as many as 13 respondents (10%). After being given a booklet on anemia, there was an increase in the level of knowledge of all respondents, wherein 132 respondents had good knowledge (100%).

Table 3. Wilcoxon Test

Knowledge	Pre-test		Post-test		Sig. (2 tailed)
	N	%	N	%	
Good	13	10	132	100	
Moderate	53	40	0	0	0.000
Poor	66	60	0	0	
Total	132	100	132	100	

Based on the table above, Wilcoxon statistical test obtained *sig* value of 0.000 < 0.05, which indicated the effect of booklet on the increase in the level of knowledge.

Discussion

The increase in the incidence of anemia among adolescent girls is partly due to the lack of education about balanced nutritional intake (Yanti et al., 2022). Anemia in adolescents can negatively affect performance and cognitive growth in adolescents, which can lead to a risk for anemia during pregnancy. This will undoubtedly have a negative effect on the fetus's growth and development inside the uterus, and it may also result in a number of problems during pregnancy and childbirth. Therefore,

such problem requires appropriate prevention and treatment right on target (Imanuna et al., 2020; Kusuma, 2022; Nasruddin et al., 2021).

Education is a process that can change behavior so that a person can implement good eating habits in daily life so that it can help prevent or manage anemia among adolescents. According to WHO, nutritional education aims to encourage a person to behave positively towards the food and nutrition he or she will consume (Ariyanti et al., 2018; Rusdi et al., 2021; Sulistiani et al., 2021; Syaiful et al., 2022).

Health education can use audiovisual media with elements of sound and images. It is usually expected that information that can reach the wider community. Booklet media can be used as a means of information containing an issue, and can also be used as reference material about prevention and management of anemia, supplementation of iron tablets, as well as MMR/NMR. Intervention to change attitudes and behavior using interesting media is expected to change people's knowledge and attitudes so that anemia can be prevented (Muyassaroh et al., 2020).

Education on the prevention of anemia among adolescent girls using the combination of lectures and Teams Games Tournament (TGT) methods could increase knowledge by 36.1%. The combined method of lectures and TGT was effective for nutrition education activities. The lecture method was chosen because the method is effectively used as an extension method with a fairly large number of participants (Sulistiani et al., 2021).

One factor of the high incidence of anemia is the lack of knowledge on anemia. Knowledge is an important role in the incidence of anemia. Based on the results of survey that has been conducted, there was a need for health education or in the form of counseling and socialization to increase adolescent knowledge on anemia since there were still many adolescent girls who did not know about anemia as well as its prevention and treatment (Safitri, 2022).

Anemia has a devastating impact on adolescent girls that can lead to delayed physical growth and interfere with behavior and emotional. Some of the signs of anemia are lethargy, weakness, fatigue and neglect (5L), frequent complaints of dizziness and firefly eyes. Further symptoms of anemia pale eyelids, lips, tongue, skin and palms. Furthermore, side effects of iron deficiency anemia are low productivity, inhibition of mental development and intelligence, decreased immune system, and morbidity (Gifari et al., 2020).

Development of media regarding nutritional education is very important to be carried out on an ongoing basis considering that adolescents as a vulnerable and unstable group still need interesting, interactive and renewable information (Az-zahra & Kurniasari, 2022; Murdiningrum & Handayani, 2021). In this case, there should be continuous efforts to overcome anemia with the aim of breaking the chain of stunting and malnutrition. Adolescent girls who will become mothers in the future are a major concern. Adolescent girls who grow up healthy according to their developmental age can definitely produce a healthy young generation (Kartiningrum et al., 2022).

Booklet is very suitable to be used in the learning process since it is easy to read anywhere, involves concise and easy-to-understand words, and contains interesting images so that the explanation is very easy for adolescents to understand (Putri, 2020).

Conclusions

It can be concluded that there was an effect of health education using booklet media on the increase in knowledge on anemia among adolescent girls with p-value=0.000. It is expected that healthcare workers can provide health services in the form of education to young women using booklet media so that adolescents are interested in listening to information and the information can be easily understood.

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Effect of Special Massage on Hamilton Anxiety Rating Scale (HARS) Scores among Primigravida Pregnant Women in the Third Trimester in Coping with Childbirth During the Covid-19 Pandemic

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A B S T R A C T

The spread of coronavirus during the Covid-19 pandemic has resulted in an increased level of anxiety among pregnant women. Decrease in the level of anxiety in pregnant women can be achieved through non-pharmacological therapy, one of which is special massage. This study aims to analyze the difference in the effect of special massage on the anxiety level between primigravida pregnant women in the third-trimester and pregnant women without special massage in coping with childbirth during the Covid-19 pandemic. This was a quasi-experimental study with a Non-equivalent Control Group Design approach. The samples in this study were 80 pregnant women in the third-trimester. The sample size was determined using the formula for unpaired categorical analytical study to test the hypothesis between the two proportions. The test results showed a comparison of anxiety scores (pre and post) in the two study groups, with a decrease in the HARS score in the special massage group by 43.7%. Meanwhile, the decrease in the HARS score in the group without special massage was -9.1%. The statistical test results with the Mann-Whitney test obtained a p-value ≤ 0.001 (p <0.05) which indicated a significant difference. It can be concluded that special massage had a significant effect on a decrease in the HARS Score of primigravida pregnant women in the third-trimester pregnant women in coping with childbirth during the Covid-19 pandemic.

Penyebaran virus corona di masa pandemi Covid-19 mengakibatkan meningkatnya tingkat kecemasan pada ibu hamil. Kecemasan pada ibu hamil tidak bwasa begitu saja dibiarkan, Sebab, jika penanganannya kurang tepat, akan menimbulkan risiko bagi ibu hamil, diantaranya resiko terjadinya prematuritas dan resiko hipertensi pada kehamilan. Penurunan kecemasan dapat dilakukan dengan terapi non-farmakology, salah satunya adalah dengan melakukan pijat khusus. Tujuan penelitian ini adalah untuk menganalisa perbedaan pengaruh pijat khusus terhadap tingkat kecemasan ibu hamil primigravidan trimester III dibandingkan ibu hamil tanpa diberikan pijat khusus dalam menghadapi persalinan pada masa pandemi Covid-19. Metode yang digunakan dalam penelitian ini adalah eksperimental semu dengan pendekatan Non-equivalent Control Group Design. Sampel dalam penelitian ini sebanyak 80 ibu hamil trimester III. Perhitungan sampel menggunakan rumus penentuan besar sampel untuk penelitian analitik kategorik tidak berpasangan, digunakan rumus besar sampel untuk uji hipotesis antara dua proporsi, Hasil pengujian menunjukan perbandingan skor kecemasan (pre dan post) pada kedua kelompok penelitian, penurunan Skor HARS pada kelompok pijat khusus sebesar 43,7%. Sedangkan penurunan Skor HARS pada kelompok tanpa pijat khusus sebesar -9,1%. Hasil uji statistic dengan Uji Mann-Whitney diperoleh nilai p ≤ 0,001 (p<0,05) yang berarti bermakna. Kesimpulan dari penelitian ini menunjukan bahwa pijat khusus memiliki pengaruh yang signifikan terhadap penurunan Skor HARS Ibu Hamil Primigravida Trimester III dalam menghadapi persalinan pada masa pandemi Covid-19.

Introduction

Pregnancy is the most special and always-awaited period in a woman's life. According to WHO (2018), pregnancy is a physiological process. The process of pregnancy begins with conception until the fetus is born, calculated from the first day of the last menstruation, which is 280 days or 40 weeks or 9 months 7 days (ACOG, 2016). Pregnant women will experience many physiological and psychological changes during pregnancy.

Psychological changes can be influenced by external factors, such as the Covid-19 pandemic. This is in line with a study conducted by (Nurliana et al., 2021) which revealed that the widespread of COVID-19 in society also influenced pregnant women, resulted in psychological problems such as depression, anxiety, and stress. Up to April 2020-2021, there were 536 cases of pregnant women confirmed with COVID-19, of which 16 people died or it was estimated that 32 of every 1000 pregnant women died. Meanwhile, if there was no pandemic under normal conditions, the mean maternal mortality rate was 3 of every 1,000 pregnant women. In fact, the number of deaths of pregnant women during the COVID-19 period increased by up to 10 times (POGI, 2021).

There were 11,607 cases of COVID-19 in Tasikmalaya City, and 368 deaths as of 29 November 2021. Tasikmalaya City was one of the largest contributors to COVID-19 in West Java (Pikobar, 2021). On December 2, 2021, researchers conducted a preliminary study at the Urug Community Health Center which consisted of 4 sub-districts including Urug sub-district, Leuwiliang sub-district, Tanjung sub-district, and Gunung Gede sub-district. It was recorded that 489 were confirmed positive for COVID-19 in the Urug Health Center area from March 15 2021 to November 15 2021, where 480 people recorded, and 28 people died, 2 of whom were pregnant women in the third-trimester. In March 2022 there was an additional 226 cases of COVID-19. Thus, the total number of confirmed cases of Covid-19 at the Urug CHC in Tasikmalaya City was 706 people.

Pregnant women are vulnerable to physiological changes during pregnancy, the immune system decreases and it affects pregnant women (Liang, H., & Acharya, 2020). When compared to pregnant women who do not have comorbidities, pregnant women with comorbidities face a higher risk of serious illness, morbidity, and mortality. (POGI, 2021). Other coronavirus infections, such as Severe Acute Respiratory Syndrome (SARS), are also more likely to cause problems and severe illness in pregnant women (Di Mascio D, Khalil A, Saccone G,dkk, 2020).

Psychological changes in pregnant women and the amount of information regarding Covid-19 causes several pregnant women to experience anxiety (Niken Sukesi, 2020; Devid Saputra. Mau'idhoh Hasanah, 2020) not only worrying about the state of the fetus in the womb but also about whether the mother and the fetus will be healthy and free from COVID-19 infections, and whether it was safe or not to perform Antenatal care visit during the Pandemic.

Pregnancy was a very vulnerable time and the environment affects it psychologically which will have an impact on pregnant women and the fetus. Based on a study conducted by Cathrine (2020), there was a significant relationship between the Covid-19 incidence and depression and anxiety in pregnancy (Bagshawea, Catherine Lebela Anna MacKinnonb Mercedes Lianne Tomfohr-Madsenb Giesbrecht,

2020). Depression during pregnancy has been associated with various complications, such as premature birth low birth weight, decreased length of birth, fetal growth retardation and post-natal complications (Alder J Fink N Bitzer J et al, 2007; Broekman et al, 2014; Grigoriadwas et al, 2013; Ciesielski, 2015; Becker et al, 2016).

There are many ways to get over anxiety, including medication and non-pharmacological treatment (Hastuti, 2015). Psychopharmacology can only be done by psychiatrists with strict limits and high caution, while non-pharmacological therapy can be done through relaxation, massage, warm compress, music, and aroma therapy (Suyatmo, Yeyi, SP, Carla, 2009). According to previous study, massage therapy can function as an effective intervention for women with pregnancy depression. Furthermore, according to The Australian Association of Massage Therapists (AAMT) there are several methods of massage (Koren, 2017)

There are several types of massage for pregnant women, including prenatal massage, effleurage massage, and endorphin massage. Endorphin Massage is a touch therapy or light massage that was given to pregnant women before giving birth. It is very helpful because such massage can release endorphins which are pain relievers so as to provide a sense of comfort (Kuswandi, 2014). Based on a study conducted by Hidayati and Wisnu (2014) entitled Effect of Endorphin Massage on β-endorphin Levels and Edinburgh Postnatal Depression Scale (EPDS) Score among Women with Postpartum Blues, it was revealed that endorphin massage was a good alternative treatment to increase β-endorphin levels (ng/l) from 1241.47 ± 1701.91 to 1929.96 ± 2617.93 (Hidayati et al., 2014) Several ways can be performed to increase the level of β-endorphin levels in the body, including: exercise, food, sexual activity, and massage (Njwas, Kosek, 2012; Loh et al, 1996; Hawkes CH, 1992; Géher, 2007).

Endorphin massage affects the surface of the skin, soft tissue, muscles, tendons, ligaments and fascia which can cause a feeling of calm in pregnant women (Candimulyo et al., 2017). This study aims to know the description of HARS score among Primigravida pregnant women in the third trimester in coping with childbirth before and after being given a special massage during the COVID-19 pandemic. Further study objective is to analyzing the effect of special massage on HARS score of Primigravida pregnant women in the third trimester compared to pregnant women without special massage in coping with Childbirth during the COVID-19 Pandemic.

Methods

This was a quantitative and quasi-experimental study with a Non-equivalent Control Group Design approach using Treatment and Control groups. The sample size in this study applied calculation for the hypothesis test for two populations. Thus, a sample size of 80 pregnant women was obtained, who were selected using purposive sampling based on inclusion criteria, namely Primigravida pregnant women, aged 15-40 years, in the third trimester of pregnancy, lived at home with their husbands or family, were willing to be a respondent, had mild, moderate and severe anxiety. On the other hand, the exclusion criteria were pregnant women who had a serious illness, were taking anxiety medication, husband or family who did not want to perform special massage (endorphin massage). Data were

collected using the Indonesian version of the Hamilton Anxiety Rating Scale (HARS) anxiety score questionnaire (HARS vol.1).

The statistical analysis technique applied here was the Mann-Whitney test which is a comparison test with two samples to determine the relationship between variables under study. The free sample was used to compare the two independent samples come from different populations. Such test was applied as alternative when the t test in parametric statistics could not be applied since it did not meet the assumptions required in the t test.

Special massage, namely endorphin massage was performed on the back of pregnant women to form the letter V. Such massage was performed by the husband at home for 3 consecutive days for 15 minutes assisted by the researchers. The current study has obtained an ethical certificate related to The Effect of Special Massage on Hamilton Anxiety Rating Scale (HARS) Score among Primigravida Pregnant Women in the Third Trimester issued by Research Ethics Committee of Padjadjaran University, Bandung number 438/UN6.KEP/EC/2022.

Results

Table 1. Characteristics of the Study Subjects

Characteristic	Group		P value
	Treatment	Control	
Age			0.104
<20	9	11	
20-24	20	22	
25-29	10	6	
>30	1	1	
Education			0.808
Elementary	8	8	
Junior High School	9	8	
Senior High School	14	14	
Academy	9	10	
Occupation			0.882
Housewife	27	29	
Self-employed	5	6	
Civil servant	4	2	
Private	4	3	
Gestational Age			0913
7	12	10	
8	14	15	
9	14	15	

Description: *) Chi-square test

Based on the table of respondents' characteristics above, it was revealed that there was no significant difference in age, education, family income, occupation, and gestational age in the two study groups (p >0.05). Thus, it can be said that the study subjects were relatively homogeneous and could be compared. The further table shows Pre and Post anxiety scores in the treatment group by the subjects' characteristics.

Table 2. Changes in Pre and Post-Anxiety Scores in The Treatment Group by The Subjects' Characteristics

Characteristic	**Pre-Anxiety Score**		**Post Anxiety Score**	
	Median	**P value**	**Median**	**P value**
Age				
<20	25 (21 – 31)	0.758	15 (10 – 20)	0.159
20-24	25 (15 – 33)		14 (8 – 24)	

Characteristic	Pre-Anxiety Score		Post Anxiety Score	
	Median	P value	Median	P value
25-29	23 (16 – 27)		10.5 (9 – 18)	
>30	23 (23 – 23)		13 (13-13)	
Education				
Elementary School	25.5 (21 – 31)	0.312	14.5 (9 – 20)	0.958
Junior High School	21 (15 – 28)		12 (11 – 19)	
Senior High School	25 (16 – 33)		13.5 (8 – 24)	
Academy	25 (17 – 39)		13 (9 – 21)	
Occupation				
Housewife	23 (15 – 31)	0.751	13 (8 – 21)	0.698
Self-employed	22 (16 – 33)		15 (10 – 24)	
Civil servant	22 (17 – 27)		13.5 (9 – 18)	
Private	25 (23 – 29)		14 (13 – 21)	
Income				
<1.5 million	25 (15 – 31)	0.694	14 (9 – 21)	0.256
1.5- 3 million	22.5 (17 – 33)		11 (8 – 24)	
>3 million	25 (16 – 29)		15 (10 – 21)	

Description: *) *Kruskal-Wallis test.*

Referring to table 2 above, there were no significant relationship between changes in the anxiety scores and characteristics of age, education, family income, and occupation in the treatment group (special massage) ($p>0.05$). Furthermore, the anxiety score was mostly decreased based on age characteristic, where the anxiety scores before treatment was 0.758 while after the special massage treatment, it changed to 0.159. On the other hand, in the control group (without special massage), there was a significant relationship between changes in the anxiety scores and characteristics of the level of education and occupation ($p<0.05$). Thus, based on the HARS score on the first day, it can be said that the higher the education level and the better the occupation, the lower the anxiety score.

Table 3. Changes in Pre and Post-Anxiety Scores in Groups Control Based on Characteristics

Characteristics	Pre-Anxiety Score		Post Anxiety Score	
	Median	P value	Median	P value
Age				
<20	23 (21 – 28)	0.129	25 (20 – 30)	0.303
20-24	22 (17 – 28)		23.5 (14 – 30)	
25-29	19.5 (14 – 24)		20.5 (17 – 28)	
>30	25 (25 – 25)		29 (29 – 29)	
Education				
Elementary School	24 (21 – 28)	0.001	24.5 (20 – 28)	0.095
Junior High School	23 (21 – 28)		24.5 (20 – 30)	
Senior High School	22.5 (18 – 26)		24.5 (20 – 29)	
Academy	19.5 (14 – 22)		20.5 (14 – 30)	
Occupation				
Housewife	23 (18 – 28)	0.005	24 (17 – 30)	0.016
Self-employed	22 (20 – 24)		23 (22 – 28)	
Civil servant	17 (14 – 20)		16.5 (14 – 19)	
Private	17 (16 – 18)		19 (15 – 22)	
Income				
<1.5 million	23 (18 – 26)	0.535	14 (9 – 21)	0.882
1.5- 3 million	22 (16 – 28)		11 (8 – 24)	
>3 million	21 (14 – 26)		15 (10 – 21)	

Description: *) Kruskal-Wallis test.

Table 3 revealed that the highest decrease in anxiety scores based on level of education with a p-value of 0.001 in the first day and a p-value of 0.095 on the second day; followed by a decrease in anxiety scores based on occupation, with a p-value of 0.005 on the first day and a p-value of 0.016 on

the second day. The data illustrated that the subject's level of education and occupation could influence changes in anxiety.

The following table displays the changes in the level of anxiety of the treatment group and the control group, both for Pre-Treatment and Post Treatment.

Table 4. Changes in Anxiety Levels in the Treatment and Control Groups between Pre and Post Intervention

Characteristic	**Group**				**P value**
	Treatment		**Control**		
	N	%	N	%	
Pre-Treatment	0	0	1	2,5	0.913
No anxiety	7	17.5	10	25	
Mild Anxiety	26	65	27	67.5	
Moderate Anxiety	7	17.5	2	5	
Severe Anxiety	0	0%	1	2.5	
Post Treatment					<0.001
No Anxiety	20	50	0	0	
Mild Anxiety	17	42.5	8	20	
Moderate Anxiety	3	7.5	24	60	
Severe Anxiety	0	0	8	20	

Based on table 4 above, shows that the pre-treatment anxiety scores in the two groups did not have a statistically significant difference, because the p-value was greater than 0.05 (p> 0.05). Meanwhile, the anxiety scores in the post-treatment group showed a significant difference, because the p-value was less than 0.05 (p<0.05).

Table 5. Comparison of Anxiety Scores (Pre and Post) in Both Study Groups

Anxiety Score (HARS)	**Group**		
	Treatment	**Control**	**P value**
Pre-treatment			0.056
Median	24	22	
range	15-33	14-28	
Post-treatment			<0.001
Median	13.5	24	
range	8 – 24	14-30	
Decreased Anxiety Score	43.7%	-9.1%	<0.001

Information: *) Mann-Whitney test; **) Wilcoxon test.

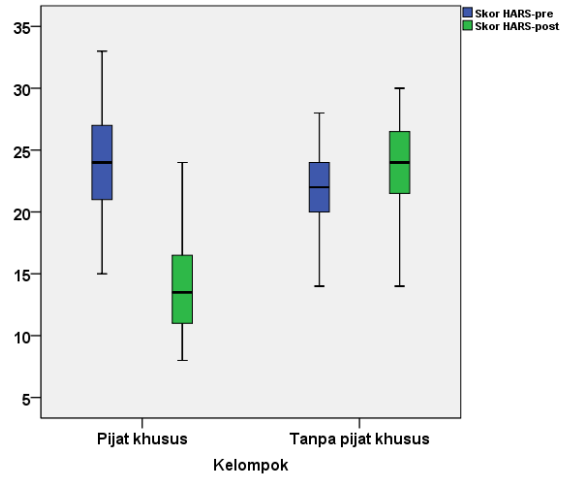

Figure 1. Comparison of Anxiety Scores (Pre and Post) in Both Study Groups

Referring to Table 5 above, it was shown that there was no difference in the anxiety scores before treatment between the treatment group and the control group (p> 0.05). However, after treatment, there was a significant difference in the anxiety scores between the two groups, as indicated by a p value of less than 0.05 (p<0.05). The HARS score after the intervention/treatment in the treatment group

decreased by 43.7%. Meanwhile, in the control group, the HARS score decreased by -9.1%. Thus, the decrease in the anxiety level in the treatment group was very significant compared to the control group ($p<0.05$).

Discussion

Based on a comparison of the HARS scores in the two groups, the HARS score range for pregnant women before the special massage treatment was 15 - 33 with a median of 24. On the other hand, the group without special massage treatment had a HARS score range of 14 - 28 with a median of 22. Information regarding the HARS score showed that pregnant women experienced moderate anxiety. Meanwhile, pregnant women with moderate anxiety showed symptoms of focusing on important things and setting aside others, experienced selective attention but could do more things if given directions. Behaviors that can be seen when experiencing moderate anxiety included nervousness or agitation, bad perception, decrease in hearing, and touching sensitivities. Previous study revealed that anxiety disorders generally occurred among women of childbearing age (Handayani R, 2015). Anxiety is a disruption in emotional state along with worry and depressive feeling in the face of difficulties (Supri Yanti, 2013).

Anxiety often occurs in pregnant women (Kessler R Keller M and Wittchen, 2001). In the third trimester, the mother's psychological changes appear to be more complex compared to the psychological state in the previous trimester, namely in the first and second trimesters (Chui Yi Chan et al., 2013). This was because a woman was increasingly aware of the presence of a fetus in her womb which was getting bigger and bigger. In addition, several fears start to increase, and the woman feels increasingly anxious about the baby's life and condition as well as her condition (Janiwarty, 2013). According to Kaplan and Sadock, anxiety in pregnant women can be due to background of pregnancy, unexpected pregnancy, thinking about bad things about the baby in the womb, life events that are not positive, negative thinking, suffering from physical illness, and fear (Sadock et al., 2015). Fear among pregnant women can be caused by fear of the delivery process. According to Handayani (2015), the delivery process often affects the psychological aspects of pregnant women in the third-trimester which can cause various psychological problems, one of which is anxiety. Anxiety and depression during pregnancy symptoms affect 10 to 25% of pregnant women, and if not handled properly, such symptoms can be associated with an increased risk of premature birth (Bagshawea, Catherine Lebela Anna MacKinnonb Mercedes Lianne Tomfohr-Madsenb Giesbrecht, 2020).

Based on the results of this study, after special massage in the treatment group, the HARS score range was 8-24 with a median of 13.5, while the control group's HARS score range was 14-30 with a median of 24. The HARS score was 13.5 indicating that the treatment group did not experience anxiety, while the HARS score HARS 24 shows that the control group experienced moderate anxiety. The decline was caused by the absence of support or touch by the husband or family and the absence of physical activity such as special massage or pregnancy exercise.

The decrease in anxiety level was due to the provision of special massage or endorphin massage wherein pregnant women obtained for 3 consecutive days. The less they obtained endorphin massage, the less it could decrease the anxiety they experience. Such finding is in line with a study conducted by Durankus (2020) which states that it is important for husbands or families to provide psychosocial support to pregnant women during a pandemic, otherwise, it will have an impact on pregnancy thereby affecting the mother and fetus.

Anxiety during pregnancy had been associated with various complications, such as premature birth, low birth weight, decreased birth length, fetal growth restriction, and post-natal complications (Alder et al, 2007; Grigoriadwas· et al., 2013; Broekman, B., et al., 2014; Ciesielski, 2015; Becker et al., 2016). It was also associated with preeclampsia and gestational diabetes, also has a negative impact on the relationship between mother and baby (Mauri M Borri C Cargioli C et al, 2016; Lefkovics, E., Baji, I., Rigó, J., 2014). In addition, anxiety during pregnancy was a predictor of postnatal anxiety and depression (Biaggi, A., Conroy, S., Pawlby, S., Pariante, C., 2015). Although pharmacological therapy is frequently used to treat mental health issues in the general population, there was insufficient evidence regarding the safety of some of these medications during pregnancy (Ravesteyn, Leontien M. van Berg, Mijke P. Lambregtse - van den Hoogendijk, 2017). Anxiety and stress during pregnancy are serious public health problems that must be addressed as soon as possible despite the constraints of the Covid-19 pandemic.

The study finding is in line with a study conducted by Hargi (2013), that husband's support in coping with childbirth was very meaningful, where the husband could grow a wife's self-confidence so that she was mentally strong enough to face the childbirth process. Husband should assist the wife in preparing all the baby's needs, pay close attention to the wife's needs, and foster self-confidence and a sense of security so that the woman may not feel anxious.

The results showed an decrease in the HARS score of primigravida pregnant women after a special massage treatment, indicating a significant difference ($p<0.05$). In the special massage group, the median post-anxiety score was lower when compared to the group without a special massage (13.5 vs 24). When compared to the pre-and post-intervention anxiety scores in the two treatment groups, there was a significant decrease in scores ($p <0.05$), with a decrease in the HARS score in the special massage group by 43.7%. Meanwhile, the decrease in the HARS score in the group without special massage was -9.1%.

The decrease in anxiety level was due to the provision of special massage or endorphin massage wherein pregnant women obtained for 3 consecutive days. The less they obtained endorphin massage, the less it could decrease the anxiety they experience. Such finding is in line with a study conducted by Durankus (2020) which states that it is important for husbands or families to provide psychosocial support to pregnant women during a pandemic, otherwise, it will have an impact on pregnancy thereby affecting the mother and fetus.

Endorphin massage was very important for pregnant women. According to (Jimenez, 2006), there are several benefits, including helping in relaxation and reducing awareness of pain by increasing blood

flow to the painful area, stimulating sensory receptors in the skin and brain underneath, changing the skin, providing a general sense of well-being associated with human closeness, increasing local circulation, stimulation of the release of endorphins, decreased stimulation of endogenous catecholamines to efferent fibers resulting in a block of pain stimuli. Endorphin massage can reduce anxiety levels. The study finding is in line with a study conducted by (Wilis Sukmaningtyas Prahesti Anita Windiart, 2016) that giving endorphins massage had an effect on reducing anxiety levels among women during the latent phase of the first stage of labor. Touch makes women to feel comfortable and can decrease the anxiety level of the women in labor. The study finding is also in line with a study conducted by (Diana Arianti & Restipa, 2019) that there was an effect of endorphin massage on a decrease in the level of anxiety in the experimental group before and after intervention. Based on the t-test that was carried out, it was obtained a significant p-value of 0.041.

Based on a study conducted by Maesaroh; Eva & Hardono (2019) that most of multiparous women in labor before being given the endorphin massage treatment experienced mild anxiety. After endorphin massage, most of them did not experience anxiety. There was an effect of endorphin massage on the anxiety among women in the active phase of the first of labor, with a p-value of 0.000. Endorphin massage was associated with the anxiety of pregnant women in the third trimester as evidenced in a study conducted by Widiastini (2018) which obtained a p-value <0.05. Thus, it can be interpreted that giving endorphins massage decreased the level of anxiety in the treatment group compared to the control group.

Special massage can be applied in midwifery practice to decrease the level of anxiety among pregnant women in the third trimester in coping with childbirth. The results of this study can be a basic knowledge for managing pregnant women who are anxious through special massage. And even though the pandemic period is over, pregnant women can adapt to the environment regarding the way of managing anxiety in the future.

There are certain limitations in this study including did not examine the β endorphin levels among pregnant women in the third trimester, and did not follow-up pregnant women who experienced severe anxiety. Researchers only provided education related to ways to manage anxiety and report the number of severe anxiety to the head of the Urug CHC

Conclusions

Based on the results of the analysis and discussion, a general conclusion can be made. Before being given special massage, 65% of primigravida pregnant women in the third trimester in the treatment group experienced moderate anxiety and 67.5% in the control group experienced moderate anxiety. After being given special massage, 42.5 % of respondents in the treatment group still experienced mild anxiety, but there was an improvement, wherein 50% of respondents had no anxiety. Meanwhile, in the control group, there was no improvement in anxiety level, wherein 60% of pregnant women experienced moderate anxiety. Thus, there was an effect of special massage on the HARS score among Primigravida Pregnant Women in the Third Trimester in coping with childbirth during the COVID-19 pandemic.

Recommendation

Future healthcare providers should consider the effect of other variables such as the level of social status, economic status and environmental conditions on the level of anxiety among pregnant women in the third trimester pregnant women, both primigravida and multigravida, involve a larger size of samples, and apply mixed method research method.

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Case-based Learning Video and Learning Motivation among Midwifery Students

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A B S T R A C T

Case-based learning is commonly used in various settings, including the medical field. This study aims to determine the effect of case-based learning video on learning motivation among midwifery students. This was a quasi-experimental study with pre-test and post-test approach. This study was conducted at the Bachelor of midwifery study program, Faculty of Medicine, Andalas University from August to October 2021. Forty-nine student midwives were selected through total sampling technique. Demographic information and motivation data were collected using the Motivated Strategies for Learning Questionnaire (MSLQ). Descriptive statistics, ANOVA/Kruskal-Wallis test, and Paired T-Test/Wilcoxon Rank-sum test were applied to analyze the data. A p-value of <0.05 was considered statistically significant. This study reported no significant differences between age and the MSLQ value components. Nonetheless, significant differences were found between parents' income with intrinsic motivation (p=0.012), task value (p=0.044), and self-efficacy (p=0.02). Furthermore, there was a significant difference between intrinsic motivation and residence (p=0.012) among the other value components. The mean scores for all value components of motivation increased after the case-based learning video intervention. Two value components (task value and efficacy) showed a significant difference (p-value 0.026 and 0.000). In conclusion, case-based learning video effectively improved motivation among students. Such finding is essential to developing suitable learning method for students.

Case-based learning umumnya digunakan dalam berbagai setting, termasuk bidang medis. Studi ini memiliki tujuan untuk mengetahui pengaruh case-based learning video terhadap motivasi mahasiswa kebidanan.Penelitian ini menggunakan design kuasi eksperimen dengan pre-test dan post-test dilaksanakan di Program Studi S1 Kebidanan Fakultas Kedokteran Universitas Andalas (Agustus – Oktober 2021). Empat puluh sembilan mahasiswa kebidanan dipilih menggunakan total sampling. Pre-test dan post-test mengumpulkan informasi demografis dan motivasi menggunakan Motivated Strategies for Learning Questionnaire (MSLQ). Penelitian ini menggunakan analisis data statistik deskriptif, uji ANOVA/Kruskal-Wallis, dan uji Paired T-Test/Wilcoxon Rank-sum test. Nilai p <0,05 dianggap signifikan secara statistik.Studi ini mengungkapkan tidak ada perbedaan yang signifikan diantara usia dan subskala MSLQ. Namun, ada beberapa perbedaan yang signifikan antara pendapatan orang tua dan motivasi intrinsik (p=0,012), nilai tugas (p=0,044), dan efikasi diri (p=0,02). Motivasi intrinsik dan tempat tinggal ditemukan memiliki perbedaan yang signifikan (p=0,012) di antara subskala lainnya. Skor rata-rata untuk semua subskala motivasi meningkat setelah intervensi, yaitu pembelajaran menggunakan case-based learning video. Dua subskala (nilai tugas dan efikasi) berbbeda signifikan dengan nilai p 0,026 dan 0,000. Case-based learning dengan menggunakan video efektif dalam meningkatkan motivasi di kalangan siswa. Temuan ini penting untuk mengembangkan metode pembelajaran yang cocok untuk siswa.

Introduction

Case based-learning (CBL), also known as case study teaching or case learning approach, is an inquiry-based learning method that encourages students to be more involved to learn in the real life condition to improve communication skills, critical thinking, and motivation (Thistlethwaite et al. 2012; Gholami et al. 2021; Yoo, Yoo, and Lee 2010). CBL was firstly used by Dr. James Lorrain Smith in 1912 at the University of Edinburgh to teach pathology topics to the students (Sturdy 2007). Later, this method has been widely used in medical fields such as medicine, dentistry, pharmacology, occupational and physical therapy, nursing, allied health fields, and child development (McLean 2016). CBL aims to help students prepare themselves in clinical practice that links their knowledge to practice using clinical scenarios (McLean 2016). In CBL, students focus on solving various case-based scenarios involving self-directed learning, collaborating with friends, developing strategic thinking and problem-solving skills (Thistlethwaite et al. 2012; Yoo, Yoo, et al. 2010).

Previous studies have shown that CBL effectively enhanced learning motivation (Gholami et al. 2021; Kantar and Massouh 2015; Yoo, Park, and Lee 2010). A study conducted in South Korea reported that 59% of respondents had a positive impression of CBL due to a perceived sense of accomplishment and enthusiasm to strengthen their characteristics as nursing students (Kim, Park, and Jun 2015). Case studies nurtures an individual's responsibility for learning and creates a better insight into the given scenarios to improve learning motivation (McMellon 2013). Furthermore, using CBL facilitates the elevation of students' satisfaction and motivation for learning, which leads to better learning outcomes (Heinrich, Pennington, and Kuiper 2012).

Both written and video case studies have been used in the CBL approach. Several studies reported that a video format in case-based learning helps students to demonstrate their empathy, improve clinical reasoning skills , integrate different information, increase understanding of the cases, and motivate them to improve their knowledge (Wong and Purdy 2021; Chan et al. 2010; Shevell, Thomas, and Fuks 2015). Students also found that the video was appealing, engaging, interesting, and entertaining (Chan et al. 2010; Shevell et al. 2015). In addition, they believed that illustrating the essential clinical competencies through video could effectively transmit knowledge and communicate information (Shevell et al. 2015).

Preliminary interviews have been conducted to five midwifery students. The researchers found that around 20% of students were dissatisfied with the problem-based learning process that had been carried out due to the lack of focus in the discussion process and lack of motivation in learning. We are interested in conducting a study on Case-based Learning (CBL) method, which is expected to solve such problem. CBL has various advantages including flexibility in using cases and offers the same "reality" principles as adult learning (Thistlethwaite et al. 2012). CBL differs from PBL in that it provides more learning structures to enhance student development and achievement of specified learning outcomes (Ridley et al. 2018). Several studies reported that CBL had a significant effect on student learning motivation (Wospakrik 2019; Yoo, Park, et al. 2010). In addition, there is lack of studies on the relationship between the implementation of case-based learning method and motivation among midwifery students. Only one study in Japan that observed the impact of CBL on clinical decision-

making (Nunohara et al. 2020). Therefore, this study aims to determine the effect of case-based learning video on learning motivation among midwifery student.

Methods

This was a quasi-experimental study with pre-test and post-test design to assess students' motivation toward case-based learning video. This study was conducted at the Bachelor of Midwifery study program, Faculty of Medicine, Andalas University, from August to September 2021. A non-probability of the total sampling method was applied in this study. Forty-nine students in the third grade enrolled in professional ethics, health law, politics, and policy in the midwifery block were invited to participate and asked to fill out an informed consent form (100%). With a lottery method, students were assigned into five groups consisted of 9-10 respondents, respectively.

The researchers assessed participants' motivation using a motivation subscale adapted from the Motivated Strategies for Learning Questionnaire (MSLQ) (31 items), with scores on a 7-point Likert scale (from 1 = not at all true of me to 7 = very true of me). This instrument was applicable in higher education settings and in medical education research in Indonesia with Cronbach alpha values from 0.89 to 0.972 on the motivation scale (Faradila, Pramono, and Firmansyah 2020; Lisiswanti, Sanusi, and Prihatiningsih 2015; Ningrum 2021). All students were given information about the present study on the day of the introductory session. Pre-test questions using MSLQ were also distributed to know the student's motivation about the upcoming block they would undertake.

We provided five case videos from the paper scenarios for five weeks (one video for one week). We created 15-minute videos which converted written cases into a video format using dialogues. After watching the video with the group members, the participants were asked to actively assess the case, create an analysis, and decide on an action plan. There was a meeting between students and a facilitator of each group. The facilitator made corrections and provided feedback to students about the learning process, starting from developing analysis and planning action. In the fifth week, after completing all the topic discussions, students were distributed a post-test questionnaire using MSLQ to assess the motivation regarding their learning activities.

Quantitative data were analyzed using IBM SPSS version 23. The descriptive statistics were presented with percentages, mean, and standard deviation. ANOVA/Kruskal-Wallis test was applied to determine whether there was a difference in the means of the scores between demographic characteristics (age, residence, and parent's income) and students' motivation before the Intervention. Moreover, we applied Paired T-Test/Wilcoxon Rank-sum test to compare the motivation scores before and after the Intervention. The p-value of <0.05 was considered statistically significant. All participants gave voluntary informed consent to participate in this study, and the participants' information was kept anonymous.

Results

Demographic Characteristics and Motivation of Respondents Before the Intervention

Table 1. Bivariate Analysis between Demographic Variables and MSLQ Scores (pre-test)

Variable	N (%)	(P-value)					
		Intrinsic Motivation	Extrinsic Motivation	Task value	Control of learning beliefs	Self-efficacy	Anxiety
Age		0.875*	0.245*	0.385*	0.146*	0.534*	0.325**
19 years old	7 (14.3)						
20 years old	32 (65.3)						
21 years old	10 (20.4)						
Parents' income		0.012*	0.842*	0.044*	0.573*	0.020*	0.815**
<IDR 2,500,000	18 (36.7)						
IDR 2,500,000-IDR 5,000,000	19 (38.8)						
IDR 5,000,000-IDR7,500,000	7 (14.3)						
>IDR 7,500,000	5 (10.2)						
Residence		0.012*	0.996*	0.873*	0.837*	0.686*	0.371**
Lived alone	32 (65.3)						
Lived with friends	13 (26.5)						
Lived with family members	4 (8.2)						

* = Kruskal Wallis analysis, **=ANOVA

The demographic data of the subjects are described in Table 1. Of 49 eligible respondents, 49 (100%) agreed to participate and completed the MSLQ before and after the Intervention. 49 respondents aged 19 years to 21 years. At the time of their enrolment into the study, 32 respondents lived alone, 4 respondents lived with family members, and 13 respondents lived with friends. The mean MSLQ scores (Table 2) ranged from 5.0490 to 5.6633 (pre-test) and from 5.0735 to 6.4519 (post-test). MLSQ questionnaires comprised six value components: intrinsic motivation, extrinsic motivation, task value, control of learning beliefs, self-efficacy, and anxiety.

This study found no significant difference between age and the MSLQ subscales. Nevertheless, some considerable differences were reported between parents' income with intrinsic motivation (p=0.012), task value (p=0.044), and self-efficacy (p=0.02) (see Table 1). Only intrinsic motivation and residence were reported to have a significant difference (p=0.012) among the other value components.

Student's Motivation Before and After the Intervention

Table 2. Bivariate Analysis of Students Motivation Before and After the Intervention

Subscale	Pre-test	Post-test	p-value
	Mean (SD)	Mean (SD)	
Intrinsic Motivation	5.3878 (0.91296)	5.7602 (0.85079)	0.055
Extrinsic Motivation	5.6633 (0.92920)	5.8827 (0.77578)	0.336
Task value	5.4830 (0.92499)	5.8946 (0.81486)	0.026
Control of learning beliefs	5.5918 (0.94606)	5.8112 (0.78980)	0.772
Self-efficacy	5.2391 (0.92278)	6.4519 (0.92827)	0.000
Anxiety	5.0490 (1.08361)	5.0735 (1.15880)	0.357

Table 2 presents the subscales' mean scores, standard deviations, and p-value before and after the Intervention. The mean scores of all subscales after experiencing CBL using a video format were higher than those of all subscales before experiencing CBL, with no differences among four subscales (intrinsic motivation, extrinsic motivation, control of learning beliefs, and anxiety). Nonetheless, there were significant differences in learning motivation value components such as task value and self-efficacy before and after CBL, with a p-value of 0.026 and 0.000, respectively.

Discussion

This study explores the motivation for implementing case-based learning video among midwifery students. Motivation is dynamic because it differs with age and maturity. The results reveal no significant differences between age and motivation. It is possible that we could not find a difference between age and motivation, as the participants' age ranged from 19 to 21 years. This finding differs from another study in the Netherlands, which revealed that age was the most significant predictor of motivation. Furthermore, age has been reported to influence learning methods and performance among medical students (Kusurkar et al. 2010).

Intrinsic motivation describes students perceive to participate in a task for some reasons including obstacle, curiosity and mastery. Our findings reported a significant difference between parents' income and intrinsic motivation, task value, and self-efficacy. High-income parents would provide facilities and a better learning environment for students to increase their learning motivation (Hutasuhut and Wirawan 2019). Family support, including financial aid, was found to have the strongest correlation with all types of motivation (Kunanitthaworn et al., 2018). Additionally, this study revealed a significant difference between intrinsic motivation and residence. In contrast, a previous study reported that residence was not a significant predictor of intrinsic motivation (Wu et al., 2020).

There was a slight rise in the mean scores of all subscales (intrinsic motivation, extrinsic motivation, task value, control of learning beliefs, self-efficacy, and anxiety) before and after experiencing CBL using a video format among midwifery students. Self-efficacy showed the highest increase among the other subscales, from 5.24 to 6.45. Two value components (self-efficacy and task value) showed statistically significant mean scores between the pre-test and post-test. The impact of self-efficacy on motivation is often disregarded in research. However, students' belief in their capability is essential and needs some more attention as self-efficacy is correlated with confidence to reach goals. Students with lower self-efficacy are pessimists related to their potential; therefore, they avoid circumstances beyond their abilities.

On the other hand, students with high self-efficacy think of difficult situations as obstacles they must confront (Javanmard 2013). Students who believe they can do a given task find their class entertaining and pivotal, and once they feel that the lesson is valuable and useful, their motivation increases. Therefore, they prefer a more profound learning method to enhance their learning skills and academic performance (Azar et al. 2010).

Students were pleased and more motivated by the case-based learning video. This is similar to several studies (Gholami et al. 2021; Kantar and Massouh 2015; Yoo, Park, et al. 2010). Case-based learning using video formats can convey the real-life situation in given cases, show empathy, increase clinical reasoning skills, integrate different information, increase understanding of the cases, and motivate learning (Saltan, Özden, and Kiraz 2016; Wong and Purdy 2021; Chan et al. 2010; Shevell et al. 2015). Students also found that the video was appealing, engaging, interesting, and entertaining (Chan et al. 2010; Shevell et al. 2015).

A previous study further found that respondents had a positive impression of case-based learning due to feelings of achievement and enthusiasm to strengthen their identity as nursing students (Kim et al. 2015). Heinrich et al. (2012) reported that the CBL method facilitates students' satisfaction and motivation by participating actively in discussions and sharing their arguments during the CBL (Heinrich et al. 2012). Such approach increases understanding of concepts in a class and develops skills for learners, which consequently improve learning motivation (Raza, Qazi, and Umer 2020). Our findings revealed that there was an increase in students' critical thinking and problem-solving ability. A study conducted in South Korea explained similar result as the CBL was a practical approach to enhance problem-solving skills, motivation, and communication ability (Yoo and Park 2015).

Conclusions

It can be concluded that case-based learning video effectively improved learning motivation among midwifery students. Such finding is essential to developing suitable learning method for students. Furthermore, future research should be conducted to assess other variables that may affect students' motivation while experiencing case-based learning.

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Effect of Free-Range Chicken Eggs on Perineal Wound Healing among Postpartum Women

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A B S T R A C T

10% of maternal mortality during the postpartum period are caused by infection due to bleeding from tears in the birth canal (perineal wound). The wound healing process is influenced by the intake of protein-rich nutrients. Free-range chicken eggs from are a high source of protein (Komala, 2021). This study aims to determine the effect of free-range chicken eggs on perineal wound healing among postpartum women. This was a pre-experimental study with intact group comparison. There were 32 samples who were selected using purposive sampling technique. The samples were assigned into the Intervention Group (administered with free-range chicken eggs) and the Control Group (were not administered with free-range chicken eggs). Data collection was performed through direct observation of perineal wounds using the REEDA scale score. Data were analyzed using the Fisher Exact statistical test. The results showed that there was a faster wound healing process among respondents who were administered with free-range chicken eggs (81.2%) compare to those who were not administered with free-range chicken eggs (25%) with a p value of 0.002 <0.05. It can be concluded that the administration of free-range chicken eggs chicken eggs had an effect on perineal wound healing among postpartum women. It is expected that postpartum women who experience perineal wound starting from the second grade will consume boiled free-range chicken eggs to speed up the wound healing process.

10% kematian ibu pada masa postpartum disebabkan oleh infeksi akibat perdarahan dari robekan jalan lahir (luka perineum). Proses penyembuhan luka salah satunya dipengaruhi oleh makanan kaya akan protein. Telur ayam kampung merupakan makanan sumber protein tinggi. Tujuan penelitian ini adalah untuk mengetahui pemberian telur ayam kampung pengaruhnya terhadap penyembuhan luka perineum pada ibu nifas. Penelitian ini merupakan penelitian pre eksperimen dengan Intact Group Comparison. Jumlah sampel 32 dengan tehnik pegambilan sampel dengan purposive sampling dan dibagi menjadi Kelompok Intervensi (diberikan Telur ayam kampung) dan Kelompok Kontrol (Tidak diberikan Telur ayam kampung). Teknik pengumpulan data melalui observasi langsung luka perineum menggunakan skor skala REEDA. Data dianalisis dengan uji statistic Fisher Exact Test. Hasil penelitian menunjukan bahwa proses penyembuhan luka yang diberikan telur ayam kampung lebih cepat sembuh (81,2%) dibandingkan dengan yang tidak diberikan (25%) dengan nilai p 0,002 <0,05. Dapat disimpulkan bahwa pemberian telur ayam kampung mempunyai pengaruh lebih cepat dalam proses penyembuhan luka perineum pada ibu nifas. Diharapkan bagi ibu nifas yang mengalami luka perineum mulai derajat II untuk mengkonsumsi telur rebus ayam kampung guna mempercepat proses penyembuhan luka.

Introduction

Postpartum period is a critical period as 60% of maternal deaths occur in such period (Elisabeth Siwi Walyani, 2017). Postpartum period begins after the birth of the placenta and ends when the uterus returns to its pre-pregnancy state. This period lasts 6 weeks or 42 days (Wahida Yuliana, 2020). One of the problems that often arise during such period is infection. Infectious complications can lead to endometriosis, metritis, even peritonitis and pelvic abscess (Novila Hardiana Utami, 2017). Postpartum infection is a cause of morbidity and mortality among postpartum women (Trianingsih, I., Yenie, H., & S.P, 2019).

Perineal wounds can trigger postpartum infection. It is known that 4% - 5% perineal wounds are a factor postpartum hemorrhage (Laila, 2021). Postpartum hemorrhage due to perineal sutures is caused by episiotomy scars or spontaneous tears in the birth canal and irregular tissue tears. 85% of women with normal vaginal delivery have perineal tears, 32-33% of which are due to episiotomy and 52% are due to spontaneous tears (Santika et al., 2020). Infections that occur due to perineal wounds can be caused by a lack of wound care. In fact, specific care should be taken to speed up the healing process and avoid complications such as puerperium infection which can inhibit perineal wound healing (Fauziah, F., 2020).

The World Health Organization (WHO) states that perineal sutures among Asian women increase by up to 50%. The number of vaginal deliveries in Indonesia with perineal sutures is 75%, and 57% of them require perineal stitches (Damanik & Siddik, 2018). Based on Central Sulawesi Health Department data, there were 35,337 postpartum women and 17,056 of them experienced perineal rupture (48.26%) (Central Sulawesi Province Health Profile, 2019). Furthermore, there were 7,033 women who had vaginal deliveries in Palu City, and 2,109 (30%) of them experienced perineal sutures (Palu Health Department Profile, 2019).

Proper perineal care can speed up the wound-healing process. Factors that support the healing process include the intake of protein-rich nutrients in the daily diet (Hastuti et al., 2022). Postpartum women need 64 grams of protein in one day (Solehati, 2020). Protein significantly influences the healing process of perineal wounds since the replacement of damaged tissue surely need protein for the process of new cells regeneration (Komala, 2021). Protein is responsible as a substance for the building blocks of muscles, body tissues, but cannot be stored by the body. So, protein intake is needed every day for the wound healing (Sebayang & Ritonga, 2021).

One source of protein-rich food is free-range chicken eggs (Warsito, H., Rindiani, & Nurdyansyah, 2015). Chicken eggs have a reasonably high protein content and quality. In addition, eggs show the best digestibility among other food ingredients with a digestibility value by 100%. Free-range chicken eggs are the source of animal protein that is easy to get anywhere, relatively cheap at a price of 2,500 each. Furthermore, based on the nutritional adequacy rate, 100g of free-range chicken eggs contain 18% protein (Ramadhani et al., 2019). Previous study showed that giving egg white was more effective than giving snakehead fish for healing perineal wounds among postpartum women at Private Practice Midwife in Kediri Regency (Purnani, 2019). Other study also revealed that consumption of

boiled chicken egg whites led to a faster perineal suture wound healing compared to those who did not consume them (Nurhayati et al., 2020). The difference between the previous study and the current study lies in the type of eggs and the type of consumption. Previous study used domestic chicken eggs and only the whites were consumed while the current study used free-range chicken eggs and both the yolks and whites of the eggs were consumed.

Based on a preliminary study, an average of 35 women had vaginal delivery per month, more than 20 perineal ruptures per month, and 14 people had second-degree perineal sutures. Some postpartum women experienced delays in the process of stitches healing. Physiologically, the perineal wound will improve within 6-7 days postpartum. Delays in wound healing can be due to lack of maternal knowledge about wound care, nutrition, personal hygiene, and abstinence culture. This study aims to determine the effect of free-range chicken eggs on second-grade perineal wound healing among postpartum women at Mabelopura Community Health Center, Palu City, Central Sulawesi Province.

Methods

This was a pre-experimental study (Intact Group Comparison). This study was carried out from March to May 2021 at Mabelopura CHC, Palu City, Central Sulawesi Province. The samples enrolled in this study were 32 postpartum women with second-grade perineal sutures, who were assigned into the intervention and control groups, which involved 16 respondents, respectively. The samples were selected using purposive sampling technique based on inclusion criteria, namely postpartum women who were willing to be respondents, had normal vaginal delivery and experienced grade II perineal rupture. The exclusion criteria were women with diabetes mellitus and had an allergy to eggs.

The intervention group was administered with 2 boiled free-range chicken eggs in the morning at 07.00-10.00 WITA and in the afternoon at 15.00 - 17.00 WITA. Boiled free-range chicken eggs were administered for 7 days, at 6 o'clock on the 1st day of postpartum period, and then it would be continued on the 2nd to 7th day at the respondent's house. On the other hand, respondents in the control group were not administered with free-range chicken eggs (administered free-range chicken eggs outside the study period). Every day, the researchers visited to control the compliance of respondents while consuming and not consuming boiled eggs. Data were collected through direct observation of perineal wounds using the REEDA scale score. Fast healing was declared fast if it was ≤7 days and it was declared slow it if it was >7 days. Data were analyzed using univariate and bivariate data analysis using the Fisher Exact Test.

Ethical approval for this study was obtained from the Research Ethics Commission of Palu Health Polytechnic through a letter number 0032/KEPK-KPK/III/2021.

Results

The results of this study consisted of univariate and bivariate data. Univariate data presented data on Respondents' characteristics such as age, education, parity, and occupation. More detailed data on respondents' characteristics are presented in Table 1 below:

Table 1. Characteristics of Respondents

Characteristic	Intervention		Control	
	Frequency (n=16)	(%)	Frequency (n=16)	(%)
Age (years)				
▪ <20	0	0	0	0
▪ 20-35	12	75	12	75
▪ >35	4	25	4	25
Education				
▪ Primary	3	18.8	5	31.2
▪ Secondary	4	25	1	6.3
▪ Higher Education	9	56.2	10	62.,5
Parity			14	40.6
▪ Primipara	8	50	6	37.5
▪ Multipara	8	50	10	62.5
Occupation				
▪ Honorary staff	3	18.8	3	18.8
▪ Civil Servant	2	12.5	1	6.2
▪ Housewife	11	68.7	12	75
Total	**16**	**100**	**16**	**100**

Table 1 showed that most of respondents in the intervention group were in the age range of 20-35 with a total of 12 respondents (75%) and had a higher education level with a total of 9 respondents (56.2%). Regarding parity, primiparous and multiparous categories showed the same number of 8 respondents (50%). Furthermore, most of respondents were housewives with a total of 11 respondents (68.7%).

In the control group, most of respondents in the intervention group were in the age range of 20-35 with a total of 12 respondents (75%) and had a higher education level with a total of 10 respondents (62.5%). Regarding parity, most of respondents were multiparous with a total of 10 respondents (62.5%). Furthermore, most of respondents were housewives with a total of 12 respondents (75%).

Table 2 presents the time for perineal wounds healing after the intervention.

Table 2 Frequency Distribution Regarding the Time for Perineal Wound Healing in the Intervention Group and the Control Group

Perineal Wound Healing	Sample Group			
	Intervention		Control	
	n	%	n	%
Fast	13	81.2	4	25
Slow	3	18.8	12	75

Based on table 2, it can be seen that most of postpartum women who were administered with free-range chicken eggs experienced a fast perineal wound healing of ≤7 days as many as 13 respondents (81.2%) and 3 respondents (18.8%) experienced a slow perineal wound healing of >7 days. On the other hand, most of postpartum women who were not administered with free-range chicken eggs (control) experienced a slow perineal wound healing of >7 days as many as 12 respondents (75%) and 4 respondents (25%) experienced fast perineal wound healing of ≤7days.

Statistical test using the Fisher's Exact aims to determine the effect of free-range chicken eggs on perineal wound healing. The details are presented in table 3:

Table 3. Cross-Tabulation of Perineal Wound Healing among Postpartum Women in the Control and Intervention Groups

Wound healing process	Control		Intervention		Total		P-Value
	Σ	%	Σ	%	Σ	%	
Fast	4	12.5	13	40.6	17	53.1	0.002
Slow	12	37.5	3	9.4	15	46.9	

Based on Table 3, it can be seen that the result of the statistical test obtained the Fisher's Exact Test value of 0.002 < (0.05) which indicated that there was an effect of the administration of free-range chicken eggs on perineal wound healing among postpartum women.

Discussion

Based on the data analysis, there was no difference in the characteristics of respondents between the intervention group and the control group. Such finding indicated that one of the requirements for conducting experimental research was fulfilled, since the basic data on the initial condition of the respondents or characteristics in both groups were homogeneous.

Based on the results of this study, the administration of free-range chicken eggs was found to be effective in healing perineal wounds among postpartum women in the work area of the Mabelopura CHC, Palu City with a Fisher's Exact Test value of 0.002 <0.05. Researchers assume that such finding is due to the administration of free-range chicken eggs which are rich in protein which affected the healing process of perineal wounds. Protein significantly influences the healing process of perineal wounds since the replacement of damaged tissue surely need protein for the process of new cells regeneration (Komala, 2021).

Theoretically, Wound healing is the process by which dead or damaged tissue is replaced in the body by regeneration with new, healthy tissue. The wound is said to be healed when the surfaces can reunite and the tissue strength returns to normal. There are two categories of wound healing: Tissue regeneration structurally and functionally to be restored as the initial condition, and replacement by connective tissue (Dewi, 2019).

Any delivery that causes a wound in the birth canal can be a route for commensal bacteria to enter and become infectious. This will increase the risk of postpartum Infection due to perineal suture from an episiotomy, spontaneous rupture, or trauma to the fetus. Improper perineal wound care coupled with the condition of the perineum, affected by lochia and moisture, dramatically support the growth of bacteria that can cause infection in the perineum (Ambarwati, 2010).

Postpartum perineal wound healing takes an average of 7 to 14 days. This time is long enough, as microbes can multiply within 48 hours (2 days) (Prawirohardjo, 2014). Pharmacologically, the treatment of perineal wounds uses povidone iodine. However, based on evidence, the continuous use of povidone iodine is no longer recommended since there will be resistance in the wound (Ambarwati, 2010).

Acceleration of perineal wound healing process can be performed in several ways, one of which is through improving nutrition by consuming calories and protein-rich foods. In wound healing, protein is a raw material for fibrin and collagen proteins, which stimulates angiogenesis, and promotes cell regeneration (Drewnowski A., 2010). Common protein sources include meat, dairy, bread, grains, eggs, fish, nuts, and seeds. One solution for postpartum women to speed up the healing of perineal wounds is to consume foods that come from animal protein, i.e. eggs from free-range chickens. Free-range chicken eggs are a cheap, available, economical animal protein and one of the most nutritious foods (Warsito, H., Rindiani, & Nurdyansyah, 2015).

Free-range chicken eggs can be consumed in various preparations such as boiled eggs. A study conducted by Trianingsih & Fadilah found that consumption of boiled eggs had an effect on perineal wound healing among postpartum women 1-7 days. The perineal wound healing time for women who consumed boiled eggs was up to 7 days, whereas the perineal wound healing process for women who did not consume boiled eggs lasted more than 7 days (Trianingsih & Fadilah, 2019). This statement reinforces that protein content plays a very important role in perineal wound healing (Azizah & Alifah, 2018). Other study also revealed that there was a significant effect of eggs consumption on the healing time of perineal wounds among postpartum women (Abdurahman et al., 2020).

Furthermore, a study conducted by Sitepu showed that the mean healing time for perineal wounds among postpartum women in the intervention group (with boiled eggs) was 5.4 days shorter than the mean healing time in the control group (without boiled eggs) of 10.6 days (Sitepu & Gultom, 2022). Boiled eggs contain choline which has the effect of repairing damaged cells in the body so as to easily form new and healthy tissue to replace damaged tissue. Protein is responsible as a substance for the building blocks of muscles, body tissues, but cannot be stored by the body. So, protein intake is needed every day for the wound healing (Indayani & Juliyanti, 2023).

Conclusions

The results of the study showed that there was a significant difference in the wound healing process between the intervention group and the control group. The intervention group that was administered with boiled free-range chicken eggs showed a relatively faster wound healing time of ≤7 days compared to the control group of >7 days. The statistical test result obtained a p-value=0.002 < (0.05), meaning that the administration of free-range chicken eggs chicken eggs had an effect on perineal wound healing among postpartum women at Mabelopura CHC in Palu City. The study finding provides an alternative treatment for perineal wound healing among postpartum women by giving free-range chicken eggs for 7 days. The results of this study can also be used as a reference for healthcare professionals who provide education related to the use of daily food sources with nutritional content, especially protein-rich food. The limitation of this study was regarding control towards other factors that affect wound healing. This study only controlled those related to diabetes, and the researchers did not observe other factors such as water intake, hygiene, mobilization, etc.

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Effect of Pelvic Rocking Technique on the Relief of Low Back Pain among Multigravida Pregnant Women

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A B S T R A C T

In third trimester of pregnancy, one of the problems that often arise is back pain. Back pain in pregnant women can be relieved by pelvic rocking exercise performed in a standing, sitting and lying position, both in pairs with the husband or one of the other family members. This study aims to determine the effect of pelvic rocking technique on the relief of low back pain among multigravida pregnant women. This was a pre-experimental study with pre-test and post-test non-equivalent control group design. The study was conducted at Cakranegara Community Health Center. The study samples involved 30 multigravida pregnant women. The statistical test applied here was Wilcoxon test. The results showed that regarding characteristics of respondents, most of them were in the non-risky age group by 23 respondents (76.7%), had low education by 29 respondents (96.7%), were unemployed (Housewives) by 25 respondents (83.3%), had normal BMI by 18 respondents (60.0%), had normal weight by 18 respondents (60,0%), had a parity of >2 by 18 respondents (66.7%) and were in the 25-38 weeks of gestation by 28 respondents (93.3%). After the implementation of pelvic rocking technique, there was a decrease in mean low back pain score by 1.47. Wilcoxon test result obtained a P value of 0.00001. Pelvic rocking technique could relieving low back pain among multigravida pregnant women.

Pada trimester ketiga salah satu masalah yang timbul adalah nyeri punggung. Nyeri punggung pada ibu hamil dapat diredakan dengan latihan gerak panggul (pelvic rocking) dalam posisi berdiri, duduk dan tiduran (terlentang atau miring) yang dapat dilakukan secara berpasangan dengan suami atau salah satu keluarga yang lain. Tujuan penelitian ini untuk mengetahui pengaruh pemberian teknik pelvic rocking terhadap pengurangan nyeri punggung bawah pada ibu hamil multigravida. Desain penelitian pre dan post-test non-equivalent control group. Penelitian dilakukan di wilayah kerja Puskesmas Cakranegara. Sampel adalah ibu hamil multigravida sebanyak 30 orang. Uji statistic menggunakan uji Wilcoxon. Hasil penelitian didapatkan karakteristik responden sebagian besar umur tidak berisiko sebanyak 23 orang (76,7%), pendidikan rendah sebanyak 29 orang (96,7%), ibu tidak bekerja (IRT) sebanyak 25 orang (83.3%), IMT normal sebanyak 18 orang (60,0%), BB sekarang kategori normal sebanyak 18 orang (60,0 %) dan paritas >2 sebanyak 18 orang (66,7%) usia kehamilan 25-38 mg 28 orang (93,3%). Sesudah diberikan teknik pelvic rocking, mean nyeri punggung bawah turun 1.47 point. Hasil uji Wilcoxon didapatkan nilai P value 0.000. Pemberian teknik pelvic rocking berpengaruh terhadap pengurangan nyeri punggung bawah pada ibu hamil multigravida.

Introduction

Pregnancy is a period full of challenges for women, so that pregnant women need help from various parties, especially husbands to go through the processes of pregnancy and childbirth comfortably

and safely (Aprilia, 2011). It takes time for women to adjust to all of the changes that occur during pregnancy. The majority of pregnant women experience discomfort and anxiety as a result of the changes during pregnancy, for example regarding frequent urination by 50%, vaginal discharge by 15%, constipation by 40%, flatulence by 30%, swelling leg by 20%, leg cramps by 10%, migraine by 20%, striae gravidarum by 50%, hemorrhoids by 60%, shortness of breath by 40%, and back pain by 70%. All of changes contribute to the third trimester discomforts experienced by pregnant women (Astuti, 2009).

Back pain is one of discomforts that can be experienced in the third trimester. Such condition is due to the increased weight being carried to the uterus. The curvature of the spine in pregnant women, an increase in body weight along with the pregnancy progress, a change in body posture, and an imbalance between antagonist and agonist muscles, specifically the erector spine and lumbosacral group, are all known to cause low back pain among pregnant women (Renaningtyas et al., 2014). If a wrong condition or position persists for a long time, it will result in tension in musculus abdominalis (Latief, 2016).

Pelvic rocking is beneficial for strengthening the abdominal and low back muscles, reducing pressure on the blood vessels in the area around the uterus, and pressure on the bladder. In addition, the movement helps the women to relax and complaints of pain in the lumbar, inguinal, vaginal and surrounding areas can be relieved. A study conducted by Zagazig University in Egypt, which was published in Journal of American Science (2016), revealed that Pelvic rocking exercise in the management of low back pain was proven to reduce the level of disability during pregnancy which often causes anxiety among pregnant women. Pelvic rocking exercise can minimize or even eliminate low back pain at the end of pregnancy and improve bodily functions and activities of pregnant women in the last trimester, whose movement activities are often limited due to frequent low back pain. The reason for selecting multigravida pregnant women is due to internal factors related to pain reactions, one of which is the previous experience of pain in the previous pregnancy.

Based on data regarding prenatal care services in the Province of NTB in 2018, there were 114,488 pregnant people living in the 10 Districts/Cities of the Province of NTB. There were 117,842 pregnant women who were fully covered by District/City ANC K1 services (102.93%). The District/City K4 services' overall coverage involved 107,968 pregnant women (94.31%) (West Nusa Tenggara Provice Health Office, 2018).

According to the recapitulation of data reported by Mataram City Health Office from August through September 2019, the target number of K4 pregnant women in 11 Community Health Centers in Mataram City was 9,722 (63.03%). Cakranegara CHC showed the highest target for pregnant women by 1,329 pregnant women (74.33%), followed by the Karang Pule CHC with the target of 1,296 pregnant women (70.45%), and Tanjung Karang CHC with the target of 1,249 pregnant women (65.25%) (Mataram Health Office, 2019).

A preliminary survey was conducted on January 20–21, 2020 at Cakranegara CHC to obtain a sense of the potential severity of low back pain among multigravida pregnant women who came in for

ANC Visit. Ten multigravida pregnant women who complained of low back pain discomfort at rest participated in the study, the majority of whom complained since 8 months of gestation. There were 6 multigravida pregnant women (60%) with managed severe pain level and 4 multigravida pregnant women (40%) with controlled moderate pain level out of the 10 multigravida pregnant women who complained of low back pain discomfort. The 10 multigravida pregnant women who complained of low back pain were found to be able to manage it by engagement in regular activities.

Applying pelvic rocking technique while standing, sitting, or lying down (supine or on one's side) can help pregnant women with back pain feel better. The muscles in the low back and abdomen can be strengthened through pelvic rocking movement. By briefly removing the fetus from the mother's low back, this activity releases strain on the low back. Additionally, this exercise can lessen strain on the mother's bladder and the blood vessels in the uterus Additionally, pelvic rocking calms the women and enhances their digestive system (Handajani, 2013).

16 pregnant women participated in a study conducted by Weni Tri Purnani in 2015 entitled "Pelvic Rocking on the Relief of Low back pain among Third Trimester Pregnant Women," at the Blabak CHC in Kandat Sub-District of Kediri District. It was found that 11 respondents (68.75%) had a mild pain after receiving pelvic rocking exercise for back pain, and 5 respondents (31.25%) reported that their back pain had disappeared completely. Therefore, in this study, pelvic rocking movement was hypothesized to have a positive effect on the relief of low back pain discomfort among pregnant women in the third trimester. In this study, a pelvic rocking technique was performed in pairs (Purnani, 2015).

According to a study conducted by Weni Tri Purnani which involved 27 primigravida and multigravida pregnant women, multigravida women were found to have more intense pain than primigravida women. This study had a difference with the previous study since the researchers observed the pelvic rocking technique applied in pairs, specifically for multigravida pregnant women (Purnani, 2015). In this study, pelvic rocking technique was explained via video media as well as printed and electronic books that could be read on Android smartphones. This study aims to determine the effect of pelvic rocking technique on the relief of low back pain among multigravida pregnant women.

Methods

This was a pre-experimental study with one group pre-test and post-test non-equivalent control group design. The study was conducted at Cakranegara Community Health Center. The population in this study was all K4 pregnant women in December 2020 at Cakranegara CHC.The study samples involved 30 multigravida pregnant women who were selected using purposive sampling technique based on inclusion and exclusion criteria. The inclusion criteria included women with complaint of low back pain and gestational age of 29-36 weeks, while the exclusion criteria were those having a history of disease or currently suffering from co-morbidities of pregnancy, and had complications (repeated miscarriage, pregnancy with bleeding, multiple pregnancies). In this study, the pelvic rocking technique was performed in pairs with husbands and/or other family member. The pain scale was assessed using the Numerical Rating Scale (NRS). Based on the normality test using Shapiro Wilk, the data were not

normally distributed (non-parametric) so the Wilcoxon Signed Rank Test (non-parametric test) was applied. The ethical approval was obtained through a letter number 208/UN18.F7/ETIK/2021

Results

Characteristics of Respondents

Table 1. Frequency Distribution of the Characteristics of Respondents

Characteristic	n	%
Age		
Risky age (<20 years / >35 years)	7	23.3
Non-Risky Age (20 – 35 years)	23	76.6
Level of Education		
Low (Elementary, junior and senior high school)	29	96.7
High (Bachelor)	1	3.3
Employment Status		
Employed	5	16.7
Unemployed	25	83.3
BMI		
Normal	18	60.0
Abnormal	12	40.0
Body Mass Index		
Normal	18	60.0
Abnormal	12	40.0
Parity		
2	10	33.3
>2	20	66.7
Gestational age		
16-24 weeks	2	33.3
25-38 weeks	28	66.7
Total	**30**	**100**

Based on Table 1, it was revealed that most of women had a normal BMI by 18 respondents (60.0%); were in the normal weight category by 18 respondents (60.0%); had parity of >2by 18 respondents (66.7%); and were in the gestational age of 25-38 weeks by 20 respondents (66.7), were in non-risky age by 23 respondents (76.7%), had low education by 29 respondents (96.7%), and were unemployed (Housewives) by 25 respondents (83.3%).

Assessment of Low Back Pain Levels Before and After Pelvic Rocking Technique

Table 2. Distribution of Low Back Pain Levels Before and After Pelvic Rocking Technique

Low Back Pain	Max	Min	Mean	SD
Before	7	1	2.67	1.688
After	7	0	1.20	1.937

Based on Table 2, it can be observed that after the implementation of pelvic rocking technique for back pain had a maximum score of 7and a minimum score of 0. Meanwhile, the mean pain score experienced after the implementation of pelvic rocking technique was 1.20, with a decrease of 1.47 from the mean pain score before the implementation of pelvic rocking technique.

Effect of Pelvic Rocking Technique on the Relief of Low Back Pain among Multigravida Pregnant Women

Table 3. Effect of Pelvic Rocking Technique on the Relief of Low Back Pain

Low Back Pain	n	Mean	Median	SD	P value
Before	30	2.67	2.50	1.688	0.000
After	30	1.20	0.00	1.937	

Based on Table 3, it can be concluded that the mean pain score experienced by pregnant women after the implementation of pelvic rocking technique was 1.20. It decreased by 1.47 from the mean pain score before the implementation of pelvic rocking technique. Furthermore, the Wilcoxon test result obtained a P value of 0.000, which indicated that pregnant women who performed pelvic rocking technique no longer experienced low back pain.

Discussion

Characteristics of Respondents

To relieve back pain, pelvic rocking technique can be done 2 times a day every 2 days with duration of 30 minutes. However, pelvic rocking technique cannot be performed on pregnant women with a history of disease, co-morbidities, and/or complications of pregnancy (repeated miscarriage, antepartum bleeding, twin pregnancy). In this study, it was discovered that the majority of respondents were in a healthy reproductive stage, and that only a small percentage of respondents were between the age range of 20 and 35. Age has a significant impact on a woman's ability to physically and mentally cope with pregnancy and childbirth. A person under the age of 20 might not be psychologically prepared to experience pregnancy or childbirth. Three things—physical, mental, and financial readiness—are key indicators of pregnancy readiness. Women aged >20 years are typically considered to be ready for pregnancy. A person aged <20 years is considered psychologically less capable of making therapeutic choices. Additionally, the pregnancy may be accompanied by abnormal conditions or states, as well as delivery outcomes including early labor or a small-for-gestational-age infant. A risk factor for the quality of pregnancy and childbirth is related to the woman's readiness to reproduce. According to Surtiningsih, the best maternal age for reproduction is between 20 and 35 years, which is categorized as the healthy reproductive age. The reproductive organs are still developing at the age of 20 years, so that certain complications may occur. When a woman is over 35, her body cells start to regress, notably in the endometrium. Furthermore, her health has also started to deteriorate, and the delivery canal stiffens, which might lead to prolonged labor (Surtiningsih et al., 2016). Furthermore, Sriwenda also found that age had a significant effect on the physical and psychological states of a woman in facing pregnancy and childbirth since a woman aged <20 years might not be psychologically ready to face pregnancy or childbirth. Readiness for pregnancy is determined by 3 factors, namely physical, mental and economic readiness. In general, women are said to be ready to get pregnant in the age of >20 years (Sriwenda & Yulinda, 2016).

The second characteristic to be discussed is parity. Parity is the number of children born to the woman. Parity is an important factor in determining the condition of the mother and fetus both during pregnancy and childbirth. Prawirohardjo states that up to the third parity, the uterus can return to its pre-pregnancy state (Prawirohardjo, 2013).

Education taken by a person is one of the demographic factors that greatly influence the health condition of individuals and society. People with a high degree of education will find it easier to access

health information from a variety of sources and will frequently try to learn more about health-related topics they are aware of.

Low back discomfort in the third trimester of pregnancy is a physiological issue that pregnant women frequently experience. Discomfort below the ribs and above the inferior gluteal region is referred to as low back pain. According to Lichayati and Isma'ul Kartikasari (2013), low back pain is a common problem among pregnant women that might affect them throughout their pregnancy and even after childbirth (Lichayati, Isma'ulKartikasari, 2013).

Assessment of Low Back Pain Levels Before and After Pelvic Rocking Technique

Measuring the amount of low back pain discomfort before and after receiving the pelvic rocking treatment revealed a reduction. After receiving the pelvic rocking technique, there was a decrease in the mean level of low back pain discomfort by 1.47. The majority of back pain is considered as normal discomfort due to changes in the back's muscles, ligaments, and bones physiology (Fraser, 2009).

Every pregnancy a woman has will be distinct from the ones she has had in the past because pregnancy is a unique experience for women. In order to support the mother deal with certain problems and relieve discomforts, it is crucial for midwives to have knowledge and an awareness of the various pregnancy disorders. Although certain complaints are frequently regarded as "normal discomforts," midwives must keep in mind that the woman may view them as extremely significant discomforts. Then she must be referred to the proper medical professional if the condition progresses to a pathological condition. Hormonal and physical changes brought on by uterine development are the main causes of the discomfort experienced by pregnant women (Fraser, 2009).

Numerous pregnant women experience back pain at any time from the beginning of pregnancy until the postpartum period. Back discomfort during pregnancy is most likely to recur in women who have previously experienced it. Therefore, being able to differentiate between back pain that develops from various causes and back pain due to changes in pregnancy is crucial. Both the development of the uterus, which affects posture, and the effect of relaxing hormone on the ligaments can induce back pain during pregnancy.

Back pain that originates in the lumbosacral region is known as low back pain. Pregnancy induces back lordosis, which is a curvature of the back that stretches the back muscles and creates pain. This condition is brought on by the rising weight of the uterus. A weak abdomen muscle will lead to pain complaints worse because it raises the strain on the spine. Low back pain complaint typically rises as parity rises. Additionally, prolonged walking, excessive slouching, and lifting weights—especially when it is done when the woman is exhausted—can all result in back pain. Pelvic rocking can improve bodily functions and activities among pregnant women in the third trimester, whose mobility activities are frequently restricted due to recurrent low back pain discomfort. Pelvic rocking can reduce or even eliminate low back pain at the end of pregnancy (R. C. L. Wulandari & Wahyuni, 2019).

Effect of Pelvic Rocking Technique on the Relief of Low Back Pain among Multigravida Pregnant Women

Given that the Wilcoxon test obtained a p value of 0.000, it was possible to conclude that pelvic rocking technique implemented among multigravida pregnant women had a positive impact on the relief of low back pain discomfort.

According to the a study conducted by A. Wulandari, M. Rohmah, and E. Suprihatin, 18 respondents had a moderate level of back pain before treatment (60%) and after receiving Pelvic Rocking exercise 26 pregnant women (86.7%) had a mild level of low back pain. Wilcoxson test finding showed a p value of 0.002–0.005, which indicated a substantial impact of pelvic rocking exercise on the relief of low back pain among pregnant women in the third Trimester at Private Practice Midwife "E" in the work area of Bululawang CHC (A. Wulandari et al., 2021).

Pelvic rocking, which involves swaying the pelvis to the front, rear, left, and right sides, is one technique for relieving back discomfort. Pelvic rocking can relieve pain by strengthening the muscles in the pelvis, waist, and back as well as by lowing the baby's head to help it enter the birth canal (Hermina & Wirajaya, 2015).

Pelvic rocking technique aims to decrease the level of discomfort. According to the study finding, the mean pain scale before pelvic rocking was 2.67 with a maximum scale value of 7, and after pelvic rocking was implemented, the mean pain scale decreased by 1.20. Such finding indicated that the implementation of pelvic rocking could actually relive pain. In fact, pelvic rocking is a technique for shifting the pelvis during a contraction. The right and left sides and circle movements help a pregnant woman to feel more relaxed, and when the pelvis swings and shakes forth and backward, it might decrease the intensity of pain (Aprilia, 2011).

According to a study conducted by Zagazig University in Egypt, which was published in Journal of American Science (2016), revealed that Pelvic rocking exercise in the management of low back pain was proven to reduce the level of disability during pregnancy which often causes anxiety among pregnant women (Elkheshen et al., 2016). Pelvic rocking exercise helps pregnant women in their third trimester, whose movement activities are frequently restricted due to recurrent low back pain. It can enhance body functions and activities. Low back discomfort at the end of pregnancy can be reduced or even completely eliminated through this exercise. As a result, pregnant women experience greater happiness and enjoy their pregnancies, leading to the achievement of the highest possible overall quality of life (R. C. L. Wulandari & Wahyuni, 2019).

Low back pain is primarily brought on by poor body posture during the gestational period. Pregnancy causes the low back to curve more and the abdomen to incline more, which causes pain in the pelvis, thighs, and all the way down to the feet. There is also increased tenderness over the pubic symphysis, which may interfere with its normal function coupled with changes in uterine size, increased fetal weight, fetal head descent, and increasingly active fetal movement. Furthermore, there can be functional limits in everyday activities and numerous missed working hours, especially at productive age. Career women are prone to injury like rib discomfort, and macro consequences becomes the main justification for seeking treatment. Pregnant women with back pain tire easily and are lethargic to perform tasks like home chores and office work (Jimenez, 2000; Bull & Archad, 2007).

Conclusion

There was a relationship between pelvic rocking technique and the relief of low back pain among multigravida pregnant women, with mean decrease in level of 1.47. It is recommended for pregnant women with low back pain to regularly practice pelvic rocking exercise in an effort to relieve back pain discomfort during in the third trimester of pregnancy.

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The Impact of Covid-19 Pandemic on the Interest in Family Planning among Couples of Childbearing Age

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A B S T R A C T

The population growth rate in Indonesia has been declining recently. Family Planning program is an initiative of the Indonesian government that has been running since 1980. It has been successful in reducing the population growth rate. The number of children a woman has during her reproductive period is known as the total fertility rate. However, the Covid-19 pandemic has prompted worries about the rising birth rate as a result of the disruption of contraceptive services. In order to assist the government in gathering information on family planning acceptors among couples of childbearing age in Indonesia and to serve as a resource for courses on reproductive health and family planning, this study aims to determine the impact of Covid-19 pandemic on the interest in family planning among couples of childbearing age. This was a quantitative analytical study with a one-shot case study design. The study populations involved 137 participants of couples of childbearing age with children. All completed the questionnaire; 112 of them were selected using the total sample approach in accordance with the inclusion and exclusion criteria. Data obtained as the results of survey were tested for validity using the product moment validity test. Chi-square analysis was applied which obtained a p value of 0.003 or <0.05. It can be concluded that there was a strong correlation between family planning implementation and participation during the Covid-19 pandemic in September to December 2020. According to the study finding, couples of childbearing age were less interested in family planning as a result of the Covid-19 pandemic.

Laju pertumbuhan penduduk di Indonesia akhir-akhir ini mengalami penurunan. Program Keluarga Berencana, inisiatif pemerintah Indonesia yang telah berjalan sejak tahun 1980, berhasil menekan laju pertumbuhan penduduk negara tersebut. Jumlah anak yang biasa dimiliki seorang wanita ketika masa reproduksinya berakhir dikenal sebagai angka kesuburan total, namun wabah Covid-19 telah memicu kekhawatiran akan meningkatnya angka kelahiran akibat terganggunya layanan kontrasepsi selama pandemi. Dalam rangka membantu pemerintah dalam menghimpun informasi tentang akseptor KB bagi pasangan usia subur di Indonesia dan sebagai narasumber untuk mata kuliah kesehatan reproduksi dan KB, maka tujuan dari penelitian ini adalah untuk mengetahui bagaimana cara penanganan Covid-19. Pandemi telah mempengaruhi minat keluarga berencana di antara pasangan usia subur. Penelitian ini menggunakan metodologi desain studi kasus one-shot dan bersifat kuantitatif. 137 peserta dalam populasi penelitian, semua pasangan dengan anak usia subur, mengisi kuesioner; 112 orang diantaranya dipilih dengan menggunakan pendekatan sampel total sesuai dengan kriteria inklusi dan eksklusi. Berdasarkan hasil survei, data dikumpulkan. Dengan menggunakan metode uji validitas product moment dilakukan pengujian keabsahan data. Analisis Chi-kuadrat data digunakan, diperoleh nilai p 0,003 atau < 0,05. Akibatnya, ada korelasi yang kuat antara pelaksanaan KB dan keterlibatan selama wabah Covid-19 pada bulan September hingga Desember 2020. Menurut temuan penelitian, pasangan usia subur kurang tertarik pada KB sebagai akibat dari pandemi Covid-19.

Introduction

Population is one of the variables that affect a country's degree of welfare since a large population would result in many health issues. Therefore, the government must pay more attention to an in increase population. In recent years, Indonesia's population growth rate has started to decrease. Family Planning program is an initiative of the Indonesian government that has been running since 1980. It has been successful in reducing the population growth rate. The population growth rate in Indonesia from 1971 to 1980 was still relatively high at about 2.31%. However, from 1990 to 2000 it decreased to 1.49%. Such decrease was a result of many people who participated in government-sponsored family planning initiatives in the community (Adiyudha, 2020; Mulyani et al., 2019).

In essence, family planning has many goals beyond just lowering birth rates or preventing pregnancy, such as lowering the risk of abortion, lowering maternal and infant mortality, preserving family mental health, preventing the spread of HIV/AIDS, and preserving family economic stability. The active engagement of Couple of Childbearing Age in the use of contraceptive methods is considered good, given the numerous benefits regarding improvement of the quality of life for all family members, society, and the nation (Gaffar & Abao, 2021; Nintyasari & Kumalasari, 2014).

There was a decrease in population growth rate for Indonesia between 2000 and 2017 to 1.36%. Such finding is consistent with the result of the 2017 Indonesian Demographic Health Survey (IDHS), which showed a decline in the Total Fertility Rate (TFR). The number of children a woman has during her reproductive period is known as the total fertility rate. However, the Covid-19 pandemic has prompted worries about the rising birth rate as a result of the disruption of contraceptive services (Netral, 2019; Setiawan, 2020).

According to the National Population and Family Planning Board (BKKBN) data in 2020, there were a less number of people who participated in family planning program in March 2020 compared to February 2020. There were 36,155 IUD acceptors in February 2020, which decreased to 23,383. The number of implant, injections, tablets acceptors ranged from 81,062 to 51,536; condom acceptors ranged from 251,619 to 146,767, Male sterilization acceptors ranged from 2,283 to 1,196, and sterilization acceptors ranged from 13,571 to 8,093. The BKKBN and other related parties made every effort to ensure that couples of childbearing age continue to use contraceptive methods and medications during the pandemic period since the data raised concerns about the emergence of a surge in baby births following the Covid-19 pandemic (Listyawardani, 2020). Based on the aforementioned context, this study aims to determine the impact of Covid-19 pandemic on the interest in family planning among couples of childbearing age.

Methods

This was a quantitative analytical study with pre-experimental design that manipulated independent factors that were hypothesised to have an impact on the development of the dependent variable as the foundation of the analysis.

The study populations involved 137 participants of couples of childbearing ages with children. All completed the questionnaire; 112 of them were selected using the total sample approach in

accordance with the inclusion and exclusion criteria. The inclusion criteria involved couple of childbearing age aged under 20 years and had at least one living child. Meanwhile, the exclusion criterion was respondents who did not complete the google form questionnaire.

The current study was conducted in September to December 2020. A google form with several sent over social media, including Facebook (FB), Instagram (IG), and WhatsApp (WA), as the data collection instrument. The impact of Covid-19 pandemic on the interest in family planning among couples of childbearing age was then estimated and computed based on the information provided by respondents.

The product moment validity test method was applied in this study to evaluate the data validity. Such test was performed to assess the accuracy of the analysis on how the Covid-19 epidemic had an impact on the interest of couples of childbearing age in family planning. Based on the comparison with r table (for N=112 respondents), it was obtained the r value of 0.186. Following data collection, the further step was analysis on data reliability. The Chi Square test was applied to assess the study variables, specifically nominal variables, with a relationship level of 0.05 (the x table value = 3.841).

Results

The results of study conducted online in September - December 2020 are presented in the table below.

Table 1. Characteristics of Respondents

Variable	Category	F	%
Age	20-30 years	19	17
	31-40 years	73	65
	41-50 Years	18	16
	>50 years	2	2
Gender	Male	9	8
	Female	103	92
Family Planning Status	Acceptor	57	51
	Non-acceptor	35	31
	Dropped out	20	18

Table 1 revealed that by age category, 19 respondents (16.96%) aged 20-30 years, 73 respondents (65.18%) aged 31-40 years, 18 respondents (16.07%) aged 41-50 years, and 2 respondents (1.79%) aged >50 years. Furthermore by gender, it was known that 9 respondents (8.04%) were male and 103 respondents (91.96%) were female. By family planning status 57 respondents (50.89%) were acceptor, 35 respondents (31.25%) were non-acceptor and 20 respondents (17.86%) dropped out as family planning acceptors.

Table 2. Cross Tabulation on the Impact of the Covid-19 Pandemic on the Interest in Family Planning among Couples of Childbearing Age

Implementation	Family Planning Status				Number	%
	Acceptor		Non-acceptor			
	F	%	F	%		
Still Used	55	49.11	12	10.71	67	59.82
Dropped Out	45	40.18	0	0.00	45	40.18
Total	**100**	**89.29**	**12**	**10.71**	**112**	**100.00**

Based on the results of the data analysis, it was found that among 112 respondents involved in this study, 55 respondents (49.11%) were family planning acceptor, 12 respondents (10.71%) were Non-acceptor. Furthermore, 45 respondents (40.18%) dropped out as family planning acceptors. There was an impact of the Covid-19 pandemic on the interest in family planning among couples of childbearing age, especially among respondents.

Discussion

Nearly everyone's lifestyle has changed as a result of the COVID-19 pandemic. Such pandemic situation also negatively impacted the use of contraceptive methods and disrupted the distribution of both drugs and contraceptives. People were hesitant to visit health facilities to have their reproductive health assessed, including to arrange contraceptive methods. On the other hand, medical staffs involved in reproductive health care were diverted to accommodate other requirements. For couples of childbearing age who require contraceptive use services and products, such conditions pose serious problems to their health and wellbeing (Aprillia et al., 2020).

People often experienced that visit to medical facilities during the Covid-19 pandemic was uneasy unimportant. According to the study findings, 45 respondents (40.18%) dropped out as family planning acceptors. People were reluctant to visit health services if they were not absolutely necessary because of the government's declaration of the COVID-19 outbreak as a national disaster, policies on quarantine measures, and mobility limitations (Sirait, 2021).

The finding of this study is consistent with a study conducted by Nurma on the factors that influenced contraceptive use during the COVID-19 pandemic, which found that age had a non-significant effect on the interest of couples of reproductive age to choose contraceptive methods. One of the reasons for an acceptor to stop the use of contraceptive method was the husband support (Aprilia Nurma, 2021).

According to the finding of a study conducted by Hanafi in 2019, the use of contraceptives would be positively and significantly impacted by the family economic level. This claim relates to the selection of contraceptive methods based on the expenses involved. According to the study conducted by Nyarko in 2015, the use of contraceptive techniques was correlated with income, education, and knowledge levels.

A decrease in the number of active family planning acceptors in this study is also consistent with a study conducted by Witono, et al. regarding participation in family planning program during the beginning of the Covid-19 pandemic. One of the causes was a decrease in the intensity of the expansion and operation of family planning services provided by healthcare services (Witono & Parwodiwiyono, 2020).

The significance of continuing to actively participate in family planning, growing the desire for family planning, and raising the acceptance of family planning among couples of childbearing age can help to lower the rate of unmet need for family planning. The choice of contraceptive method is another crucial consideration. For instance, compared to other contraceptive methods, injection has a pretty high

failure rate. A woman may not use any contraceptive method because she is unaware of the effects on behavior, perceptions, motivation, and activities related to pregnancy (Fadhila et al., 2017; Musyayadah et al., 2022).

There is a significance of providing accurate information about the advantages, disadvantages, and side effects that family planning acceptors may encounter, as well as details about the locations of family planning services that continued to provide services during the Covid-19 Pandemic while adhering to strict health protocols (Adiyudha, 2020; Wijayanti et al., 2018). Accurate information can lessen patient apprehension and improve comprehension of couples of childbearing age and also enhance their confidence to use contraceptive methods.

Conclusions

The study findings indicated that although a significant proportion of couples of childbearing age who continued to use family planning methods, there was a decline in the interest in family planning among couples of childbearing age.

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Relationship between Risk Factors and the Incidence of Hypertension in Pregnancy

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A B S T R A C T

Hypertension in pregnancy is one of the causes of maternal death. Severe preeclampsia is the most significant cause of complications that can lead to death. This study aims to determine the factors that influence the incidence of hypertension in pregnancy. This was an analytical observational study with a case control approach. The study population was all pregnant women, with a total sample of 47 pregnant women, who were selected using a purposive sampling technique based on inclusion criteria. Data were collected using a questionnaire that had been tested for validity and reliability. Data were analyzed using the Chi-Square statistical test. This study was conducted among pregnant women at the Obstetrics and Gynecology Polyclinic of Ngimbang Regional General Hospital in Lamongan. Based on the results of statistical test using the Chi Square Test, it was obtained a p value = 0.000 (P<0.05) which indicated that there was a relationship between history of hypertension and the incidence of Hypertension in pregnancy. The OR value of 262.857 indicated that a woman with a history of hypertension had 262.857 times higher risk to have hypertension in pregnancy. It can be concluded that hypertension in pregnancy was caused by factors of history of hypertension and coffee consumption habit. Pregnant women are recommended to avoid risk factors for hypertension in pregnancy. Furthermore, healthcare workers are expected to provide counseling and health education for early detection of pregnant women so as to prevent the risk factors for hypertension.

Hipertensi pada ibu hamil merupakan salah satu penyebab kematian ibu tertinggi. Preeklampsia berat merupakan penyebab yang menimbulkan komplikasi yang dapat berujung pada kematian. penelitian ini dilakukan dengan tujuan untuk mengetahui faktor-faktor yang mempengaruhi kejadian HDK. Jenis penelitian yang digunakan adalah observasional analitik dengan pendekatan case control. Populasi seluruh ibu hamil, dengan sampel sebanyak 47 ibu hamil, menggunakan teknik purposive sampling dengan kriteria inklusi. Pengumpulan data menggunakan kuesioner yang telah diuji validitas dan reliabilitasnya. Dengan menggunakan uji statistik Chi-Square,mpenelitian dilakukan pada ibu hamil di Poli kandungan RSUD Ngimbang Lamongan. Berdasarkan hasil uji statistik dengan menggunakan Uji Chi Square diperoleh nilai p = 0,000 (P<0,05) artinya ada hubungan antara riwayat hipertensi dengan kejadian hipertensi pada ibu hamil. Nilai OR sebesar 262,857 berarti riwayat hipertensi mempunyai resiko sebesar mempengaruhi kejadian hipertensi dalam kehamilan. Kesimpulan HDK disebabkan oleh faktor riwayat hipertensi dan kebiasaan konsumsi kopi. Saran kepada ibu hamil agar dapat menghindari faktor resiko bisa terjadinya hipertensi dalam kehamilan dan diharapkan kepada para petugas kesehatan agar dapat memberikan penyuluhan dan edukasi kesehatan deteksi dini kepada ibu hamil agar dapat menghindari faktor resiko penyebab hipertensi.

Introduction

Hypertension is a non-communicable disease which is still a major problem in the world of global health with more than one billion patients (World Health Organization, 2014). The number of

patients with Hypertension in pregnancy is predicted to increase every year (Arafah & Notobroto, 2018).

Hypertension in pregnancy is one of the causes of maternal death. In this case, severe preeclampsia is the most significant cause in the hypertension group in pregnancy which causes complications that can lead to maternal death. Hypertension in pregnancy in Indonesia has increased by 30% which is the most common cause of death for pregnant women in Indonesia. One of the direct causes of maternal death in Indonesia is hypertension in pregnancy by 28%, followed by eclampsia by 24%, and hemorrhage by 11%. (MoH RI, 2022; Safitri & Djaiman, 2021). In 2019, the total number of pregnant women who died from hypertension in Indonesia reached 1,066 cases, followed by East Java with 162 cases (East Java Health Office, 2020)

The Maternal Mortality Rate (MMR) was obtained from various surveys carried out specifically with the implementation of family health checks and Indonesian Demographic Health reviews. The coverage of the MMR research area was wider than the previous survey (Alwiningsih, 2017). According to report made by the Community Health Centers in the Family Health Department of the Lamongan Health Office in 2020, the total number of pregnant woman death as managed by healthcare workers was 14 patients, namely 5 women in labor and 9 postpartum women with a MMR of 84 per 100,000 births, which has increased when compared to the MMR in 2019. Several triggering factors for the high maternal mortality rate was hypertension, bleeding, infection, and disorders of the circulatory system. Therefore, efforts that can be made to reduce maternal mortality include studying maternal mortality cases, increasing staff by reviewing Normal Childbirth Care (APN), rolling desks, holding classes for pregnant women, accompanying high-risk pregnant women, providing Complementary Food for pregnant women and assisting delivery at health facilities with the team (Lamongan District Health Profile, 2021).

A woman is determined as being at risk of high blood pressure (hypertension) when the systolic blood pressure is >140 mmHg and diastolic blood pressure is >90 mmHg. The risk factors for hypertension can be divided into 2 groups, namely the consequential factors that can be changed, namely age, gender, heredity, and parity factors among pregnant women, and those that cannot be changed, namely obesity, stress, smoking, alcohol, and salt intake (Arikah et al., 2020).

There are several aspects that influence the incidence of hypertension among pregnant women worldwide, such as; have family history of hypertension, have a history of preeclampsia in past pregnancies, obesity, nulliparity, diabetes, chronic hypertension, and extreme maternal age. According to Mochammad Ilham et al. (2022), there was a relationship between parity and the incidence of Hypertension in pregnancy with a p value of 0.000. Furthermore, it was also found that there was a relationship between weight gain and the incidence of hypertension in pregnancy with a p value of 0.048. Parity is one of the causes of hypertension in pregnancy. A study conducted by Marlina et al. (2021) showed that there was a relationship between parity and the incidence of hypertension in pregnancy with OR = 3.934

Based on the high maternal mortality rate due to Hypertension in pregnancy in Indonesia, especially in Lamongan City, this study was conducted with the aim of determining the factors that influence the incidence of hypertension in pregnancy at Ngimbang regional General Hospital of Lamongan. Since this hospital is one of the public hospitals in Lamongan, it is expected that there will be more cases of hypertension in pregnancy to be involved as the study samples at this hospital. This study is expected to provide benefits for those who read it.

Methods

This was a case-control-based analytical observational study. The study population consisted entirely of pregnant women. A purposive sampling method based on inclusion and exclusion criteria was used to select the 47 pregnant women who made up the study's total sample (Rosadi & Hildawati, 2021). Inclusion criteria involved: 1) Pregnant women who were willing to be the study samples; 2). Pregnant women who visited the Obstetric Gynecology Polyclinic of Ngimbang Regional General Hospital; 3). Pregnant women who could read. Meanwhile, the exclusion criteria involved: 1) Pregnant women who were not willing to be the study samples, 2). Pregnant women who did not visit the Obstetric Gynecology Polyclinic of Ngimbang Regional General Hospital; 3). Pregnant women who were not good at reading. Data were collected using a questionnaire that had been tested for validity and reliability. Data were analyzed using the Chi-Square statistical test.

Results

Table 1. Relationship between History of Hypertension and the Incidence of Hypertension in Pregnancy

History of Hypertension	Hypertension				α = 0,05	OR	95%CI
	Case		Control				
	f	%	f	%			
Yes	46	97.,9	7	14.9	0.000	262.857	30.997-2229.018
No	1	2.1	40	86.1			
Total	**47**	**100**	**47**	**100**			

According to table 1, it was shown that the incidence of hypertension was higher in the category of cases with a history of hypertension by 46 (97.9%). In addition, there was a higher number of control respondents who did not have hypertension in the category of no history of hypertension by 40 (86.1%).

According to the results of statistical tests using the Chi Square test, it was obtained a p value of 0.000 (P <0.05) which indicated that there was a relationship between a history of hypertension and the incidence of hypertension among pregnant women. The OR value was 262.857 which meant that women with a history of hypertension had 262.857 times higher risk to have hypertension in pregnancy.

According to table 2, it was revealed that the incidence of hypertension was higher in the category of having a coffee consumption habit by 38 (80.9%). In addition, there was a higher number of control respondents who did not have hypertension in the category of no coffee consumption habit by 46 (97.9%).

Table 2. Relationship between Coffee Consumption Habits and Incidence of Hypertension in pregnancy

Coffee Consumption Habit	Hypertension				α = 0.05	OR	95%CI
	Case		Control				
	f	%	f	%			
Yes	38	80.9	1	2.1	0.000	194.222	23.543-1602.291
No	9	19.1	46	97.9			
Total	**47**	**100**	**47**	**100**			

According to the results of statistical tests using the Chi Square test, it was obtained a p value of 0.000 (P <0.05) which indicated that there was a relationship between coffee consumption habit and the incidence of hypertension among pregnant women. The OR value was 194.222 which meant that women with coffee consumption habit had 194.222 times higher risk to have hypertension in pregnancy.

Discussion

The results showed that almost 100% (97.9%) of hypertension occurred in pregnant women with a history of hypertension. The results of statistical tests revealed that there was a relationship between a history of hypertension and the incidence of hypertension in pregnancy. Based on the data above, it can be seen that with a history of hypertension, a woman might experience hypertension in pregnancy (Ianatus Shofya Nurrohmah, 2019).

History of hypertension can be defined as previously experienced hypertension before pregnancy or before 20 weeks of gestation. Women who have a history of hypertension are at greater risk of experiencing hypertension in pregnancy and can cause preeclampsia. Besides that it can increase maternal and neonatal morbidity and mortality (Fox et al., 2019). Furthermore, a history of chronic hypertension during pregnancy can increase the risk of hypertension in pregnancy, and such condition can result in superimposed preeclampsia and chronic hypertension (Mandiri & Khadijah, 2018).

According to a study conducted by Imaroh, the results of statistical test using the Chi Square test obtained a p value of 0.015 (p <0.05; 95% CI = 5.950). It very well may be reasoned that there was a connection between family background of hypertension and the occurrence of hypertension in pregnancy. In addition, women with a family history of hypertension had 5.9 times greater risk of experiencing hypertension (Marlina et al., 2021).

According to a study conducted by Robson, a history of previous pregnancy could be a factor in hypertension during pregnancy. The results further showed that a history of pregnancy was dominated by 16 patients (18.82%9), 2 patients (2.35%) had a previous history of preeclampsia, and 12 patients (14.12%) had a previous history of hypertension. Pregnant women who previously had a history of preeclampsia had a 7-fold increased risk of developing hypertension in pregnancy (Dewi & Sulistiyono, 2015). A history of hypertension was significantly related to the incidence of hypertension in pregnancy since pregnant women who previously had hypertension had a 20% risk of having hypertension in their current pregnancy.

The results of this study showed that the incidence of hypertension was more common among pregnant women with a coffee consumption habit by 80.9%. The results of statistical analysis revealed that there was a relationship between coffee consumption and the incidence of hypertension (p = 0.000).

According to the American Pregnancy Association, caffeine is a stimulant. That is, when pregnant women consume caffeine, their blood pressure and heart rate may increase. Not only a stimulant, caffeine is also a diuretic (Suhardjono, 2017). Thus, consuming caffein can increase the frequency of urination. Increased frequency of urination can reduce fluid levels in the body. If not balanced with sufficient fluids, pregnant women can experience dehydration (Malka & Kebidanan Batari Toja Watampone, 2022).

A study conducted by Dewi & Sulistiyono (2015) showed that there was a relationship between the coffee consumption habit and the level of hypertension in the work area of fishermen's CHC in Gresik District. Based on the frequency and duration of coffee consumtion, type of coffee, and thickness of coffee, most of patients who had coffee consumption habit experienced hypertension with a p value = 0.000.

Moreover, a study conducted in Japan by Zaki et al., (2021) revealed that pregnant women who consumed caffeinated drinks had an increase in the risk of hypertension in pregnancy (Suhartini & Ahmad, 2019). According to the assumption of researchers, coffee consumption habit can cause hypertension in pregnancy since coffee contains caffeine which can increase blood pressure. As we know, pregnant women are very susceptible to various complications during pregnancy because of the many changes that occur both physiologically and psychologically. Thus, the consumption of caffeine contained in coffee is very vulnerable to triggering hypertension in pregnancy (Indayani & Fijri, 2021).

Conclusion

Based on the results of this study, it was found that the incidence of hypertension among pregnant women was caused by a history of hypertension and coffee consumption habit. Pregnant women are recommended to avoid risk factors for hypertension in pregnancy. Furthermore, pregnant women with a history of hypertension should pay more attention to their diet so as not to cause hypertension during their pregnancy. Obese women also need to monitor their weight gain, as well as pregnant women with coffee consumption habits in order to reduce coffee consumption during pregnancy. In addition, healthcare workers are expected to provide counseling and health education for early detection of pregnant women so as to prevent the risk factors for hypertension.

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Effectiveness of Virgin Coconut Oil (VCO) on Changes in Weight and Height among Under-five Children with Stunting

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ABSTRACT

Virgin Coconut Oil (VCO) is a type of vegetable oil that can facilitate the food digestion and nutrients absorption processes. VCO contains ±10% unsaturated fatty acids and ±90% saturated fatty acids. Besides fat, VCO also contains micronutrients. Administering VCO to under-five children with stunting aims to improve metabolic function so as to increase immunity, optimize growth and development and quality of child health status. This study aims to determine the effectiveness of Virgin Coconut Oil (VCO) on changes in body weight and height among under-five children with stunting. This was a Quasi-Experimental study with a Non Equivalent Control Group design. The samples involved 32 under-five children with stunting. The intervention by administering VCO at a dose of 1 X 5 ml before eating in the morning was conducted for 30 days. Data were analyzed using paired t-test. The results of the study found that administration of VCO was not proven to be effective in significantly increasing body weight (p=0.693) and height (p=0.548) among under-five children with stunting (p>0.05).

Virgin Coconut Oil (VCO) atau minyak kelapa murni adalah salah satu jenis minyak nabati yang dapat mempermudah proses pencernaan makanan dan penyerapan gizi. VCO mengandung asam lemak tak jenuh ±10% dan asam lemak jenuh ±90%. Kandungan VCO selain lemak juga mengandung zat gizi mikronutrien. Pemberian VCO pada balita stunting ditujukan untuk memperbaiki fungsi metabolik sehingga dapat meningkatkan imunitas, mengoptimalkan tumbuh kembang dan kualitas status kesehatan balita Tujuan penelitian ini adalah mengetahui efektivitas Virgin Coconut Oil (VCO) terhadap perubahan berat badan dan tinggi badan pada balita stunting. Penelitian ini adalah metode Quasy-Eksperiment dengan rancangan Non Equivalent Control Group. Sampel yang digunakan adalah balita stunting berjumlah 32 responden. Intervensi pemberian VCO dengan dosis 1 X 5 ml sebelum makan pada pagi hari dilakukan selama 30 hari. Analisis menggunakan paired t-test. Hasil penelitian didapatkan bahwa pemberian VCO tidak terbukti efektif meningkatkan berat badan (p=0,693) dan tinggi badan (p=0,548) pada balita stunting secara signifikan (p>0.05)

Introduction

Decrease in the incidence of malnutrition in children under 5 years of age is still a global health problem and a priority for most low-income countries. Globally, 1 in 3 children under 5 years of age suffers from malnutrition, and two thirds of them live in Asia (Van Beekum et al., 2022).

Indonesia is currently having a challenge regarding stunting. Based on the result of the Indonesian Nutrition Status Study (SSGI) the prevalence of stunting among under-five children in 2021 was 24.4%, while the prevalence in East Java was 23.5%, higher than the target set by WHO of <20%. According

to the Indonesian Ministry of Health, the incidence of short or stunted under-five children is determined by measuring the length or height, which is below normal range when compared to the standard (Sandjojo, 2017).

Stunting is a nutritional problem in children which can have a negative impact on the quality of life in an effort to achieve optimal growth and development. Stunting can affect and hinder the process of child development (Tri Siswati, 2018). The problem of stunting also has a negative direct and long-term impact on health which may lead to poor child development, decreased intellectual function which affects children's learning processes at school and at home, while making it difficult for them to get along and play with peers. In addition, there is an increased risk of infection and decreased productivity. The long-term impact on stunting children refers to a higher risk of developing degenerative diseases, such as cancer, diabetes and obesity. Such diseases may occur because the needs for micro and macro nutrients in the body are not met optimally, which further leads to imperfect formation of body cell functions (Sandjojo, 2017).

Providing complementary foods with adequate and balanced nutritional content to under-five children is expected to support their growth and development process. Fat is an important component that needs to be given to stunted under-five children. Virgin Coconut Oil (VCO) or pure coconut oil is a type of vegetable oil that can facilitate the food digestion and nutrients absorption processes. VCO contains ±10% unsaturated fatty acids and ±90% saturated fatty acids which are dominated by lauric fatty acids of around 47% - 53%. The saturated fatty acids in VCO are medium-chain fatty acids which are more easily dissolved and are not stored in the body as fat tissue. Besides fat, VCO also contains micronutrients (Anton Muis, 2019). Administration of VCO to under-five children with stunting aims to improve metabolic function so as to increase immunity, optimize growth and development and the quality of the health status (Berawi et al., 2020). Administering VCO to under-five children with stunting aims to improve metabolic function so as to increase immunity, optimize growth and development and quality of child health status. This study aims to determine the effectiveness of Virgin Coconut Oil (VCO) on changes in body weight and height among under-five children with stunting.

Methods

This was a Quasi-Experimental study with the Non-Equivalent Control Group Design to reveal causal relationships by involving a control group in addition to the experimental group. The samples involved 32 under-five children with stunting. Measurement of body weight and height used a manual measuring instrument, which will be observed before being given the VCO intervention and re-observed after being given the VCO intervention. The intervention by administering VCO at a dose of 1 X 5 ml before eating in the morning was conducted for 30 days. Data were analyzed using paired t-test.

Results

Table 1. Frequency Distribution of Body Weight Before and After Administration of VCO

Weight	Pre-test			Weight	Post-test			P value
	n	%	Mean		n	%	Mean	
Non-Ideal Weight	32	100	9.5	Wight Gain	9	28.1	9.7	0.693
				Fixed Weight	17	53.1		
				Weight Loss	6	18.8		
Total	32	100			32	100		

Table 1 revealed that before administration of VCO, all respondents had a non-ideal body weight (100%), whereas after administration of VCO, most of the respondents had a fixed body (53.1%), with a p value = 0.693.

Table 2. Frequency Distribution of Body Height Frequency Before and After Administration of VCO

Height	Pre-test			Height	Post-test			P value
	n	%	Mean		n	%	Mean	
Stunted/severely stunted	32	100	9.8	Height Gain	5	15.6	9.9	0.548
				Fixed Height	27	84.4		
Total	32	100			32	100		

Table 2 revealed that before administration of VCO, all respondents were stunted/severely stunted (100%), while after administration of VCO, most of respondents had a fixed height (84.4%), with a p value = 0.548.

Discussion

Weight Before and After Administration of VCO among Under-five Children with Stunting

Based on the data, it can be seen that before administration of VCO, all respondents had a non-ideal body weight (100%), whereas after administration of VCO, most of the respondents had a fixed body (53.1%), with a p value = 0.693.

Growth is a quantitative change regarding the increase in number, size, dimensions at the level of cells, organs, and individuals. Children not only grow physically, but also grow in the size and structure of the organs of the body and the brain. Physical growth can be assessed by weight (grams, pounds, kilograms), length (cm, meters), bone age, and secondary sex characteristics. Body weight is the most important anthropometric measurement to be measured at every opportunity to check the health of children in all age groups (Dhiyan Nany Wigati, 2020).

Body weight is used to diagnose normal or LBW babies. In infancy, body weight can be used to determine the rate of physical growth and nutritional status, unless there are clinical abnormalities such as dehydration, ascites, edema, and the presence of tumors. In babies who are born at term, the birth weight will return on the 10^{th} day. The body weight will be 2 times the birth weight for babies aged 5 months, 3 times the weight at 1 year old, and 4 times the birth weight at 2 years old. During preschool-age, the average weight gain is 2 kg/year. Of course, a toddler's weight gain doesn't have to be drastic, on the contrary, it takes place slowly, gradually, and in a proportional pattern every month. An increase in body size means that the growth process is going well and vice versa, a decrease in body size can be a signal of a growth disorder (Hasriany Arifin, 2022).

Fixed body weight or no weight gain can be influenced by many factors, including difficulty in eating, eating only the food they like or lack of variety in the food menu. Children weight gain is indicated by a change in body size. Under-five children are those with the characteristics of rapid growth at the age of 0-1 year, where at the age of 5 months the body weight increases 2 times the birth weight and the body weight increase 3 times the birth weight at the age of 1 year and becomes 4 times in 2 years old. Growth begins to slow down during the pre-school period, with weight gain of approximately 2 kg per year, and then becomes constant until the end (Ika, 2020).

Other researcher explained that stunting among under-five children was due to a lack of food intake and recurring illnesses, especially infectious diseases, which can reduce children's appetite and increase metabolic needs. Children will only eat the food they like or even having difficulty in eating. Such habit is often considered normal, but prolonged eating difficulties will cause problems in the development and growth of children. In healthy under-five children, weight increases annually between 1.4-2.3 kg (Khairun, Nisa Berawi and Muhartono, 2021).

Intake of Virgin Coconut Oil (VCO) which contains medium chain fatty acids (MCFA) increases calorie expenditure and produces a feeling of fullness faster. MCFAs can also serve as useful substitutes for other fats in food to help increase satiety and increase calorie expenditure as well. The fatty MCFA content helps slow gastric emptying. In addition, MCFA is also directly broken down and transported to the liver as fuel. Therefore, VCO is used for energy and is less likely to be stored as fat. The study finding is in line with a study conducted by Ziya Erokay Metin, Pelin BilgicI, et al in 2022, which found the effect of consumption of VCO on hunger suppression along with its potential to lose weight (Metin et al., 2022).

Height Before and After Administration of VCO among Under-five Children with Stunting

The study data showed that before administration of VCO, all respondents were stunted/severely stunted (100%), while after administration of VCO, most of respondents had a fixed height (84.4%), with a p value = 0.548.

Height is the measurement from the crown of the head to the soles of the feet. Height growth follows the general type of growth pattern. Ideal height is the range of normal body length according to age and sex. Ideally, the increase in body length from birth to 1 year of age is about 25 cm, from 1 year to 2 years is about 13 cm, and from 2 years to 3 years is about 9 cm. Children aged 4-5 years may not experience too significant increase in body length, for only about 8 cm for one year. Based on the standards set by the Ministry of Health of the Republic of Indonesia which refers to the World Health Organization (WHO), the ideal height for children is differentiated according to age and gender. The ideal height for boys based on their age includes: 1 year old: 72 – 78 cm, 2 year old: 82 – 92 cm, 3 year old: 83 – 95 cm, 4 year old: 84 – 97 cm and 5 years: 85 – 98 cm. On the other hand, the ideal height for girls based on their age includes: is 1 year old: 70 – 78 cm, 2 years old: 80 – 92 cm, 3 years old: 82 – 95 cm, 4 years old: 83 – 96 cm and 5 years old: 84 – 97 cm (Setiawati et al., 2020).

Height gain is influenced by many factors, including age, gender, genetic factors, nutritional intake, the presence of certain diseases and physical activity (Soedjatmiko, 2016). Poor height growth

is closely related to stunting. Under-five children with stunting can experience stunted motor development. A previous study found that there was a significant relationship between stunting and the motor development of children under two years of age (Pantaleon, 2015). Stunting in under-five children can have an impact until adolescence. Lack of cognitive abilities can occur among stunted adolescents. The result of another study further showed that adolescents with stunting were at risk of having less cognitive abilities 18.333 times greater than adolescents who were not stunted (Muliawati et al., 2019).

According to the decision of the Minister of Health No. 1995/MENKES/SK/XII/2010 concerning Anthropometric Standards for Assessment of Children's Nutritional Status, the definition of short and very short regarding nutritional status is based on the index of Body Length for Age (PB/U) or Height for Age (TB/U) which is equivalent with the term stunted (short) and severely stunted (very short). The incidence of short or stunted under-five children is determined by measuring the length or height, which is below normal range when compared to the standard, namely MGRS (Multicenter Growth Reference Study). Under-five children are categorized as short if their z-core is less than -2SD and very short if their z-score is less than -3SD (Ministry of Health of the Republic of Indonesia, 2016). Stunting in under-five children can cause by many factors, one of which is the mother's height (Winda et al., 2021).

Effectiveness of VCO on Changes in Weight and Height among Under-five Children with Stunting

The result showed that administration of VCO was not proven to be effective in significantly increasing body weight ($p=0.693$) and height ($p=0.548$) among under-five children with stunting ($p>0.05$).

Weight and height are indicators of child growth. Growth is an increase in the size and number of cells and intercellular tissue, meaning an increase in the physical size and structure of the child's body, especially height. Body weight is more closely related to the nutritional status of children. There are several factors that can affect changes in height and weight in children, including food intake, infectious diseases, and parenting patterns. Infectious diseases can affect nutritional status of children. On the other hand, children with poor will have a weak immune system which will ultimately affect their nutritional status. Parenting patterns in term of behavior and attitudes of mothers or other caregivers in terms of closeness to children, feeding, cleanliness, caring, affection and so on can also have a significant impact to growth and development. Growth in toddlerhood will be one of the determining factors for growth in the next period (Soedjatmiko, 2016).

A previous study revealed that consumption of animal-based foods was a positive predictor of child growth, especially in height and weight (Kavle, JA et al, 2015). Deficiency of various micronutrients definitely affects metabolic processes in the body, including the formation of optimal red blood cells in the delivery of nutrients and oxygen throughout the body. Consumption of VCO processed from natural sources of coconut fruit with various active substances has the ability to improve various metabolic processes and be a solution to metabolic disorders among stunted children (Berawi et al., 2020).

The study finding is in line with a study conducted by Sumitha Arun, Manish Kumar, et al (2019) which reported that oral supplementation of virgin coconut oil (VCO) together with breast milk did not

increase growth parameters or changes in body composition among very low birth weight babies, particularly in weight gain, triceps skinfold thickness, increase in head circumference and body fat percentage (Arun et al., 2019).

In 2022, Bilge, Elvan and Tugne in their study entitled "The effect of coconut oil on anthropometric measurements and irisin levels among overweight individuals" reported that coconut oil administration had no impact on anthropometric (weight, height and BMI) and biochemistry aspects (Meral Koc et al., 2022).

Conclusions

Our study found that administration of VCO was not proven to be effective in significantly increasing body weight and height among under-five children with stunting. Intake of Virgin Coconut Oil (VCO) which contains medium chain fatty acids (medium chain fatty acids/MCFA) increases calorie expenditure and produces a greater feeling of satiety. Therefore, VCO is used as a source of energy and is less likely to be stored as fat. More studies are needed to include Virgin Coconut Oil (VCO) as functional nutrition in the therapy for under-five children with stunting.

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Anthocyanins in Mulberry Leaves (*Morus rubra L.*) Ethanol Extract as the Inhibitor for the Growth of *Candida albicans*

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ABSTRACT

Infections caused by *Candida albicans* are generally common in the vaginal mucosa or called *Vulvovaginal Candidiasis*. Herbal medicine is proven to be an alternative to treat vaginal candidiasis. Mulberry leaves have many chemical compounds, one of which is anthocyanins. Anthocyanins have pharmacological benefits and biological activity that can protect against human pathogenic bacteria. This study aims to observe the effect of anthocyanin compounds extracted from mulberry leaves (*Morus Rubra L*) on the growth of *Candida albicans*. Identification of compounds on mulberry leaves used the TLC spectrophotodensitometry on silica gel 60 F254. TLC plates were washed with methanol and activated at 110ºC for 30 minutes. The plates were eluted in a chamber that had been saturated with the mobile phase of n-butanol:glacial acetic acid:water (4:1:2) and transferred using a CMAG TLC densitometer with a spectrum in the wavelength range of 200-700 nm. Design study is experimental study with a short Post-Test Only Control Group. This study was conducted at the Pharmaceutical Biology Laboratory of PGRI Adi Buana University and the Laboratory of Professor Nidhom Foundation. The results showed that there was a content of anthocyanin compounds in mulberry leaves with antifungal function against *Candida albicans*.

Infeksi yang disebabkan oleh Candida albicans umum terjadi pada mukosa vagina atau disebut Vulvo Vaginal Candidiasi (VVC). Pengobatan secara herbal dibuktikan bahwa dapat menjadi salah satu alternatif untuk mengatasi kondisi kandidiasis vagina. Daun mulberry memiliki banyak senyawa kimia salah satunya adalan antosianin. Anthocyanin dapat melindungi dari bakteri pathogen manusia yang memiliki manfaat farmakologis dan aktivitas biologi. Tujuan penelitian melihat senyawa antosianin dari daun mulberry (Morus Rubra L) terhadap antifungi Candida albicans. Identifikasi senyawa pada daun mulberry (Morus Rubra L) menggunakan alat KLT Spektrofotodensitometri pada plat silika gel 60 F254 yamh dicuci dengan methanol dan diaktifasi dengan suhu 110oC selama 30 menit. Plat akan dielusi pada chamber yang telah jenuh dengan fase gerak n-butanol:asam asetat glasial:air (4:1:2) dan dipindahi dengan menggunakan alat densitometer CMAG TLC spektrum dalam rentang gelombang 200-700 nm. Pengamatan senyawa anthocyanin daun mulberry terhadap antifungi Candida albicans menggunakan desain penelitian eksperimental laboratories dengan pendekatan Post-Test Only Control Group Design. Penelitian dilakukan di Laboratorium Biologi Farmasi Universitas PGRI Adi Buana Surabaya dan Laboratorium Profesor Nidhom Foundation Surabaya. Hasil menunjukan bahwa terdapatnya kandungan senyawa anthocyanin pada daun mulberry (Morus Rubra L) serta memiliki daya antifungi pada biakan Candida albicans.

Introduction

Candida albicans is an opportunistic pathogenic fungus that exists as a harmless commensal (a small single-celled living thing that lives with other organisms). About 75% of women experience vaginal infections caused by *Candida albicans* at least once in a lifetime (Sobel, 2007). Infection caused by *Candida albicans* generally affects gastrointestinal epithelial cells, vaginal mucosa, and oropharyngeal mucosa (Schulze & Sonnenborn, 2009). Furthermore, such infection commonly occurs in the vaginal mucosa or so called Vulvovaginal Candidiasis (VVC), and this condition usually may also recur in the vaginal mucosa or so called Recurrent Vulvovaginal Candidiasis (RVVC). Candida species are the most common cause of infections caused by fungi (Meiller et al., 2009)

Treatment and prevention of a disease using natural ingredients called herbs are increasingly preferred by the community (Sharma et al., 2018). The value of herbal medicine lies in the number of chemical substances that produce certain physiological actions in the human body. There are many plants that have been used due to their antimicrobial properties, which are caused by the presence of compounds synthesized in secondary metabolism of the body. Plant extracts and phytochemicals which have antimicrobial properties are known to be very effective in therapeutic treatment (Niratker et al., 2015).

Morus rubra L or Red Mulberry is a plant that belongs to the *Moraceae* family which has the characteristics of easy to fall, fast growing, tree height from small to medium to 15-20 m high. *Morus rubra L* or Red Mulberry has been reported to have benefits in the world of health for the antimicrobial, astringent, hypoglycemic, anti-atherosclerotic, ophthalmic, and diuretic activities (Sharma et al., 2018). Antimicrobial activity and compounds in *Morus rubra L* or Red Mulberry are interesting to study and recent studies revealed that anthocyanins can protect against human pathogenic bacteria (Suriyaprom et al., 2021).

Anthocyanin compounds are the glycoside form of anthocyanin compounds and are part of secondary metabolites of Flavonoids. In plants, anthocyanin compounds are responsible for giving red, blue, purple, and other colour (Sharma et al., 2018). There are numerous scientific publications related to the benefits of anthocyanins in the world of health (Djohan et al., 2019). Anthocyanins have been shown to have antioxidant, anti-inflammatory, anticancer, lipid peroxidation and antimicrobial activities (Memete et al., 2022).

The treatment of the pathogenic fungus *Candida albicans* can be performed by chemical compounds that have antimicrobial activity, especially antifungal. Mulberry leaves (*Morus rubra L*) have been analyzed for their phytochemical and anthocyanin compounds. Anthocyanins have been shown to inhibit bacterial growth but have not been proven to inhibit fungal growth in pathogenic condition (Kim & Jang, 2011)

This study aims to determine the content of anthocyanin compounds identified in mulberry leaves extract on the growth of *Candida albicans*. The benefit of the study is the addition of herbal product as an alternative to treat the incidence of flour albus caused by *Candida albicans*.

Based on some of the theoretical studies above, there is a need to conduct studies regarding the anthocyanin compounds in mulberry leaves (*Morus rubra L*) to protect against *Candida albicans*.

Method

Extraction of Mulberry Leaves (*Morus rubra L*)

Identification of the inhibitory power of flavonoid compounds in preventing the growth of *Candida albicans* was performed. The agar media was placed in 4 petri dishes as much as 25 ml. Furthermore, 0.5 ml of *Candida albicans* suspension was inoculated into the media and spread evenly in a circular motion so that *Candida albicans* was evenly distributed on the petri dish and waited until the media was solid. Each petri dish that had been inoculated with *Candida albicans* were divided into 8 locations on the agar media to be occupied by paper disks that had been dripped with mulberry leaf extract solution. After the paper disks had been placed in 4 petri dishes and labelled according to the dosage, each paper disk was given drops of mulberry leaf extract using a micropipette according to the dosage label that had been made. The 4 petri dishes were incubated in an incubator. Incubation was carried out at 37oC for 24 hours. After 24 hours, the petri dishes were taken out, observed and measured to find out diameter of the inhibition zone in the form of the bright zone using a ruler (millimeter). The diameter of the inhibition zone showes the antifungal power of each test material.

The next stage was identification of anthocyanin compound using TLC Spectrophotodensitometry. A 60 F254 silica gel TLC plates with a size of 2x10 cm were prepared. The plates were washed with methanol and activated at 110oC for 30 minutes. The type of ethanolic viscous extract obtained was then spotted as much as 10µL on the activated plates using a linomat V spotter. Then the plates were eluted in a chamber that was saturated with the mobile phase of n-butanol:glacial acetic acid:water (4:1:2). The plates were transferred using a CMAG TLC scanner 3 densitometer with a wavelength of 210nm and a spectrum in the wave range of 200-700 nm. The maximum anthocyanin wavelength was determined by taking into account the spectrum of the scanned absorption results in the wavelength range of 200-700 nm. The maximum wavelength appeared from the spectra, namely the wavelength that showed the maximum absorbance value. The plates were transferred back at the maximum anthocyanin wavelength. Identification of anthocyanins was carried out by looking at the Rf value and the spectrum resulting from measurements of the Rf value and anthocyanin spectrum in the literature.

The plates were then re-identified using a spot sighter and color reagents in the form of ammonia (NH3), AICI3 5% and FeCI3 2%. Each plate was identified by a different spotting marker. The first plate was steamed with ammonia, the second plate was sprayed with 5% AICI3 color reagent, while the third plate was sprayed with 2% FeCI3 color reagent. The color changes produced were observed visually under UV light with a wave of 254 nm and under a wave of UV light 366 nm. The plates that had been sprayed were scanned again with a CAMAG TLC scanner densitometer with 3 maximum anthocyanin wavelengths and a wavelength range of 200-700 nm. The chromatogram as well as spectrum change or shift were observed to determined the suspected anthocyanin spot.

Results

Mulberry leaves were obtained from the Family Medicinal Plants of the Faculty of Science and Health, Universitas PGRI Adi Buana, Surabaya. Mulberry leaves that had been picked were cleaned, washed, dried in the wind overnight, then dried in the sun. The leaves were further blended to became 100 grams of mulberry leaves simplicia. Furthermore, simplicia extraction of mulberry leaves was carried out using the maceration method. Extraction used 100 grams of mulberry leaves and 400 ml of 70% ethanol solvent. The extraction result was left for 5 days with occasional stirring. The liquid obtained was then filtered and left for 1 day, then filtered again and the filtrate was collected. The filtrate obtained was evaporated to obtain a concentrated extract. Mulberry leaves extract was made in 8 series of dilution, namely 15%, 30%, 45%, 60%, 75%, 80%, 95%, 100%.

The results of identification of mulberry leaves showed that mulberry leaf simplicia contained anthocyanin compounds which were carried out by TLC spectrophotodensitometry on silica gel 60 F_{254}. TLC plates were washed with methanol and activated at 110^{o}C for 30 minutes. The plates were eluted in a chamber that had been saturated with the mobile phase of n-butanol:glacial acetic acid:water (4:1:2) and transferred using a CMAG TLC densitometer with a spectrum in the wavelength range of 200-700 nm. The maximum wavelength showed the maximum absorbance value. The resulting waves were recorded in the table below:

Table 1. Peak Wavelength on Band I and Band II of Mulberry Leaves Extract

Isolate	Wavelength
Band I	425 - 620
Band II	275 – 295

Based on the results of the table above, it was known that the peak values in band I and II were in the range of 425 – 620 nm and 275 – 295 nm, respectively. Absorption in the wavelength region of 425–620 nm was the absorption of anthocyanin compounds. According to Haeria et al (2016), the maximum wavelength to measure the anthocyanin activity of mulberry leaves extract was 490-535 nm. The extract spectrum data obtained showed the presence of anthocyanin compounds with native groups.

Identification of *Candida albicans* in this study used four isolates derived from vaginal swabs. These *Candida albicans* isolates were obtained from the Microbiology Laboratory, Faculty of Medicine, Brawijaya University, Malang. Prior to being used in this study, the fungus was identified by means of colony culture on Sabouraud Dextrose Agar (SDA) plates, gram staining, and the Germinating Tube Test.

This study aims to determine the inhibition of mulberry leaves (Morus Rubra L) extract on the growth of *Candida albicans* in vitro. The test samples were taken as many as 8 dilution series in 4 petri dishes based on the calculations in the preliminary study. Petri dishes were incubated for 24 hours at 37^{0}C in an incubator. Furthermore, calculations were performed to determine the inhibition zones of mulberry leaves (Morus Rubra L) extract using caliper in millimeters. The results are presented in the table below:

Table 2. Results of Assessment of Flavonoid Inhibitory Power against the Growth of *Candida albicans*

Sample	Dilution Series (%)	Mulberry Leaves (*Morus Rubra L*) Extract
1	15%	0 mm
	30%	0 mm
	45%	0 mm
	60%	0 mm
	75%	0 mm
	80%	11.9 mm
	95%	12.3 mm
	100%	14.1 mm
2	15%	0 mm
	30%	0 mm
	45%	0 mm
	60%	0 mm
	75%	0 mm
	80%	14.7 mm
	95%	16,1 mm
	100%	17.6 mm
3	15%	0 mm
	30%	0 mm
	45%	0 mm
	60%	0 mm
	75%	0 mm
	80%	12.3 mm
	95%	13.2 mm
	100%	16.5 mm
4	15%	0 mm
	30%	0 mm
	45%	0 mm
	60%	0 mm
	75%	0 mm
	80%	12.8 mm
	95%	14.0 mm
	100%	15.1 mm

Discussion

Morus rubra L or Red Mulberry is a plant that belongs to the *Moraceae* family which has the characteristics of easy to fall, fast growing, tree height from small to medium to 15-20 m high. In Indonesia, mulberry in Indonesia is one of the plants that grows wild and the Indonesian people use it quite a bit due to the lack of public awareness of the pharmacological benefits of mulberry plants. The mulberry leaves used in this study were young mulberry leaves. According to previous study, it was shown that the total polyphenol content found in young leaves was higher than that of old mulberry leaves (Jurian et al., 2016; Maharani, 2012).

This study used extract made of mulberry leaves (*Morus rubra L*). The weight of the mulberry leaves used in this study was 500 grams, which were then dried to obtain a powder with a weight of 100 grams, and macerated with 70% ethanol with a volume of 400 ml and filtered three times to obtain a thick extract with a concentration100%. After that, the concentration of the extract was determined by serial thinning to obtain several concentrations, namely 15%, 30%, 45%, 60%, 75%, 80%, 95%, 100%. Of the 8 concentrations, it was found that at concentrations of 80%, 95%, 100%, there was no growth of *Candida albicans*. In contrast, at concentrations of 15%, 30%, 45%, 60%, 75%, there was still growth of *Candida albicans*. The ingredients contained in mulberry leaves were anthocyanins, alkaloids,

flavonoids, and polyphenols. Previous studies revealed that bioactive compounds can be found by extracting these plants. Anthocyanins, alkaloids, flavonoids, and polyphenols can act as antimicrobials Anthocyanins are compounds with antimicrobial activity that can inhibit the enzymes esterase sera DNA and RNA polymerase. In addition, anthocyanins are able to inhibit cell respiration and play a role in DNA intercalation (Siregar, 2004). Anthocyanin compounds work by inhibiting the biosynthesis of fungal nucleic acids, so that the fungus cannot develop and eventually dies (Swari et al., 2020). Furthermore, anthocyanins have genestein compounds that function to inhibit cell division or proliferation. This compound binds to microtubule proteins in cells and causes inhibition of fungal growth (Sharma et al., 2018). ROS (Reactive Oxygen Species) frequently find membrane lipids in *C. albicans* and generate lipid hydroperoxides, lipid peroxidation has been shown to disrupt the lipid bilayer and alter membrane potential, resulting in reduced fluidity, increased permeability, and disruption of phospholipids, which can form and induce membrane disruption, resulting in reduced cell size and leakage of intracellular components of *c.albicans* (Aboody & Mickymaray, 2020).

To find out whether or not there was a significant difference between concentrations, a statistical analysis was performed using the One-Way ANOVA test which showed that there were significant differences between concentrations in the inhibitory power against the growth of *C. albicans*. The test results regarding the antifungal activity of mulberry leaves extract against *C. albicans* showed that 80%, 95%, 100% concentrations of mulberry leaves extract were able to inhibit the growth of *C. albicans* fungus. Quercetin and anthocyanin compounds were contained in ethanol extract of mulberry leaves. Anthocyanins have an original group of phenolic compounds that act as protein coagulators. Phenol groups can bind to bacterial cell membranes in their hydrogen bonds, causing changes in protein structure. Changes in the structure of cell membrane proteins can result in disrupted cell membrane semi-permeability, so that cellular metabolism is disrupted and results in cell death

The results of the study showed that the inhibition was higher at the percentage of 100% mulberry leaves extract. The person correlation test result showed that there was a strong relationship between the variables. The higher the concentration of the extract, the lower the number of *Candida albicans*. The study finding also indicated that the increasing concentration of the extract led to the greater inhibition diameter. Such finding is in line by previous studies which revealed that the effectiveness of an antibacterial substance in inhibiting growth depended on the nature of the test bacteria, the concentration and the length of contact time (Pappas et al., 2004). Based on the results obtained, it was found that mulberry leaves extract at a concentration of 80% was the minimum concentration to inhibit the fungus *C. albicans* (Pappas et al., 2004).

Conclusions

The results showed that mulberry leaves extract contained anthocyanin compounds as antifungals. In the inhibition test, it was found that administration of mulberry leaves (*Morus Rubra L*) extract significantly reduced the growth of *Candida albicans* with a p value of $0.000<\alpha$. Furthermore, the results showed that the inhibition zone ranged from 11.9 to 17.6 mm. Such finding indicated that the

anthocyanin compounds in mulberry leaves (*Morus rubra L*) extract had strong antifungal property to inhibit the growth of *Candida albicans*.

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