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The Effect of Spirulina Platensis Extract (*Arthrospira platensis*) on Enhancing Hemoglobin Levels in Pregnant Women

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A B S T R A C T

The prevalence of anemia is still relatively high in the world. The impacts of this case are abortion, premature birth, premature rupture of membranes, histitis, postpartum hemorrhage, low birth weight (LBW), risk of congenital defects, infection in babies, and even death. The objective of this research was to assess how the use of spirulina platensis extract influences the elevation of hemoglobin levels in expectant mothers. In this case, the method used is Quasi-Experiment through a pretest and posttest control group design with a sample of 60 participants, consisting of 30 participants and a control group of 30 participants. Furthermore, the group subjected to the intervention was provided with a remedy, which involved administering Spirulina platensis extract in the form of one 300 mg capsule once a day for 30 days and standard care, while the control group received standard care only. In addition, the sampling technique used is simple side random. The results of the Paired Sample T-test analysis in the intervention group during the pretest obtained a mean hemoglobin level of 9.63 with a standard deviation of 0.490, while during the post-test, obtained mean score of 10.93 with a standard deviation of 0.907 with a p-value of 0.000. Meanwhile, the analysis of the control group during the pretest obtained mean hemoglobin levels of 9.60 with a standard deviation of 0.498, while during the posttest, the mean score obtained was 9.70 with a standard deviation of 0.535 and p-value of 0.083. The difference between the mean hemoglobin levels during the posttest in the experimental and control groups showed m= 10.93; SD= 0.907 vs. m= 9.70; SD= 0.535, with a p-value of 0.000. Therefore, it is summed up that there was an increase in hemoglobin levels in pregnant women after the administration of Spirulina platensis extract. As input for the health workers, especially midwives, it is suggested to offer alternative therapeutic approaches for pregnant women suffering from anemia by applying Spirulina platensis.

Introduction

In 2019, the World Health Organization (2021) reported that 29.9% of women between the ages of 15 and 49 worldwide were diagnosed with anemia. The prevalence of pregnant women, at 36.5%, was higher than that of non-pregnant women, which was 29.6%. Moreover, anemia remained the most widespread in Southeast Asia (World Health Organization, 2022). In Indonesia, 48.9% of pregnant women suffer from anemia, however, in East Java, the prevalence of anemia is 5.8%. According to data provided by the Kediri District Health Service in 2022, the prevalence of anemia is 23.3%. According to the Kediri District Health Office (2022), the Sambi Community Health Center had the most significant anemia cases among pregnant women, totaling 300 instances. The Ngasem Community Health Center came second, with 185 cases of anemia among pregnant women.

Anemia with a hemoglobin concentration of no less than ten g/dL at term occurs in most pregnancies and primarily reflects physiological processes rather than an underlying hematological deficiency or disorder. In this case, approximately 2% to 26% of pregnant women have significant anemia (Hb values <11 g/dL in the first trimester or <10 g/dL in the second and third trimesters) (Means et al., 2020). Anemia and Iron Deficiency Anemia is more common among pregnant women who are older than 35, non-native English speakers, carrying more than one child, underweight before pregnancy, or had severe nausea and vomiting while pregnant (Tan et al., 2020). Therefore, specific implications are necessary for mother and child health, both immediate and long-term, for the anemia during pregnancy (Jung et al., 2019). Fast-metabolizing cells need more iron and are more likely to malfunction if they do not get sufficient iron. Due to the limits of widely used indicators like hemoglobin and ferritin levels, iron deficiency during pregnancy may be difficult to identify (Georgieff et al., 2020).

Anemia is linked to several forms of illness and exacerbates some conditions, necessitating heightened critical care for both mothers and neonates. Anemic women not only experience a greater burden of disease, but they also have elevated incidence of prenatal conditions such as pre-eclampsia (Yadav et al., 2021). The prevalence of infectious illnesses before and after birth is much greater in anemic women, and anemia is linked to a higher risk of induction of labor, cesarean section, and blood transfusion. Preterm delivery, worse scores on the subjective global evaluation, and an increased risk of perinatal death and morbidity are all linked to moderate and severe anemia during pregnancy (Smith et al., 2019).

Anemia can also lead to complications during childbirth, including a threefold increase in the likelihood of incontinentia pigmenti, the need for a cesarean section, pre-eclampsia, premature birth, fetal death, and even excessive bleeding after delivery. Preterm birth has a heightened risk for long-term problems, including cerebral palsy and heart disease (Jung et al., 2019). Anemia during the puerperium can lead to several risks, including uterine sub-involution resulting in postpartum hemorrhage, cardiac decompensation immediately after delivery, infection during the puerperium, decreased breast milk production, anemia during the pure perineum, or an increased risk of breast infection (Sunuwar et al., 2019). Iron Deficiency Anemia is associated with increased rates of maternal and perinatal mortality, including stillbirth, early delivery, and low birth weight. Furthermore, anemia can result in death and disability (Rabe et al., 2021). Interventions to address nutritional needs and combat anemia during pregnancy may involve the administration of iron pills and the use of alternative therapies like seaweed. Additional therapies that elevate hemoglobin (Hb) levels include purple sweet potato, guava, red spinach, green beans, and moringa leaves. Spirulina platensis is abundant in protein and is considered to have a high protein content with significant biological significance due to its composition of amino acids (Batool et al., 2022).

Similar research that has been carried out is giving spirulina to pregnant women. The intervention given was less effective because, in this study, pregnant women still experienced anemia due to lack of rest or mothers experienced insomnia. In this study, researchers attempted to provide education about getting enough rest and not sleeping late at night. Researchers also provide information about foods that

are good for increasing hemoglobin levels so that increasing hemoglobin levels in pregnant women is more effective.

Spirulina, also known as Spirulina platensis, is a kind of blue-green algae with a single spiral cell. Chlorophyll, beta carotene, phycocyanin, and minerals abound in plenty. Maternal serum retinol and hemoglobin levels concerning spirulina consumption during pregnancy have been researched, but no other prenatal outcomes have been examined. Previous researchers gave spirulina platensis capsules to pregnant women only to increase hemoglobin levels, whereas, in this study, researchers also looked at improving the nutritional status of pregnant women. The research results showed that the vitamin A status of both mothers and infants might be improved by supplementation with a modest physiological daily dosage of beta carotene from spirulina. Serum protein, serum iron, and blood hemoglobin levels also rose somewhat. However, spirulina supplementation was associated with a statistically significant increase in oligohydramnios in multiparous women (Yusof et al., 2016).

Spirulina has been designated as the World Health Organization's most promising future food due to its abundant natural protein and vitamin content. Spirulina has just been designated as Generally Recognized as Safe (GRAS) by the US Food and Drug Administration (FDA) (Othoo et al., 2021). Furthermore, Spirulina was awarded a "Class A" certification by the USP DSI-EC following a thorough examination of reports. When grown under controlled conditions and based on clinical case studies, animal toxicity data, and reports of adverse effects, it has been determined that it is safe for human consumption (Trotta et al., 2022).

A separate study discovered that administering 300 mg capsules of seaweed spirulina once a day for 30 days resulted in an increase in hemoglobin levels. Notably, only 5% of participants did not experience an increase in Hb levels. Specific instances of anemia endured due to inadequate rest or maternal sleeplessness (Stang et al., 2021). In another study, women in their second trimester of pregnancy were administered 56 capsules of spirulina, each containing 300 mg. The initial hemoglobin concentrations ranged from 8 to 11 gr/dL, with an average of 10.16 gr/dL. After consuming spirulina for eight weeks, the hemoglobin levels significantly increased to 13.35 gr/dL, resulting in a difference of 3.19 gr/dL (Marlina & Nurhayati, 2020).

Previous researchers gave spirulina platensis capsules to pregnant women only to increase hemoglobin levels, whereas, in this study, researchers also looked at improving the nutritional status of pregnant women. Related to this matter, current research was carried out to determine whether pregnant women with anemia may benefit from the provision of the blue-green algae Spirulina platensis (*Arthrospira platensis*) extract.

Method

The study employed a quasi-experimental approach, utilizing a pre-and post-test control group analysis of variance to collect and analyze quantitative data. This study employed a two-group design, consisting of an intervention group of 30 individuals and a control group comprising 30 participants. The intervention group received treatment by administering spirulina platensis extract in the form of 30

capsules, each containing 300 mg, once daily for 30 consecutive days. Additionally, they were provided standard care in the form of iron pills from healthcare facilities. Meanwhile, the control group exclusively received conventional care in the form of iron tablets from healthcare providers. For this experiment, we employed a simple random sample technique derived from the field of probability sampling. The study included a sample of 60 people, with 30 participants assigned to the intervention group and 30 participants assigned to the control group. The measurements were conducted using G-Power software version 3.1.6, explicitly using the F test with assumptions set at a significance level of 0.05, an effect size of 0.30, and a power level of 0.80. The study involved two groups. The minimal sample estimate achieved is 45, assuming an attrition rate of 30%. Therefore, a sample of 60 respondents was chosen.

This research was conducted from June to July in the work area of the Sambi Health Center and Ngasem Health Center, Kediri Regency. The inclusion criteria in this study were pregnant women willing to be respondents. These pregnant women had a history of anemia and CED and were pregnant women in the second trimester and third trimester. Meanwhile, the exclusion criteria in this study were pregnant women who had drug allergies and pregnant women who did not want to take part in the intervention provided.

The intervention provided was Spirulina platensis extract, which contained as many as 30 capsules containing 300 mg, once daily for 30 consecutive days. Participants continued to receive standard care when consuming Fe tablets. Spirulina platensis extract was consumed in the morning between 07.00-08.00 am after breakfast, and the group continued to receive standard care by consuming Fe tablets. Daily observation of compliance with drinking spirulina platensis extract was carried out by asking pregnant women to record on the observation sheet every time they consumed spirulina platensis extract.

The instrument used in this study is the Quik-Check brand digital Hb device, which measures hemoglobin levels. The examination of hemoglobin levels in pregnant women was carried out twice during the pre-test and post-test. In the pretest, the examination was carried out on the first day before the intervention of spirulina platensis extract for 30 days was given. Meanwhile, in the Posttest, the examination was carried out on the 30th day after the intervention of spirulina platensis extract for 30 days was done. The results of the examination were recorded on the observation sheet. Researchers monitored the group daily by conducting home visits and chats on WhatsApp. The monitoring aimed to know whether the pregnant women experienced side effects and reactions when receiving the intervention.

The analysis data used in hemoglobin levels is ratio data, so the paired sample t-test was used with the condition that the data must be normally distributed. Furthermore, the difference between the experimental and control groups before and after the intervention on hemoglobin levels was also measured using the Independent T-Test. Data was tested using the SPSS application/software program version 22 for Windows.

The ethical considerations of the study were approved by the Poltekkes Kemenkes Malang ethics committee with No.DP.04.03/F.XXI.31/910/2023.

Results

Table 1. Characteristics of Respondents in the Experimental Group and Control Group

Characteristics	Experiment Group (n=30)		Control Group (n=30)		*p-value*
	F/M	%/SD	F/M	%/SD	
Age	27.87	6.678	32	7.149	0.024[b]
Education					
1. Basic (elementary. junior high)	4	(13%)	7	(23%)	0.365[a]
2. Secondary (senior high school)	17	(17%)	19	(63%)	
3. Higher (S1)	9	(9%)	4	(13%)	
Parity					
1. ≤ 2	25	(83.33%)	17	(56.67%)	0.024[a]
2. > 2	5	(16.67%)	13	(43.33%)	
Pregnancy Spacing					
1. < 2 year	18	(60%)	8	(26.67%)	0.009[a]
2. ≥ 2 year	12	(40%)	22	(73.33%)	
Hemoglobin level	9.63	0.490	9.60	0.498	0.000[b]

Description = a: Chi Quadrat test, b: Levene test

Table 1 displays the respondents' mean age and standard deviation in the experimental and control groups. The experimental group had a mean age of 27.87 years with a standard deviation of 6.678, while the control group had a mean age of 32 years with a standard deviation of 7.149. This indicates that anemia was higher among individuals aged 20-35 years. This discovery is consistent with a prior investigation indicating that anemia is more widespread among individuals aged 20-35 (De Sá et al., 2015). In the most recent education data, the majority of participants from the experimental and control groups had completed secondary education (SMA), with 36 individuals (60%). This finding aligns with prior studies that have demonstrated a correlation between the educational attainment of mothers and their blood iron levels. There is a positive correlation between the mother's education level and the amount of information she receives (ElFar et al., 2022). During the parity assessment, most participants from both the experimental and control groups reported having a maximum of two deliveries, with 42 individuals (70%) falling into this category. Consistent with prior research, Sharma et al. (2020) found that pregnant women with a parity of more than three have a similar relative risk of having anemia compared to pregnant women with a parity of less than three.

In addition, the majority of participants in the experimental group had a pregnancy interval of less than two years, namely 18 individuals (60%), while the majority of participants in the control group had a pregnancy interval of two years or more, precisely 22 individuals (73.33%). Additional research indicates that both excessively long and excessively short intervals between pregnancies might have detrimental effects on the well-being of both the mother and the fetus. This is because such intervals may also be associated with abnormal levels of hemoglobin in pregnant women (Ampofo et al., 2018). Before the intervention, the mean hemoglobin level of the experimental group was 9.63 g/dL, with a standard deviation of 0.490. By comparison, the control group had an average hemoglobin level of 9.60 g/dL, with a standard deviation of 0.498. This indicates that the hemoglobin levels of the experimental

and control groups were comparable prior to the administration of spirulina extract, with all pregnant women being anemic. In order to assess the normality of the data, the Shapiro-Wilk test was used. If the data adheres to a normal distribution, employing the Paired Sample T-Test is appropriate.

Table 2. Hemoglobin Levels Before and After Giving Spirulina Platensis Extract (*Arthrospira platensis*) to Pregnant Women in the Experimental Group

Variables	Experiment Group(n=30)		*P-Value*
	PreTest	***PostTest***	
	Mean±SD	**Mean±SD**	
Hemoglobin level	9.63±0.490	10.93±0.907	0.000

Description = Paired Sample T-Test

Table 2 displays the analytical findings of hemoglobin levels in the experimental group. The data indicates that the mean hemoglobin concentration before the test is 9.63 grams per deciliter, while the mean concentration after the test is 10.93 grams per deciliter. In this instance, the control group had a 1.3 g/dL greater increase in hemoglobin levels compared to the experimental group. The experimental group demonstrates a rise in hemoglobin levels when comparing the findings before and after the test. In addition, the Paired Sample T-Test conducted on the hemoglobin levels of the experimental group yielded very significant results, as evidenced by a p-value of 0.000. Therefore, it can be inferred that administering spirulina platensis extract to pregnant women in the experimental group resulted in elevated hemoglobin levels.

Table 3. Hemoglobin Levels Before and After Standard Care in the Control Group

Variables	Control Group (n=30)		*P-Value*
	PreTest	***PostTest***	
	Mean±SD	**Mean±SD**	
Hemoglobin level	9.60±0.498	9.70±0.535	0.083

Description = Independent T-Test Test

Table 3 shows the data concerning the analysis results of the hemoglobin levels in the control group. The data shows that the average hemoglobin level at the pretest is 9.60 gr/dL, while at the posttest, it is 9.70 gr/dL. In this case, the control group's hemoglobin levels rose by 0.1 gr/dL less than the experimental group. The control group exhibited a slight rise in hemoglobin levels compared to the pre- and post-test values. Furthermore, the Paired Sample T-test results on hemoglobin levels for the control group showed a p-value of 0.083. Therefore, the hemoglobin levels of the pregnant women in the control group did not vary significantly from one another.

Table 4. Differences in Pregnant Women's Hemoglobin Levels Between the Experimental and Control Groups

Variable	Experiment Group (n=30)		Control Group (n=30)		*P-Value*
	Mean	**±SD**	**Mean**	**±SD**	
Hemoglobin level	10.93	0.907	9.70	0.535	0.000

Description = Paired Sample T-Test

The table above displays the disparities in hemoglobin levels between the experimental and control groups following the administration of spirulina platensis extract. Moreover, the results of the independent T-test revealed that following the intervention, the experimental group exhibited a mean hemoglobin level of 10.93 g/dL. In contrast, the control group had a mean hemoglobin level of 9.70 g/dL. The Independent T-Test revealed significant results for the hemoglobin levels of both groups, with

a p-value of 0.000. This demonstrates a disparity in hemoglobin levels between the two groups after administering spirulina platensis extract to pregnant women.

Discussion

Anemia is a global problem for poor countries, affecting human health and hindering social and economic progress. An individual is diagnosed with anemia when their hemoglobin (Hb) concentration falls below the typical level, and their red blood cell (RBC) count is insufficient to meet physiological requirements. In this case, the World Health Organization (WHO) defines maternal anemia as a Hb value of less than 11 g/dL (Chaparro et al., 2019).

Pregnant women develop anemia due to insufficient iron levels. The iron needed during pregnancy is substantially higher. Iron consumption is crucial for transporting oxygen from the mother to the developing fetus. During pregnancy, there is an increased demand for ATP to facilitate the growth of organs, particularly the brain. Thus, a daily intake of approximately 4-5 mg of iron is required throughout the early stages of the second trimester. The placenta is a large, metabolically active organ capable of storing iron. Giving birth leads to significant iron depletion, approximately 250 mg (Agarwal et al., 2021).

Spirulina, a microalgae used for generations as a food source in Central Africa, is currently extensively utilized as a nutritious dietary supplement all over the globe due to its high nutrition (Grosshagauer et al., 2020). Arthrospira (Spirulina) is a very high-protein food. Protein is essential in nutrition for the development and regulation of substances. Protein also regulates human health by providing precursors to amino acid molecules and functions as a component in the body's cells. Protein also plays a role in transporting iron to the spinal cord to form blood cells. Red. Protein intake, especially animal protein intake, helps increase iron absorption. Therefore, low protein intake can reduce Hb levels, which can cause anemia (Erningtyas et al., 2023). Spirulina effectively replaces up to 40% of the protein in a diet due to its high protein concentration (about 60%). Spirulina sp. cyanobacteria contain many non-essential fatty acids, specifically γ-linolenic acid (GLA, C18:3) and sulfolipids. The total lipid content of Spirulina sp. cyanobacteria ranges from 6.4% to 14.3% of their dry body weight. Numerous other food items are abundant in vitamins K, B12, and provitamin A, along with zinc, iron, calcium, phosphorus, magnesium, and manganese—pregnant and lactating moms who incorporate spirulina supplements into their diet experience a reduced likelihood of getting anemia. (Bitam et al., 2020).

This study investigated pregnant women's hemoglobin levels before and after spirulina platensis extract (Arthrospira platensis) administration. Based on the investigation, it was found that all 30 participants in the experimental group exhibited elevated hemoglobin levels. Following therapy, the increase in hemoglobin levels can be attributed to spirulina platensis, a non-pharmacological approach that incorporates patient belief variables to instill confidence. The researcher also reminded the woman to continue taking the primary care Fe pills. Spirulina has several health benefits, such as containing antioxidants that protect against inflammation and oxidative damage caused by free radicals, full of nutrients such as vitamins B1, B2, and B3, iron and folic acid, which are beneficial for baby's brain

development, has omega-3 and omega-1 fatty acids. 6, especially gamma-linolenic acid, an omega-6 fatty acid derived from plants, helps produce hemoglobin and red blood cells and can lower blood pressure, potentially reducing the risk of cardiovascular disease. In general, spirulina is considered safe. However, the specific risks and side effects during pregnancy are still unknown, and more research is needed on pregnant people. This has the potential risk of spirulina being contaminated with microcystin (toxin) and heavy metals such as mercury. Based on previous research, no side effects occurred. In this study, the researchers also made observations regarding the side effects that occurred during administration. The results showed that no side effects occurred during or after the study. Researchers concluded that administering spirulina platensis extract (Arthrospira platensis) to pregnant women can be an alternative for midwives in overcoming the anemia problem in pregnant women (Niang et al., 2017). After receiving spirulina platensis extract, the experimental group had a mean posttest hemoglobin level of 10.93 g/dL, whereas the control group had a mean posttest hemoglobin level of 9.70 g/dL, demonstrating significant differences. After the treatment using spirulina platensis extract, pregnant women's hemoglobin levels were found to be different from those of the control group on average, as measured by the post-test in this study.

A separate investigation revealed that the administration of spirulina could markedly enhance hemoglobin levels compared to pregnant women solely consuming iron supplements. According to this study, it is clear that combining spirulina with regular iron supplements might lead to significant improvements in cases of pregnant anemia (Leal-Esteban et al., 2021). Spirulina has a long history of being used as a food additive and has been extensively studied in laboratory and animal experiments to determine its possible health advantages for humans (Sorrenti et al., 2021). Since the 1990s, numerous papers have explored the health advantages of Spirulina, covering various areas such as cell and tissue culture, animal experimentation, and human clinical trials. The publications discuss various experimental methodologies, such as using whole cells, different cell extracts, and isolated biomolecules, to investigate the potential health benefits of consuming this microalgae. These methodologies specifically focus on c-phycocyanin, Gamma Linolenic Acid, and sulfated polysaccharides. Potential health benefits encompass safeguarding against malnutrition, elevated cholesterol levels, diabetes, obesity, inflammatory allergies, toxicity caused by heavy metals/chemicals, radiation-induced damage, and anemia (Wan et al., 2016).

Chlorophyll A and Phycocyanin are only two of the antioxidant pigments in the cyanobacterium Spirulina, which contains proteins, carbs, vitamins, minerals, and vital fatty acids. Obesity, diabetes, hypertension, cardiovascular disease, anemia, cancer, oxidative stress, arthritis, immunity, and muscular cramping are just some of the conditions that have been shown to benefit from it. Spirulina may cause acute poisoning, liver damage, indigestion, and cancer due to the toxins it produces, such as microcystins and hepatotoxins. Adults may consume up to 30 g daily without ill effects, although the safe range is 3-10 g. (Gogna et al., 2022).

Conclusions

Giving spirulina platensis extract to pregnant women can increase hemoglobin levels in the intervention group compared to the control group. This study has made a good contribution as a non-pharmacological therapy in midwifery in increasing hemoglobin levels in pregnant women who experience anemia. Suggestions for further research are the results of research on the effect of Spirulina platensis Extract (*Arthrospira platensis*), which can be studied further by looking at other factors that influence overcoming the increase in hemoglobin levels in pregnant women who experience anemia.

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Analysis of Factors Affecting the Implementation of Uterine Exploration at the Third Stage of Labor

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A B S T R A C T

Labor is one of the critical periods for women based on IDHS data up to 2020 shows that bleeding, hypertension in pregnancy, and infection are the causes of maternal death. Observation data was conducted in January-February 2022 at 5 Puskesmas in the city of Tasikmalaya, and it was found that 3 out of 5 women in labor underwent exploratory procedures during the third stage of labor because there were signs of retained placenta. The act of uterus exploration could be a portal of bacterial entry into the cavity and cause infection. This study aimed to look at the factors that affect the implementation of uterine exploration in the third stage of labor. The research method uses a sequential explanatory mix method to analyze the supporting factors for third-stage exploration actions by midwives. The research sample was 43 midwives. Quantitative results showed that there was no influence of characteristic factors on exploration actions ($\rho>0.05$), and there was no influence of self-efficacy on uterus exploration ($\rho>0.05$). Qualitative results showed that there were four main factors supporting exploration, such as visible signs of bleeding and weak contractions, ensuring that there were no remaining placentas and routine actions that were carried out. The research concludes that the exploratory action carried out is the midwife's accumulated experience, which results in the perception of dealing with cases of retained placenta in the third stage of labor, this makes the uterus exploration an additional action to anticipate problems.

Introduction

One of the critical periods of a woman's reproductive cycle is childbirth. The delivery process of a woman is influenced by several factors, including the state of a woman's health during the preconception period, conception, and pregnancy, which is a manifestation. Based on Indonesia Demographic and Health Survey (IDHS) data until 2020, it shows that childbirth is the highest contributor to direct death in women, caused by bleeding, followed by hypertension in pregnancy and infection. The number of deaths of women due to bleeding was recorded in 2020 in Indonesia as many as 4,627 people, with 1,110 of them dying due to hemorrhage. (Government department of health, 2020)

Labor has 4 phases that must be passed by a woman, 2 of the 4 phases are the phases with the most contributors to bleeding in cases of death, namely in the third stage (placental expulsion) and fourth stage (phase 2 hours postpartum). The third stage of labor is a phase of placental expulsion that only lasts a short time, which is 30 minutes in each phase of labor. However, in certain circumstances, the third stage can be a long phase and have difficulty causing problems in labor, namely bleeding caused by the holding of the placenta called placental retention. Placental retention is established when oxytocin

as part of active management third stage of labor (AMTSL) is given in a span of 2 times for 30 minutes, i.e. shortly after the baby is born, if there are no signs of placental detachment (globular uterus, elongated umbilical cord, and blood spurts), then a second oxytocin with the same amount of 10 IU IM is given at 15 minutes after the first oxytocin injection. If, after the second oxytocin injection, there is still no umbilical cord lengthening when controlled cord Traction / CCT is performed as a maneuver in AMTSL. Still, there are other signs, such as placental retention management being carried out and management being carried out with placental manual maneuvers. But under normal circumstances, sometimes the placenta is born spontaneously and entirely after the first oxytocin injection (within 15 minutes after the baby is born) but leaves the part of the membrane or cotyledons in the uterus/uterus that causes uterine contractions not optimal so that bleeding can occur. If this situation arises, then the exploration of the uterus to remove the remaining placenta left behind is an action that midwives must take. The cause of bleeding during the third stage is expelling the placenta and experiencing obstacles (placental retention). Placental retention has a prevalence of 15-20%, with an incidence of 0.1-0.3% each birth. (Prawirohardjo, 2014; WHO et al., 2000)

Several factors affect placental detachment in the third stage, namely the inadequate condition of his/contraction in third stage resulting from mismanagement during childbirth, illness/health condition of the mother and fatigue that occurs during labor, abnormalities in placental nidation/place of attachment of the placenta; the placenta is attached too deep, causing the placenta to be difficult to detach, placental deformity, uterine abnormalities, errors in the management of AMTSL, maternal factors such as age less than 20 and more than 30 years, parity, history of cesarean section in previous childbirth, history of curettage in abortion, anemia, history of last placental retention, comorbidities such as eclampsia, preterm labor, multiple pregnancies.(Alviani et al., 2018; Jumiatun & Nani, 2020; Sukmiati, 2015; Susiloningtyas & Purwanti, 2012; Tanjung, 2019)

In addition to complicating factors in pregnancy, self-efficacy in midwives' is an important thing that affects the care provided. Self-efficacy is a belief or drive a person shows when carrying out his role, including skills and cognitive abilities. Self-efficacy becomes an important thing in a person's achievement that will affect the ability to do something. According to Bandura, the concept of self-efficacy includes belief in things that must be achieved in the future is not based on experience, faith in the abilities possessed is not just hope, assessing specific circumstances not in general, having the confidence to be able to do something is not because of confidence. Self-efficacy is different from self-concept. Self-efficacy is based on experience, agreement with something or norm, or self-esteem related to self-assessment and self-control. It is more about self-confidence and the ability to do something to succeed. (Bandura, 1982; Classes & Classes, 2018; Schunk & K. DiBenedetto, 2021; Shiau et al., 2020)

WHO launched AMTSL to reduce the number of bleeding events that occur through AMTSL, namely by giving oxytocin as much as 10 IU intramuscularly, followed by stretching the umbilical cord under control when there are contractions as a procedure to accelerate the process of placental expulsion and reduce the amount of blood released. AMTSL's efforts, which are part of the standard labor handling procedure, succeeded in reducing the incidence of bleeding due to placental retention in the third stage

of labor, based on observational data conducted in January-February 2022 at 5 Puskesmas in Tasikmalaya city and regency, it was observed that midwives carried out uterine exploration on 3 out of 5 women during the third stage of labor, because there were signs of placental residue (left part of the placenta in the uterine cavity).

Research conducted by Irdayanti in 2021 found that midwives' perceptions of childbirth care have an important role in attitudes and behaviors in providing labor care in the third stage. To avoid excessive medical intervention, midwives need to understand the philosophy of care. Another study by Siregar in 2017 stated that active management in the third stage of labor carried out by midwives was influenced by education, motivation, experience, and knowledge. (Handayani, 2022; Irdayanti et al., 2021; Siregar et al., 2017). Exploratory action as an effort to prevent bleeding caused by placental residue becomes one of the portals of entry bacteria into the cavum that can cause infection, and infection becomes the third cause of death of women during labor and postpartum. Based on research conducted by Sukmiati (2015) regarding the evaluation of the implementation of AMTSL, it was found that there are still health workers who stretch the umbilical cord under control and do not wait for the uterus to contract, this can cause placental detachment is not optimal, and allows the placenta to rest in the uterine cavity. Knowing the factors that support midwives' clinical decision-making in carrying out exploratory actions after AMTSL becomes the basis for efforts to increase the third stage, reduce discomfort and psychological trauma in women during labor, and improve the quality of maternity care to support safe and comfortable expected delivery. Based on that statement, this study aimed to look at the factors that support the implementation of uterine exploration in the third stage of labor.

Method

The study design used a qualitative-quantitative approach, mixed method sequential explanatory, to analyze the factors that influence the midwife's actions in exploring the uterus after the placenta is born. A quantitative design was carried out first to see the influence of factors that influenced the actions of midwives in exploring the uterus in the third stage and continued with qualitative design to clarify other factors that became motives. The study was conducted in 4 public health centers in Tasikmalaya city with the criteria that public health centers are PONED and able to PONED (receive labor 24 hours / 7 days), have been accredited with the minimum standard of services, and have an average number of deliveries for one month above 20 deliveries. Data collection will be carried out in June-July 2023.

The sample in this study was taken by proportional sampling, namely by randomly taking 8-12 midwives from each public health center with a proportion of 2:3. The total subjects of this research amounted to 43 midwives to be observed when providing labor care using the questionnaire regarding knowledge of the implementation of AMTSL and self-efficacy in care during childbirth. The Questionnaires were tested for validity and reliability with a value of R>0.50. The inclusion criteria are midwives with a minimum education of Diploma 3 and an active practice license, and the exclusion criteria are midwives who have not attended updated midwifery training.

The observation process involves *a single-blind* enumerator. Enumerators are young midwives who conduct the internship process at the five public health centers (one public health with one enumerator), which researchers have carried out in perception equations. Single-blind is carried out. Namely, the midwife giving lab center or care does not know which maternity care is assessed.

The research variables consisted of midwife characteristics, knowledge of MAK III, and self-efficacy as a factor of uterine exploration. The quantitative data was analyzed bivariate with chi-square and Fisher exact test as a derivative. The qualitative (explanatory) explanation of the trigger activity of uterine exploration in the third stage was obtained by manually transcribing an open questionnaire.

The research has received ethical approval from the health ethics commission of the Poltekkes Kemenkes Malang, with an Ethics number 276/V/KEPKPOLKESMA/2023, according to 7 (seven) WHO standards in 2011.

Results

Primary data collection using a questionnaire obtained an overview of respondents' characteristics as follows:

Table 1. Frequency Distribution of Respondent Characteristics

Characteristic	Frequent	
	n=43	%
Age		
<25 years	1	2,3
25-40	24	55,8
>40 years	18	41,9
Practical Experience		
<10 Years	13	30,2
10-20 years	21	48,8
>20 years	9	20,9
Employment Status		
Non-ci-village worker	22	51,2
Civillage worker	21	48,8
Education		
Diploma III	33	76,7
Diploma IV	10	23,3
Place of Practice		
Puskesmas only	28	65,1
Puskesmas and other health facilities	15	34,9
Knowledge		
Good	13	30,2
Less	30	69,8

Test normality and homogeneity; Levene test ; ρ value >0,05

Table 1 shows the distribution of respondents' characteristic features, as for the description of respondents obtained, most respondents are aged <35 years (60.5%), with the youngest age of 24 years and 13 people aged around 40 years, with most having practical experience over ten years (69.7%). Over half of the respondents graduated with a diploma III in midwifery, with 10 practicing in public health centers and other health facilities.

The level of knowledge referred to in this study is the knowledge that is reflected in decision-making when conducting active management of the third stage of labor (AMTSL), namely about the initial time of doing controlled cord Traction (CCT) after oxytocin injection, it was found that less than half (30.2%) had good knowledge about when the right time to do CCT. Most respondents performed

CCT without paying attention to the signs of placental detachment, namely the globular uterus, which indicates the contraction of the baby's post-expulsion of the baby, the lengthening of the umbilical cord as a result of the release of the maternal part of the placenta from the surface of the uterus, and visible discharge of blood from the birth canal caused by the detachment of the maternal part of the uterus which causes injury to the site of implantation of the placenta. (1–4) More than half of respondents took PTT the first 1-2 minutes after injecting oxytocin as part of AMTSL.

The results of bivariate analysis using chi-square to see the influence and magnitude of characteristic correlation on midwives' self-efficacy when performing CCT and exploratory practice behavior of uterine cavum cleansing after placenta birth, shown in the following table:

Table 2. Characteristic Correlation to Self-Efficacy and Characteristic Self-Efficacy to Exploratory Actions

Variable	Frequency		ρ value*	ρ value**
	n=43	%		
Age				
<25 years	1	2,3	0,704	**0.013**
25-40	24	55,8		
>40 years	18	41,9		
Practical Experience				
<10 Years	13	30,2	0,488	0,216
10-20 years	21	48,8		
>20 years	9	20,9		
Employment Status				
Non-ci-village worker	22	51,2	1***	0,203***
Civillage worker	21	48,8		
Education				
Diploma III	33	76,7	0,177***	0,451***
Diploma IV	10	23,3		
Place of Practice				
Puskesmas only	28	65,1	0,458***	0,318***
Pueksemas and other health facilities	15	34,9		
AMTSL Knowledge				
Good	13	30,2	1***	1***
Less	30	69,8		
Self-efficacy				
High	9	20,9		1***
Low	34	79,1		
Exploratory Practice Behavior				
Always	15	34,5		
Sometimes	28	65,1		

* value ρ characteristic with self-efficacy; Test chi-square; ** value ρ characteristics, self-efficacy against uterine exploratory practice, ***derivative-fisher exact test, expected cell value <5; α=5%;

Table 2 shows that there is no significant difference between age, practical experience, employment status, education, and place of practice on midwives' self-efficacy in assessing self-confidence when conducting AMTSL, especially CCT , this is shown by the ρ value>0.05 from the calculation results using the chi-square test, while the results of the knowledge test on self-efficacy are 1, it means that it does not affect at all.

The results of qualitative uterine exploration carried out in conjunction with quantitative data collection in 43 respondents obtained several factors that became the motive for midwives to explore the placental uterine cavity, namely as follows:

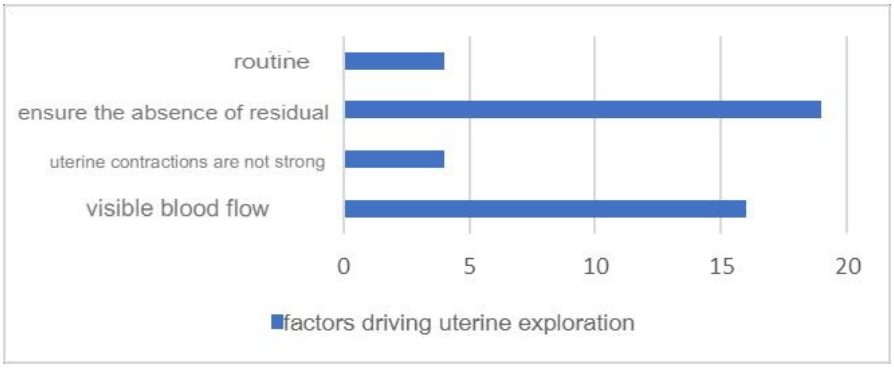

Figure 1. Factors Driving Uterine Exploration

Figure 1 shows the factors that support midwives in exploring the uterus. The factors driving exploration quantitative results related to the relationship of characteristics to uterine exploration actions carried out by midwives that there is no positive relationship, this is due to another impulse that leads to awareness of anticipation of the main problem that often arises during the fourth stage of labor, namely postpartum hemorrhage bleeding due to placental residue. The remaining placenta left behind in the uterine cavity becomes an obstacle for the uterus to contract so that the injury caused by the placental implantation scar is not closed optimally (the muscles do not contract optimally, resulting in the remaining blood vessels connecting the uterus and the maternal part of the placenta are not entirely closed). This results in open blood vessels, characterized by inadequate uterine contractions and blood discharge from the birth canal. This sign becomes the vigilance of midwives at the end of the third stage, so most midwives who see these signs will explore in anticipation of bleeding that can threaten the mother's life.

Discussion

In theory, the length of practice experience is related to a person's age. As a midwife age, she has a longer practical opportunity, considering the year of graduation and the length of formal education. In this study, it was seen that the overall characteristics did not show a significant positive relationship with the self-efficacy of midwives when exploring the uterine cavity. Midwives with a long practice period and practicing in more than one place did not show differences in self-efficacy related to implementing CCT in AMTSL. (Baker et al., 2021; Bassiouny et al., 2022; Bonet et al., 2022) This is by Bandura's theory of self-efficacy, that self-efficacy shown by confidence or confidence in doing an action cannot be separated from the events experienced by someone while doing something, causing doubt or specific considerations to prevent the occurrence of other more significant and dangerous problems. In addition, environmental conditions and habits become another factor that strengthens confidence in doing things, in this case, the confidence of midwives to assess with confidence that the placenta is entirely born after AMTSL is performed. (Chikkamath et al., 2021; Goodburn, et al., 2020; Ouyang et al., 2022).

The data presented in Table 2 showed no positive relationship between the exploration actions carried out by midwives after the placenta was born with the confidence of midwives when assessing the completeness of the placenta and the inherent characteristics of each respondent, with a value of

ρval = 1, so statistically it was said that the overall factors and levels of self-efficacy possessed by midwives, were not factors that encouraged midwives to take exploratory actions.

Physiologically, the uterus will contract to close the placental attachment wound after the placenta is born. The wound will not be closed entirely but will gradually return to its original state as uterine involution occurs (return of the uterus size to its original state). During the process, the uterus still secretes blood called lochea as an indicator of wound healing, under normal circumstances, the discharge will gradually decrease and disappear until the 10th day (lochea alba, white). (Gündüz, Ü., & Öztürk 2023) Blood output after the placenta is born is normal. Still, it needs to be ensured that there are no parts of the birth canal (portio, vagina, and perineum) that are injured and uterine contractions are in good condition (contracting adequately).

It is part of the procedure that every placenta born must be checked for placental completeness. In Indonesia, this is part of the standard of maternity care for the third stage of labor. Some midwives doubt the results of the examination due to the frequent lagging of the delicate membrane of the placenta that causes bleeding. This can be seen from the qualitative results of factors that support midwives in exploring Cavum Uteri (figure 1). Just as bleeding can be caused by several factors other than the rest of the placenta, uterine contractions can also be weak due to a filled bladder that interferes with the uterus contracting, trauma during the second stage of labor resulting from excessive intervention (*cristeller maneuver*). Before exploring the uterine cavity, it is necessary to ascertain the causative factors of bleeding and flaccid contractions. Inadequate contractions after 15 seconds of uterine massage are one indication of a pathological state. (Handayani, 2022; Heidari et al., 2023; Ika & Dewi, 2022; Irdayanti et al., 2021; Jumiatun, & Nani 2020; Juwita et al., 2023)

The occurrence of placental residue can be caused by the duration of uterine contraction that is too strong during the second stage of labor, causing a weakening of the strength of uterine contraction during the third stage of labor; this is often associated with incomplete placental removal and is usually the cause of secondary bleeding due to the remaining remains. There is no standard procedure related to uterine exploration as a routine action. The midwives do this as an anticipatory step without objective reason but using the experience of secondary bleeding as a justification by ignoring the discomfort of the client. Exploration of the uterine cavity at the end of the third time of delivery is considered inappropriate and can increase the risk of puerperal infection. However, these efforts can be made in anticipation due to the high incidence of bleeding due to the rest of the placenta (Keman, 2010; Kesehatan, 2020; Klassen & Klassen, 2018). So, one of the prevention efforts is to give broad-spectrum antibiotics such as prophylaxis. The use of antibiotics as a prophylactic effort carried out by midwives does not violate the code of ethics or related regulations. Midwives can give antibiotics as a preventive measure. (Kundu, A., & Jana 2021).

Diagram 1 provides an overview of the phenomenon that a person's self-efficacy is strongly influenced by the motives or drives that a person has when doing something. The drive to ensure that there is no placental residue is the dominant factor, this is driven by the high incidence of anemia in Indonesia, which is a predisposing factor to placental residue in the third stage. Lack of nutritional intake

is caused by low hemoglobin levels in a person's body, causing tissue to become fragile and easily torn. This occurs in maternity mothers who have anemia. This situation can cause the placenta to be more deeply embedded in the uterus so that fragile placental tissue can be left behind. (Goodburn et al., 2020; Mihretie et al., 2023; Oxorn, 2010).

This phenomenon became a motive for midwives to explore as part of the action at the time of childbirth. High cases of anemia, as well as many cases of secondary bleeding caused by placental residues that increase the incidence of postpartum infection, are solid motives for midwives to explore the placental postnatal uterine cavity. This situation requires efforts to minimize the practice of uterine exploration in the third stage as part of improving service quality, increasing client comfort and safety, and minimizing the use of antibiotics that are not needed so that midwifery care can return to the philosophy of reducing intervention.

Conclusions

There was no correlation between midwife characteristics and self-efficacy factors on uterine exploration at the time of childbirth, with the findings found that the main driving factor for exploration was the experience of secondary postpartum hemorrhage due to placental residues and postpartum infection due to placental residues, which made a strong reason for exploring the uterus at the third stage. This is reinforced by the environment, namely, all midwives who are respondents explore the uterus as an additional measure at the time of childbirth.

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The Effect of "MOLKESPRO" Educational Media on The Level of Knowledge of Early Adolescents about Reproductive Health

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A B S T R A C T

Child marriage in Indonesia is a recurring reality in society. Early marriage is a form of gender inequality, especially for women. Globally, 21% of women living in 2020 were married before the age of 18, and 12 million girls under 18 are married each year, or about 23 girls married as children every minute. Various reasons for the high rate of early marriage are not only due to educational, economic, and stigmatizing factors but also due to the low understanding of adolescents about reproductive health, which causes adolescents to have no choice, especially for adolescent girls. The purpose of this study was to determine the effect of "MOLKESPRO" monopoly media on adolescents' knowledge about reproductive health. The design of this study was pre-experimental with a pre-post-test design approach. Using the purposive sampling technique, the population was grade 6 elementary school students, as many as 31. In this study, the instrument used was a questionnaire about reproductive health—data analysis using a paired t-test. The results showed that the respondents' knowledge got the less category (35%) before being given health education and got a good knowledge category (81%) after being given health education. The results obtained p value<0.000 (0.000<α). Therefore, there is an effect of "MOLKESPRO" on the knowledge of early adolescents about reproductive health. Thus, the "MOLKESPRO" monopoly media can be used by midwives and other health workers in providing health education to early adolescents related to reproductive health, this is because its attractive design can make students enthusiastic to learn materials about reproductive health using the atmosphere created with fun.

Introduction

Early marriage in Indonesia is a reality that continues to recur in society. Various reasons become the basis for carrying out early marriage. Early marriage is a form of gender inequality, especially for women. This gender inequality problem must be addressed immediately. The Sustainable Development Goals (SDGs) program issued by the United Nations aims to eliminate the practice of child marriage in society. One of the goals of the SGDs program is "To Eliminate All Harmful Practices, Including Child Marriage by 2030". The National Family Planning Coordination Body (BKKBN) supports the minimum marriage age of 21 for women and 25 for men. This policy ensures that each married couple has attained physical and mental maturity (Judiasih *et al.*, 2020).

Globally, 21% of women alive in 2020 were married before the age of 18, and 12 million girls under 18 are married each year, or about 23 girls married as children every minute. Today, one in five young women aged 20 to 24 were married as children compared to almost one in four ten years ago (UNICEF, 2023). In Indonesia, in 2018, one-tenth of girls were married. Data from the Ministry of

Women's Empowerment and Child Protection of the Republic of Indonesia department in 2018 found that among women aged 20-24 years who married before the age of 18, as many as 11.21%, even married before the age of 15 years by 0.56%. Children in rural areas are always more likely to experience early marriage than teenagers in urban areas (BPS, PUSKAPA, UNICEF, 2020).

Various reasons for the high rate of early marriage are in addition to educational, economic, and stigmatizing factors, also due to the low understanding of adolescents about reproductive health, which causes adolescents to have no choice or weak bargaining position, especially for adolescent girls. Girls from households with the lowest expenditure levels are almost three times more likely to marry before age 18 compared to girls from families with the highest expenditure levels. Girls in rural areas are twice as likely to be married before the age of 18 compared to girls in urban areas. Women aged 20-24 who married before age 18 were four times less likely to complete high school than those who married after age 18 (UNICEF Indonesia, 2020). The low knowledge of adolescents about reproductive health is the background of premarital sexual intercourse. Adolescent reproductive health is the main focus because adolescents are a group that does not utilize reproductive health services due to the lack of accessibility for adolescents, especially early adolescents. In addition, the adolescent reproductive health program has not been maximized in its implementation, so reproductive health needs to be provided to adolescents. Many problems arise from ignoring reproductive health. Problems that occur due to a lack of knowledge of reproductive health are unwanted pregnancy, abortion, early marriage, STIs or STDs, and HIV/AIDS. One of the efforts that can be made to reduce these numbers is by conducting health education on how to care for reproductive organs, education on adolescent development during puberty, health education on the impact of pornography, health education on unwanted pregnancy and abortion, health education on HIV/AIDS and sexually transmitted infections, and health education (Ardhiyanti, 2023).

This is related to the data from the preliminary study, which shows that some random students aged 10 to 13 said they did not know about reproductive health. According to the explanation of one of the teachers, information about reproductive health is only obtained through subjects such as science (puberty), PJOK (maintenance of reproductive hygiene), and religious education, so outside of these subjects, they have not received enough information related to reproductive health. From this description, information about reproductive health is needed to improve their knowledge. This study aims to determine the effect of monopoly media on respondents' knowledge before and after using the press. Monopoly is a well-known game, making it accessible and potentially more engaging for 10-13-year-olds than traditional educational materials. The game format can encourage active participation and knowledge retention through gameplay mechanics like buying properties (learning concepts), answering questions (demonstrating knowledge), and interacting with other players.

Method

This study's research design and participants employed a pre-experimental design with a pre-test-post-test approach. A purposive sample of 31 sixth-grade students (aged 10-13 years) participated. In

this study, before the intervention, a pre-test assessed participants' initial knowledge about reproductive health using a validated questionnaire covering understanding, goals, influencing factors, physical changes, and hygiene practices. The questionnaire's validity and reliability were established beforehand. The intervention involved "Monopoli Kesehatan Reproduksi" (MOLKESPRO) – a specifically designed Monopoly-based educational media. The MOLKESPRO's feasibility was confirmed through evaluations by respondents (95% feasibility) and media experts (100% feasibility). In treatment delivery in this study, participants completed the pre-test. Then, they played MOLKESPRO in groups of 5-6 for two sessions, each lasting 75 minutes. Seven days after the second session, a post-test measured their post-intervention knowledge. Statistical analysis in this study, with the Wilcoxon signed-rank test, was used to analyze the knowledge change between pre-test and post-test. This research has passed ethical review with number 385/KEPK-POLKESMA/2022.

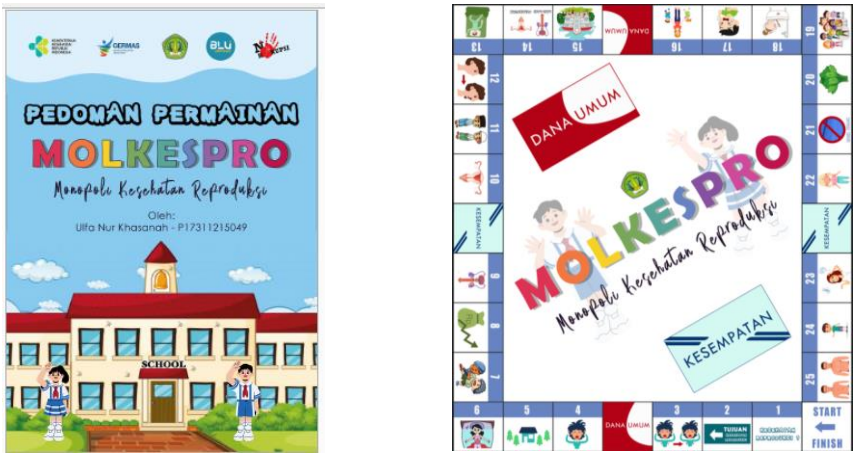

Figure 1. MOLKESPRO Media

Results

This research was conducted at public elementary school 3 Jedong in Wagir District, Malang Regency. The school is located inland and far from the city. The community, especially early adolescents, has difficulty accessing information and learning optimally, especially related to reproductive health. The results of the study are presented in the form of data tables, including the frequency distribution of students' knowledge before being given health education using monopoly media, the frequency distribution of students' knowledge after being given health education using monopoly media, and the paired t-test analysis table in tables 1 and 2.

Table 1. Frequency Distribution of Students' Knowledge Before and After Being Given Health Education Using Monopoly Media

Students' knowledge	Before education with MOLKESPRO		After education with MOLKESPRO	
	Frequency	Percentage	Frequency	Percentage
Good	11	35	25	81
Fair	9	30	6	19
Less	11	35	-	-

Based on Table 1, it can be seen that the category of knowledge of respondents—the categorization of knowledge in this study into three groups, namely good, sufficient, and less. The category is good if the pretest and post-test scores are in the value range "Good" if the value goes into the range 76-100, "Fair" if the value goes into the range 56-75, "Less" if the value goes into the range

<56. Table 1 shows students' knowledge about reproductive health before being given health education using monopoly media. Almost half of the respondents' knowledge got the less category with a percentage of 35% as many as 11 people. Almost all respondents get a good knowledge category, with a percentage of 81%.

Table 2. The Effect of "MOLKESPRO" Educational Media on The Level of Knowledge of Early Adolescents About Reproductive Health

Educational MOLKESPRO	N	Mean	Std. Deviation	Minimum	Maximum	Asymp. Sig. (2-tailed)
Pretest	31	64.61	13.6	36.3	86.36	0.000
Post-test	31	81.63	8.7	63.6	100	

Based on Table 2 above, the value asymp can be seen. Sig. (2-tailed) was 0.000, of which 0.000<0.05. Because the value is less than 0.05, it can be concluded that there is an effect of "MOLKESPRO" reproductive health monopoly media on early adolescents' knowledge about reproductive health.

Discussion

The results showed that almost half of the respondents had poor knowledge before using the reproductive health monopoly. Poor knowledge can be caused by a lack of reproductive health information. One of the things that can affect a person's knowledge is information (Mubarak, 2011). This is supported by the results of an interview with one of the teachers that information about reproductive health is only obtained through subjects such as science (puberty), PJOK (maintenance of reproductive hygiene), and religious education, so outside of these subjects, they have not received enough information related to reproductive health.

Previous research explains that the information received influences the level of knowledge. As many as 56% of respondents have a poor level of knowledge due to almost all respondents having never received information (Suparno, 2021). In addition to information, age can also affect a person's level of knowledge. Based on the study results, the respondents ranged from 11-13 years old, with the majority being 12. This is due to previous research that the older the age, the more developed the power of capture and mindset so that the knowledge obtained is getting better (Raidanti, 2022). Therefore, the information obtained can affect the respondents' answers when answering pre-test questions, the majority of which show less and sufficient categories.

Monopoly media is a tool for respondents to do sensing so that the process produces knowledge. Based on the study results, almost all respondents had good category knowledge after receiving an intervention in the form of a monopoly game in groups. According to the researcher, one of the factors that can underlie the process of changing respondents' knowledge is due to interest. This is shown by 93.1% of respondents being interested in learning about reproductive health, so it can be seen that interest is one of the factors that make a person gain more profound knowledge (Mubarak, 2011).

This is due to the advantages of monopoly media in the form of media collaboration with games that can attract the attention and interest of students (Lestari et al., 2021). If the subject matter is not attractive, boredom and laziness arise, so education must endeavor to make the given subject matter

attract students' attention. This is shown by the respondents' assessment related to this monopoly media, which obtained a score of 92% on the assessment criteria about the monopoly design used. It is interesting from the score that it is interpreted that this media is feasible and does not need to be revised, therefore, it can attract their attention to learning about reproductive health.

Another opinion that explains the changes in respondents' knowledge is that the frequency of giving tests that are carried out repeatedly can improve the long-term memory of respondents related to reproductive health material (Jayani and Dicky Hastjarjo, 2016). In this study, the frequency of treatment was repeated twice with an interval from the first repetition for one week, and after one week from the second repetition, a post-test was conducted. This study is in line with previous research, which explains that after being given health education in the form of educational monopoly twice, the level of knowledge increased from 11% to 81% in the good knowledge category and from 56% to 4% in the poor category.

Monopoly games have become a common form of social interaction games. In modern times, board games such as Monopoly have become a popular pastime to play with friends and family, partly due to the added in-person engagement of playing the game face-to-face versus looking at a screen. Board and card games like Monopoly can have many benefits, including an exciting game, a peer challenge, a collaborative social experience between friends, or a way for family members to spend quality time together. However, the design of many board games, such as Monopoly, is rarely used as a medium for education, especially reproductive health education (Johnson & Kane, 2020).

Without modification, most board and card games or Monopoly are only used for entertainment because of the attractive colors, text, visual textures, and symbols. Researchers have studied how social interactions are formed during games. Much of this research has focused on social play, which is defined as active engagement with a game (through controls or observation and attention to ongoing play) by more than one person. Monopoly games have found that games must balance social interaction with feelings. Social play in board and card games or monopoly can occur five types of social communication during gameplay: 1) Task: interactions that arise from activities required to maintain or update game status; 2) Game reflection: reacting or reflecting on the game after making a move; 3) Strategy: discussion of the game before making a move; 4) Interaction outside the game: talking about topics outside the game; 5) Discussing the game itself: commenting on the game (Johnson & Kane, 2020).

This study aims to explore technology or games as educational media by making existing games more accessible and used as a medium in delivering information, especially to early adolescents, about reproductive health. In developing the MOLKESPRO monopoly, we tried to add materials related to reproductive health without disturbing the social aspects of the existing game.

Designing an accessible version of the game has its challenges. In making a game easy to understand and play, it is essential not to disturb the balance of the game design, put players in an unequal position, or reduce the game's entertainment value.

Monopoly media that can influence respondents in the form of increased reproductive health knowledge can be caused by several internal and external factors. According to the researcher, some of

these internal factors come from the media, such as design, color selection, image characters, and the ease of respondents using the media for the learning process. Some internal factors will trigger external factors from respondents, such as interest in the media, to increase interest and motivation and create a pleasant learning atmosphere. These internal and external factors prove that monopoly media can increase respondents' knowledge related to the health education material in the form of reproductive health.

Previous research shows that the harmony of color selection and the selection of appropriate and easy-to-read fonts can make the media more attractive (Suparno, 2021; Putri, 2022). Material that is packaged with an attractive design can arouse the interest and attention of students to learn the material. Previous research also proved that monopoly media can increase student learning motivation and make students more active and creative in the learning process (Agustin, 2021). This is because Monopoly can create exciting learning activities and help the learning atmosphere to be happy, lively, and relaxed (Suciati, 2015).

The results of the research that has been conducted and supported by previous research prove that the provision of monopoly as a learning media can increase adolescents' knowledge related to reproductive health. This is evidenced by previous research that using Monopoly as a learning medium whose material is presented through questions, commands, and challenges can raise curiosity and emphasize high thinking skills (Lestari, 2021). The media used by researchers has been by its function in the form of cognitive functions, previous research explains that the cognitive function is that visual symbols or images facilitate the achievement of goals to understand and remember the information or messages contained in the image (Nurdyansyah, 2019).

Conclusions

The existence of MOLKESPRO, a monopoly-based educational media, has had a significant positive effect on respondents' knowledge of reproductive health. Before the intervention, a higher proportion of respondents fell into the "less knowledge" category compared to the "sufficient" and "good" categories. However, after using MOLKESPRO, the "less knowledge" category became nonexistent, while the "good knowledge" category increased significantly compared to "sufficient." These findings suggest that MOLKESPRO is an effective tool for improving knowledge about reproductive health among early adolescents—factors influencing knowledge acquisition include information access, age, interest, and media design. The research demonstrates that using Monopoly media focusing on design, repetition, and social interaction significantly improved students' knowledge compared to pre-intervention levels.

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Weight Gain During Pregnancy Based on Pre-Pregnancy Body Mass Index with Duration of Labor

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A B S T R A C T

Chronic Energy Deficiency and being overweight in pregnancy is a severe problem because it could cause many risks in labor. This study aimed to determine the association between weight gain during pregnancy based on Body Mass Index before pregnancy with the duration of labor. The type of research was analytical observational with a cross-sectional approach. Thirty respondents used the quota sampling technique. The Spearman-rank test showed a significant value of 0,039, so there was a significant relationship between weight gain during pregnancy and the duration of the first stage of labor in the latent phase. The significant value was 0,016, indicating a relationship between weight gain during pregnancy and the duration of the first stage of labor in the active phase. However, a significant value of more than 0,05 in the variable duration of the second, third, and fourth stages of labor. So, it was necessary to monitor weight gain and provide counseling on the impact of excessive weight gain during labor. In addition, women with excessive weight gain should be given more time during the first stage because the duration in the second until the fourth stage of labor would generally run so that it could reduce unnecessary interventions.

Introduction

Based on data from the Family Health Program registered with the Ministry of Health in 2020, Indonesia's maternal mortality rate was 4.627, 4.221 more than in 2019. In 2020, the causes of maternal death were bleeding in as many as 1.330 cases, high blood pressure during pregnancy in as many as 1.110 cases, and circulatory disorders in as many as 230 cases (Indonesia Ministry of Health, 2021a). To improve women's health status and reduce MMR-IMR, to sharpen the strategy and in line with 2020-2024, the Ministry of Health is transforming the health system including maternal and infant health services with six-pillar approach, one of which is the pillar of the health primary care transformation that aims to create healthy mothers-to-be through community-based health efforts such as; 1) preparing women to be eligible for pregnancy; 2) detection of pregnancy complications as early as possible in health services; 3) delivery in Health Facilities and 4) services for babies who are born (Indonesia Ministry of Health, 2021b).

The five ‘P's’ are clinically relevant to the prosperous duration of labor described as power (strength of contractions/pushing), passage (shape of the mother's pelvis), passenger (size of the fetus), and position (fetus against the pelvis). In contrast, the ‘5th P,’ the ‘psyche,’ reflects the mother's

psychological state (Gimovsky et al., 2024). By understanding how these components impact labor, women would effectively participate in their birthing involvement and optimize the conditions for a positive result(Graybill, 2023).

Chronic Energy Deficiency during pregnancy is a severe problem, but so is being overweight. There is a myth that pregnant women need to eat twice as much as usual to meet the needs of both mother and fetus. Pregnant women who overeat can experience excessive weight gain but unbalanced nutritional fulfillment. Being overweight is a global pandemic condition whose prevalence continues to increase. This condition is also commonly found in women of childbearing age. Overweight and obese in pregnancy is one of the high-risk obstetric conditions.

Maternal obesity has been reported to be a risk factor for various antenatal, intranatal, postnatal, and neonatal complications such as postpartum complications, induction of labor, macrosomia, shoulder dystocia, prolonged labor, increased blood loss, and cesarean section (Salman et al., 2022). Pregnant women who had weight gain during pregnancy more than usual would be 5,458 times the opportunity of postpartum hemorrhage (Maqfiro & Abd Mutalib, 2022). In 2020-2021, the occurrence of the COVID-19 pandemic triggered an increase in obesity in women entering pregnancy. High-calorie intake from sugary drinks and snacks, which is not balanced with physical activity, causes an increase in excess weight during pregnancy.

One study showed that obesity did not affect the duration of the active phase (Polónia et al., 2020). At the same time, several other studies described long labor duration as being associated with increased BMI (Carlhäll et al., 2013). However, these studies did not analyze seconds separately from each stage of labor, so this study will observe the duration from stages I-IV to be more specific.

It is imperative to consider the effect of maternal Body Mass Index on the progress and duration of labor to facilitate decision-making on potential obstetric interventions. Prolonged active labor more than 12 hours) was associated with severe postpartum hemorrhage (Nyfløt et al., 2017). Prolonged labor is common, especially in women who have just had their first child. New mothers whose first labor is difficult and prolonged say that the experience can affect them forever. Knowing the factors that influence the length of labor can increase vigilance and, at the same time, handle it properly so that the delivery can go well and as expected, both by the mother and her helper.

Based on this background, the researcher is interested in studying the relationship between weight gain during pregnancy based on Body Mass Index (BMI) before pregnancy and the duration of the first until the fourth stage of labor.

Method

The researcher conducted a correlational analytic study to examine the relationship between weight gain throughout pregnancy, as measured by Body Mass Index (BMI) before pregnancy, and the duration of labor during stages I-IV. The researcher used a cross-sectional methodology, wherein data is gathered simultaneously. Data collection was conducted after acquiring authorization from the research location. The population consists of women who undergo labor in the Independent Midwifery

Practice in Ternate City. Thirty samples were obtained using the quota sampling technique. The inclusion criteria for respondents were primigravid women who were over 37 weeks pregnant, had a head position pregnancy, and had no contraindications for vaginal delivery. The exclusion criteria for respondents included women who had prenatally identified congenital abnormalities and contraindications for vaginal delivery. The sequence of implementation consists of the following stages: a) Researchers solicit potential respondents, indicating their willingness to participate as respondents, and b) Elucidate the goals and objectives of the research. The researcher requested that the mother peruse the explanation prior to approval. c) Once the mother assented, the researcher requested that she sign an informed consent form.

The data utilized in this study is source data. The data about weight growth during pregnancy is derived from the pre-pregnancy Body Mass Index (BMI) and the duration of labor in stages I-IV. The data were collected during the trial. The data collection tool consisted of an observation sheet that recorded data on the maternal weight gain, while the partograph was used to measure the duration of labor. Observation sheets and partographs were utilized to obtain the data. Subsequently, the data were gathered, processed, and examined. Once the researcher has gathered the results on the data collection form, they organize them in a tabular format. The study aimed to investigate the relationship between the dependent variable and one or more independent variables. All variables involved in the analysis were categorical in nature, and Spearman's rank correlation was used to evaluate the data. The Health Research Ethics Committee of the Tanjungkarang Health Polytechnic has granted an ethical exemption for this research, as shown by the approval number 047/KEPK-TJK/I/2023.

Results

Table 1. Frequency Distribution of Respondent Characteristics

Characteristics		n	Percentage
Education	Senior High School	21	70,0%
	Higher Education	9	30,0%
Occupation	Housewife	6	20,0%
	Private employee	14	46,7%
	Government employee	10	33,3%
Age	Lower risk (20-35 years)	26	86,7%
	Higher risk (<20 years and >35 years)	4	13,3%
Antenatal Care	Complete (≥ six times)	30	100%
Type of Pregnancy	Single pregnancy	30	100%
Gestational Age	Post-term	4	13,3%
	Aterm	26	86,7%
Weight Gain During Pregnancy	More than normal-Lower than normal	18	60,0%
	Normal	13	40,0%
Duration of the first stage of labor in the latent phase	Abnormal	9	30,0%
	Normal	21	70,0%
Duration of the first stage of labor in the active phase	Abnormal	10	33,3%
	Normal	20	66,7%
Duration of the second stage of labor	Abnormal	2	6,7%
	Normal	28	93,3%
Duration of the third stage of labor	Abnormal	2	6,7%
	Normal	28	93,3%
Duration of the fourth stage of labor	Abnormal	3	10,0%
	Normal	27	90,0
Total		**30**	**100**

According to Table 1 above, it can be seen that the majority of respondents (70%) were senior high school graduates, the majority of respondents (46.7%) were private employees, almost all (86.7%) in the lower-risk labor, all respondents (100%) had complete antenatal care, all respondents (100%) have single baby, almost all (86.7%) aterm in gestational age, the majority of respondents (60%) weighted pregnancy more than normal-lower than normal, the majority of respondents (70%) had a normal duration of the first stage of labor in the latent phase, most of the respondents (66.7%) had normal duration of the first stage of labor in active phase, almost all respondents (93, 3%) had normal duration of the second stage of labor, almost all respondents (93.3%) had normal duration of the third stage of labor. Almost all respondents (90%) had a normal duration of the fourth stage of labor.

Table 2. Weight Gain During Pregnancy and Duration of the First Stage of Labor in the Latent Phase

Weight gain during pregnancy	**Duration of the first stage of labor in the latent phase**				**Total**	
	Abnormal		**Normal**			
	f	**%**	**f**	**%**	**f**	**%**
More than normal- Lower than normal	7	38,9	11	61,1	18	100
Normal	2	16,7	10	83,3	12	100
Total	9	30,0	21	70,0	30	100
Sig. = 0,039			α= 0,05			

The table shows that among respondents with weight gain during pregnancy more than normal-lower than normal, seven respondents (38,9%) had an abnormal duration of the first stage of labor in the latent phase and 11 respondents (61,1%) in the normal category. Respondents who had weight gain during pregnancy were normal: 2 respondents (16,7%) had an abnormal duration of the first stage of labor in the latent phase, and 10 respondents (83,3%) were in the normal category. The Spearman-Rank correlation test showed that the Significant value = 0,039 (Sig <0,05) indicates a significant relationship between weight gain during pregnancy and the duration of the first stage of labor in the latent phase.

Table 3. Weight Gain During Pregnancy and Duration of the First Stage of Labor in the Active Phase

Weight gain during pregnancy	**Duration of the first stage of labor in the active phase**				**Total**	
	Abnormal		**Normal**			
	f	**%**	**f**	**%**	**f**	**%**
More than normal-Lower than normal	8	44,4	10	55,6	18	100
Normal	2	16,7	10	83,3	12	100
Total	10	33,3	20	66,7	30	100
Sig. = 0,016			α= 0,05			

The table above shows that respondents who had weight gain during pregnancy were more than normal-lower than normal: 8 respondents (44,4%) had an abnormal duration of the first stage of labor in the active phase, and ten respondents (55,6%) in the normal category. Respondents who had weight gain during pregnancy were normal: 2 respondents (16,7%) had an abnormal duration of the first stage of labor in the active phase, and ten respondents (83,3%) were in the normal category. The Spearman-Rank correlation test showed that the Significant value = 0,016 (Sig <0,05) indicates a significant relationship between weight gain during pregnancy and the duration of the first stage of labor in the active phase.

Table 4. Weight Gain During Pregnancy and Duration of the Second Stage of Labor

Weight gain during pregnancy	Duration of the second stage of labor				Total	
	Abnormal		Normal			
	f	%	f	%	f	%
More than normal-lower than normal	2	11,1	16	88,9	18	100
Normal	0	0	12	100	12	100
Total	2	6,7	28	93,3	30	100
Sig. = 0,170			α= 0,05			

The table above shows that respondents who had weight gain during pregnancy were more than normal-lower than normal: 2 respondents (11,1%) had an abnormal duration of the second stage of labor, and 16 respondents (88,9%) were in the normal category. All of the respondents (12 respondents) who had weight gain during pregnancy in the normal category had a normal duration of the second stage of labor. The Spearman-Rank correlation test showed that the Significant value = 0,170 (Sig>0.05) showed no significant relationship between weight gain during pregnancy and the duration of the second stage of labor.

Table 5. Weight Gain During Pregnancy and Duration of the Third Stage of Labor

Weight gain during pregnancy	Duration of the third stage of labor				Total	
	Abnormal		Normal			
	f	%	f	%	f	%
More than normal-lower than normal	0	0	18	100	18	100
Normal	2	16,7	10	83,3	12	100
Total	2	6,7	28	93,3	30	100
Sig. = 0,275			α= 0,05			

All of the respondents (15 respondents) who had weight gain during pregnancy more than normal-lower than normal, had a normal duration of the third stage of labor. Respondents who had weight gain during pregnancy in the normal category: 2 respondents (16,7%) had an abnormal duration of the third stage of labor, and 10 respondents (83,3%) were in the normal category. Spearman-Rank correlation test showed that the significant value is 0,275 (Sig>0,05), so there is no significant relationship between weight gain during pregnancy and the duration of the third stage of labor.

Table 6. Weight Gain During Pregnancy and Duration of the Fourth Stage of Labor

Weight gain during pregnancy	Duration of the fourth stage of labor				Total	
	Abnormal		Normal			
	f	%	f	%	f	%
More than normal-lower than normal	3	16,7	15	83,3	18	100
Normal	0	0	12	100	12	100
Total	3	10	27	90	30	100
Sig. = 0,084			α= 0,05			

The table above shows that respondents who had weight gain during pregnancy were more than normal-lower than normal: 3 respondents (16,7%) had abnormal duration of the fourth stage of labor, and 15 respondents (83,3%) were in the normal category. All of the respondents (12 respondents) who had weight gain during pregnancy in the normal category had a normal duration of the fourth stage of labor. Spearman-Rank correlation test showed that the significant value is 0,084 (Sig>0,05), so there is no significant relationship between weight gain during pregnancy and the duration of the fourth stage of labor.

Discussion

Height weight measurement is among the ten minimum integrated antenatal care standards (Indonesia Ministry of Health, 2020). Based on the results of measuring weight and height, the Body Mass Index can be determined by the formula of weight in kilograms divided by height in meters (kg/m2). However, this formula can only be applied to ages 18 to 70, with normal spinal structure, not pregnant or breastfeeding, and not even bodybuilding or sports athletes (Irianto, 2017). Thus, the Body Mass Index of pregnant women is determined based on the weight before pregnancy as a benchmark to determine the range of weight gain during pregnancy. During pregnancy check-up services, weight gain must be monitored according to the weight gain chart in the mother and child health handbook adapted from the Institute of Medicine (IOM), United States (Indonesia Ministry of Health, 2023). Thus, each pregnant woman cannot be equated with the target weight gain because it refers to the pre-pregnancy BMI value, including the category of underweight, normal, overweight, or obesity.

Based on the characteristics of the respondents, it is known that 70% are in Senior High School, 46,7% are private employees, 86,7% are at lower risk for childbirth, all respondents 100% had complete antenatal care, all respondents 100% had single baby, 86,7% were aterm in gestational age so that from these characteristics indicate that the mother is in a safe condition for delivery. However, 60% weighted pregnancy, which was more than normal-lower than normal. Obesity rates are increasing worldwide, and this trend also affects women of childbearing age. Maternal obesity is the leading cause of maternal death in developed countries and is associated with gestational diabetes, fetal abnor malities, preeclampsia, and macrosomia compared to women of normal weight (Mother & Child Installation, 2023; Hung & Hsieh, 2016). Women who were underweight before pregnancy are at risk for placental abruption, small gestational age, and low birth weight (Tsai et al., 2015).

According to this study, those who gained extra weight had a longer duration of the initial stage of labor in the latent phase. Specifically, seven respondents (46.7%) in the excess weight category experienced an abnormal duration, while eight respondents (53.3%) in the normal weight category had a normal duration. Participants who had a higher than usual body weight encountered an atypical length of the initial stage of childbirth in a dormant phase. Specifically, two participants (16.7%) experienced this abnormality, whereas the remaining 10 participants (83.3%) had a normal duration. Participants who experienced below-average weight gain throughout pregnancy exhibited a typical duration of the initial stage of labor in the latent period. According to the Spearman-Rank correlation test, the Sig value of 0.039 (Sig <0.05) indicates a statistically significant link between weight growth throughout pregnancy and the duration of the first stage of labor in the latent phase.

According to a study conducted by Mohamed Samy et al. at Bab El Shearia Hospital, around 50% of nulliparous women who are fat had a significantly prolonged first stage of labor. Conversely, the second stage of labor may be independent of the mother's BMI. The duration of the second stage of labor in women who have not given birth previously may be relatively short or may result in a cesarean section, depending on their body mass index (BMI) prior to pregnancy (Samy et al., 2015). Caroline Shenouda and her colleagues conducted a study at Victoria Hospital in London, Ontario, revealing that

the labor rate may decrease when the maternal BMI increases. According to Shenouda et al. (2020), obese primiparous women take an extra 1.62 to 2.67 hours to reach 10 cm dilatation compared to women of normal weight. Likewise, Shayna M. According to Norman's research, women with a Body Mass Index (BMI) of 30 or above experienced a longer duration and slower progression of the initial stage of labor during the latent phase (Norman et al., 2012).

Most published studies examining the impact of obesity on the advancement of labor focus on comparing the initial and subsequent stages of labor. The findings of this study are consistent with those of other authors, indicating that overweight pregnant women had a longer average duration of the initial stage of labor, particularly in terms of the latent phase (Hilliard et al., 2012; Bogaerts et al., 2013). Pregnant women who are overweight have an increased frequency of labor induction and a higher likelihood of unsuccessful induction of labor, as indicated by several research findings. The findings indicate that overweight pregnant women experience a reduced rate of cervical dilatation during childbirth (Carlhäll et al., 2013).

A study at Centro Hospitalar São João, Porto, Portugal, showed that the active phase was not significantly affected by obesity (Polónia Valente et al., 2020). In another prospective study in Southern Sweden conducted by Sara Carlha¨ll et al., it was found that the duration of the active phase increased with increasing BMI in nulliparous women. However, after reaching the opening of the second stage of labor, obese women would give birth faster, so the possibility of prolonged labor was only during the first stage (Carlhäll et al., 2013). A retrospective observational cohort study of 1885 women at Nordsjællands Hospital, University of Copenhagen, Denmark, stated that excess weight had no significant effect on the total duration of the first stage of labor in the active phase. However, there was an increase in the occurrence of sectio caesarea. The absence of this effect may be due to sectio caesarea delivery in obese women being carried out earlier, thus shortening the duration of the first stage of labor in the active phase (Ellekjaer et al., 2017).

In this study, individuals who had gained weight during pregnancy were found to have a higher-than-average weight gain, while others had a lower-than-average weight gain. Out of the total respondents, eight individuals (44.4%) experienced an abnormal duration of the first stage of labor in the active phase, while ten individuals (55.6%) fell into the typical category. Out of the respondents who had weight increases throughout pregnancy, two individuals (16.7%) had an abnormal duration of the first stage of labor in the active phase. Ten individuals (83.3%) fell into the normal category. The Spearman's rank correlation test revealed a significant link between weight growth during pregnancy and the duration of the first stage of labor in the active phase, as indicated by a significant value of 0.016 (Sig < 0.05).

Obese women experience elevated cholesterol levels, leading to alterations in intracellular calcium and potential impacts on myometrial contractions. There is a hypothesis that leptin levels, a peptide generated by fat cells, may rise and hinder uterine contractions, leading to more prolonged first-stage labor (Wray & Arrowsmith, 2021). According to the findings of Annick Bogaerts et al., obesity is a significant risk factor for extended labor, particularly when the cervix has not yet dilated to 6 cm

(Bogaerts et al., 2013). Obese and overweight women who are induced into active labor have an equivalent likelihood of experiencing spontaneous vaginal birth as women with a normal weight (Carlhäll et al., 2020).

The injection of intrapartum oxytocin was found to be linked to excessive weight gain, indicating a potential connection between excessive weight gain and labor dysfunction. This association may be attributed to the negative impact of increased adiposity on uterine contractions. Obese pregnant women with a significant estimated fetal weight may experience longer labor and require more muscular contractions due to the presence of extra soft tissue deposits in the pelvis. Moreover, pregnant women tend to store more fat in the core part of their bodies rather than at the periphery. This leads to soft tissue deposition in the pelvis, which narrows the birth canal's diameter and prolongs the delivery duration (Amyx et al., 2023).

The labor process involves a complex interaction between five variables, namely the 5Ps: Power (strength of uterine contractions), Passenger (condition of the fetus), Passage (structure of the mother's pelvis), Position, and Psychic (emotional well-being of the mother)(Graybill, 2023). The strength of uterine contractions is evaluated every 10 minutes to determine whether they are regular, frequent, or last more than 40 seconds. Passenger assessment involves looking at the fetus's size, position, and attitude, as well as the presence of conditions that may affect the progress of labor. Maternal pelvic structures involving bones and soft tissues also need to be noted, including the state of the bladder, rectum, masses, or vaginal canal. It is only during labor that the adequacy of the pelvis can be determined. The position of the birthing person during labor can significantly affect the delivery process. Certain positions can speed up the descent of the baby's head, optimize pelvic size, and increase comfort during the birthing process. The mother's emotional well-being should be considered when ensuring proper support and a supportive environment. This includes the mother's stress and anxiety levels and the presence of a partner who provides adequate support(Swer, 2021).

According to this survey, a higher percentage of respondents had weight increases throughout pregnancy than those who did not: 2 respondents (11.1%) had a longer than average duration of the second stage of labor, whereas 16 respondents (88.9%) had a normal duration. All 12 responders who saw weight gain within the usual range during pregnancy also had a normal duration of the second stage of labor. The Spearman's rank correlation test indicated that the p-value was 0.170 ($p>0.05$), indicating no statistically significant association between weight growth during pregnancy and the duration of the second stage of labor.

Regardless of the weight increase throughout pregnancy based on maternal BMI, all women who reach active phase I of labor have an equal probability of experiencing spontaneous delivery during phase II. This knowledge may be relevant for patients undergoing induction who can feel disheartened if the duration between hospital admission and the onset of active labor is prolonged (Carlhäll et al., 2020). The primary objective is to ensure a smooth transition during the active period of labor. By accomplishing this, even women who are overweight will experience labor that is as effortless as women with a normal weight (Hautakangas et al., 2022). Obese women typically experience a shorter period of

exertion, resulting in a speedier second stage of labor. Pregnant women classified as obese and those classified as normal experience a similar rise in intrauterine pressure during the second stage of labor (Zelig et al., 2013). The correlation between maternal weight gain during pregnancy and the baby's birth weight is insignificant. This implies that mothers who experience excessive weight gain during pregnancy do not necessarily give birth to babies with a corresponding increase in weight. This is because the increase in maternal weight includes various components such as the contents of the uterus, abdomen, breasts, extracellular fluid, and blood volume (Wigianita et al., 2020).

Leptin also hinders collagen breakdown by matrix metalloproteinases (MMPs) and the programmed cell death of cervical cells in laboratory settings. This interference may impede the development of the uterus in fat women. Furthermore, leptin decreases the development of the uterus in overweight women by promoting the production of cervical collagen during the latter part of pregnancy. To prevent fetal membrane malfunction, membrane cell death is reduced. This helps prevent the membranes from breaking on their own in obese women. Therefore, obese women in the second stage of labor may need to have amniotomy, as suggested by Wendremaire et al. (2013) and Carlson et al. (2015).

Overweight and obese women during pregnancy experienced reduced duration of labor upon entering the second stage of labor. Regardless of the cause, pregnant women are motivated by the evidence indicating that the duration of the second stage of labor is shorter for them compared to women with average weight, and there is a reduced likelihood of requiring an emergency C-section. Hence, the findings of this study have the potential to curtail superfluous interventions for expectant women who are overweight or obese. Consequently, increased body weight during pregnancy is linked to a reduced length of labor (Østborg et al., 2022).

Nevertheless, the likelihood of sphincter ani damage diminishes as the mother's weight increases throughout pregnancy (Blomberg, 2014). During childbirth, the rates of episiotomy are notably higher in women with a normal weight. This could be attributed to the greater muscle mass resulting from increased pressure on the pelvic floor in obese women or the larger volume of fat mass they have (Hjertberg et al., 2018).

All 15 respondents in this study who experienced weight increase during pregnancy that deviated from the normal range, either higher or lower, had a normal duration of the third stage of labor. Of the respondents who experienced weight growth throughout pregnancy in the normal category, two respondents (16.7%) had an abnormal duration of the third stage of labor. In contrast, ten respondents (83.3%) had a normal duration. The Spearman-Rank correlation test indicated a non-significant association ($p=0.275$, $p>0.05$) between weight gain during pregnancy and the duration of the third stage of labor. The lack of a link may be attributed to the limited size of our sample. Obesity has been recognized as the primary factor contributing to postpartum hemorrhage. The risk of postpartum hemorrhage increases as the mother's weight increases (Kim et al., 2017). According to Cummings et al. (2018), the longer the duration of labor, the higher the risk of postpartum hemorrhage.

A prolonged duration of the third stage of labor, lasting more than 20 minutes, is associated with an increased risk of postpartum hemorrhage (Frolova et al., 2016).

In overweight pregnant women, the width and frequency of muscle contractions are lower than in normal pregnant women. Uterine contractions compared to a normal pregnant woman, calcium (Ca^{2+}) flow is low, and myometrial contractions are weak. It is believed to be caused by high cholesterol levels in the body, which affects the ease with which the uterus contracts. Several components of the cell signaling system play an important role in smooth muscle transport, found in cholesterol-rich cell membrane regions called lipids and caveolae. Estrogen and oxytocin receptors in the myometrium increase, and cholesterol levels determine their effectiveness (Muir et al., 2023; Carlhäll, 2018).

In this study, respondents who had weight gain during pregnancy were more than normal-lower than normal: 3 respondents (16,7%) had an abnormal duration of the fourth stage of labor, and 15 respondents (83,3%) were in the normal category. All of the respondents (12 respondents) who had weight gain during pregnancy in the normal category had a normal duration of the fourth stage of labor. Spearman-Rank correlation test showed that the significant value is 0,084 (Sig>0,05), so there is no significant relationship between weight gain during pregnancy and the duration of the fourth stage of labor. Three respondents were in the abnormal category because contractions were inadequate due to residual placenta, so additional monitoring time was added.

Expanded body weight is emphatically connected with expanded blood cholesterol levels and mindful of myometrial contractility changes. Cholesterol is an imperative component of cell films. A few primary components within the smooth direction of muscle signaling pathways are localized in cholesterol-rich locales of cell film parts, such as caveolae. In creature models, high-fat, high-cholesterol count calories diminished the expression of connexin-43 and caveolin-1 (myometrial contraction-associated proteins). However, they expanded the expression of COX-2, which may lead to destitute myometrial contractility amid corpulence. On the off chance that uterine contractility is impeded, the mother will experience excessive blood misfortune, which can, at that point, imperil the mother's life, called postpartum hemorrhage (Hajagos-Tóth et al., 2017).

The limitation of this study is that the small number of research samples does not allow to study all categories of weight gain based on Body Mass Index before pregnancy, besides that internal examination with Vagina Toucher (VT) to determine cervical opening is still a subjective measurement made by midwives from time to time.

Conclusions

There was a significant association between weight gain during pregnancy and the duration of the first stage of labor in the latent phase and active phase.

There was no significant association between weight gain during pregnancy and the duration of the second, third, and fourth stages of labor.

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Effectiveness of Tempe Yogurt and Tempe Juice on Pregnancy Hypertension

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A B S T R A C T

Data from the Global World Health Organization shows that hypertension is currently a global concern. Hypertension is caused by cardiovascular disease, and all of them cause death. According to report, only 54% of adults with hypertension were diagnosed, 42% received treatment, and only 21% had treatable hypertension. This needs to be underlined that efforts to increase awareness and management of hypertension are required. One of the non-communicable diseases that causes most deaths is hypertension. Based on the performance report of the South City Community Health Center, there were relatively high cases of hypertension in pregnant women in the last six months, namely 10 cases. Age, genetic factors, and parity can cause hypertension in pregnant women. This study aims to determine the effectiveness of tempeh yogurt and tempeh spice juice against hypertension in pregnancy in the South City Health Center Working Area. A quantitative study with a quasi-experimental two-group pretest-posttest design was conducted from April to September 2023. Samples were taken using purposive sampling of 40 samples, where the samples were divided into two intervention groups, namely 20 respondents who were given intervention using tempe yogurt three times a day, 200 ml, and 20 respondents were given 200 ml of tempeh spice yogurt three times a day. The results of the analysis showed that respondents aged >35 years (45%) in group A and aged 20-35 years (40%) in group B. Parity <2->4 (65%) in group A, parity 2-4 in group B. There was no history of hereditary hypertension (85%) in group A and (80%) in group B. There was a significant difference before and after the tempeh yogurt and tempeh spice juice intervention on systolic and diastolic blood pressure ($p<0.05$). There was a significant difference in the reduction in systolic blood pressure after being given tempeh yogurt and tempeh spice juice ($p<0.05$). It can be concluded that one effort to reduce pregnancy hypertension is by consuming tempeh yogurt and tempeh spice juice regularly.

Introduction

Public health problems, known as Non-Communicable Diseases (NCDs), have become a significant global, national, regional and local concern. According to the WHO report, in 2019, non-communicable diseases (NCDs) killed 40 types of diseases throughout the world. This NCD causes around 60% of total deaths in the world and plagues 43% of the global population with pain and suffering. In 2020, the number of adults suffering from hypertension is estimated to reach around 1.56 billion. In Indonesia, hypertension is one of the main causes of death. According to the results of Riskesdas in 2019, hypertension in Indonesia had a prevalence of 34.1%, with a ratio of 35.9% for women and 32.3% for men. Hypertension in pregnancy in Indonesia is ranked second as a cause of maternal death after bleeding. In this case, severe preeclampsia causes hypertension in pregnancy, which

has an impact on the risk of complications and the danger of death for the mother. Cases of hypertension in pregnancy in Indonesia are increasing. The effect is that almost 30% of maternal deaths in this country are caused by this condition. Bleeding is a cause of maternal death, especially during pregnancy. However, the increasing number of cases of hypertension in pregnancy has also caused an increase in maternal mortality rates in Indonesia.

Based on data from the South City Health Center, data on the number of pregnant women in 2022 who suffer from hypertension is 8% (20 out of a total of 224) pregnancies, in 2023, between January – April, there will be ten pregnant women with hypertension. A person is considered at risk of hypertension if the systolic blood pressure measurement exceeds 140 mmHg and the diastolic blood pressure exceeds 90 mmHg. There are two groups of risk factors for hypertension. Namely, the first group is risk factors that can be changed, such as age, gender, genetic factors, and risk factors such as parity in pregnant women. The second group is risk factors that cannot be changed, such as obesity, stress, smoking, alcohol consumption, and salt consumption (Jayanti et al., 2022)

To overcome the problem of hypertension, two treatment methods can be chosen, namely by using particular medicines or through non-drug measures. To achieve the desired effect, there is an alternative option that can be considered, namely consuming processed tempeh, which is made into a drink for pregnant women with hypertension. The results of research conducted by Evrianasari (2019) show a significant difference in mean systolic and diastolic blood pressure in pregnant women with pre-eclampsia who were given yogurt compared to those who were not given yogurt. Yogurt can prevent preeclampsia in pregnant women (Evrianasari et al., 2019), and the results of research conducted by Mulyani *et al.* (2018) show that there is a significant effect of giving tempe juice on total cholesterol levels, LDL cholesterol levels, HDL cholesterol levels, and triglyceride cholesterol levels, namely ($p<0.05$) (Mulyani & Rafiqa, 2018)

Tempeh is a fermented food that can be processed into drinks, is easy to consume, and lasts longer than similar products. This product has two main advantages, which make it easy to consume and last longer. The protein in soybeans contains the amino acid arginine, which acts as a precursor to nitric oxide (NO), which has the effect of opening blood vessels. Nitric oxide inhibits the aggregation (clumping) of blood platelets, thus facilitating smooth blood circulation. Yogurt is a dairy product that contains potassium, calcium, and magnesium. A balanced intake of potassium, calcium, and magnesium in the body has very positive benefits in reducing blood pressure (Evrianasari et al., 2019)

This study aims to determine the effectiveness of tempeh yogurt and tempeh spice juice against hypertension in pregnancy in the South City Health Center Working Area. The novelty in this research is the result of processed tempeh, which is made as a base for safe drinks for pregnant women to consume to reduce hypertension through tempeh yogurt drinks and tempeh spice juice.

Method

This research used quantitative research methods with a quasi-experimental design consisting of two groups: a two-group pretest-posttest design. The research was conducted in April – September 2023

at the South City Health Center. In this research, the independent variables were tempeh yogurt and spice juice. Tempeh yogurt and tempeh juice were given for three days at 200 cc. The dependent variable observed in this study was hypertension in pregnant women. The population is all pregnant women who come for pregnancy checks in the South City Health Center Work Area. The number of samples in this research was 40 people. The method chosen for sampling was purposive sampling, and respondents were selected using inclusion and exclusion criteria. Inclusion criteria included the patient being declared pregnant, willing to participate in research, and having complete medical records. The exclusion criteria are patients aged <20 years who have a history of heart disease in multiple pregnancies, kidney disease, and hypertension in previous pregnancies. The instrument used is a blood pressure monitor or sphygmomanometer to measure blood pressure. We also used questionnaires to obtain information regarding the history of hypertension in pregnant women, such as age, parity, and heredity, and observation sheets for monitoring blood pressure. In carrying out the normality test in this research, the Shapiro-Wilk, statistical, paired t-test, and independent t-test were used. This research has gone through an ethical test carried out by the Gorontalo Health Polytechnic ethical committee number DP.01.01/KEPK/201/2023 on August 24, 2023.

Results

Univariate analysis

Table 1. Characteristics of Pregnancy Hypertension in South City Health Centers

Variable	Categories	Group A		Group B	
		f	%	f	%
Mother's Age	<20 Years	3	15	6	30
	20-35 Years	8	40	8	40
	>35 Years	9	45	6	30
		20	100	20	100
Parity	2-4	7	35	18	90
	<2- >4	13	65	2	10
		20	100	20	100
Ancestral History	Yes	3	15	4	20
	No	17	85	16	80
		20	100	20	100

Based on the results in Table 1, it was found that respondents aged 20-35 years were 8 (40%) respondents in groups A and B, respondents aged <20 years were 3 (15%) in group A and 6 (30%) in group B. Respondents aged >35 years were 9 (45%) in group A and 6 (30%) in group B. The results showed that parity 2-4 was obtained by 7 (35%) in group A and 18 (90%) in group B, while <2->4 was obtained by 13 (65%) in group A and 2 (10%) in group B. 3 (15%) pregnant women who had a history of hypertension in group A and 4 (20%) in group B, while those who did not have a history of hypertension were 17 (85%) in group A and 16 (85%) in group A. 80%) in group B.

Bivariate Analysis

The analysis used in this study was the pariate t-test and independent t-test analysis. An independent samples t-test (or independent t-test for short) compares the means between two unrelated groups on the same dependent, continuous variable. Which was first carried out by the *Shapiro Wilk test* with the results obtained before the intervention was given; the systole was 0.124, the diastole was

0.500, and after the treatment, the systole was 0.119, and the diastole was 0.223. meaning it is usually distributed.

Table 2. Differences in blood pressure in pregnant women in Group (A) Tempeh Yogurt Intervention and Differences in Blood Pressure in Pregnant Women in Group (B) Intervention Tempeh Spice Juice

Group		Pre-Test		Post-Test		p Value
		Mean	Standard Deviation	Mean	Standard Deviation	
Group A	Systole	139	7.88	122	6.15	0,000
	Diastole	97	7.32	83	8.12	0,001
Group B	Systole	140	7.94	116	4.84	0,000
	Diastole	97	7.16	80	7.59	0,000

Based on the data obtained from group A, changes in blood pressure in group A can be observed before (pretest) and after (posttest) the intervention. Before the intervention, there was an average systolic blood pressure of 139 mmHg with a standard deviation of 7.88, After the intervention, the average blood pressure was 122 mmHg with a standard deviation of 6.15. This shows a significant difference, with a p-value of less than 0.05 ($p<0.05$). This means there was a significant reduction in systolic blood pressure before and after the intervention in group A. Meanwhile, the diastolic pressure before treatment was 87 mmHg, with a standard deviation 7.32. The results showed that after treatment, the average diastolic blood pressure in group A was 83 mmHg with a standard deviation of 8.12 and a p-value of 0.000 ($p < 0.05$). This indicates a significant reduction in group A diastolic blood pressure.

Based on the data obtained from group B, changes in blood pressure in group B can be observed before (pretest) and after (posttest) the intervention. Before the intervention, there was an average systolic blood pressure of 140 mmHg with a standard deviation 7.94. After the intervention, the average blood pressure was 116 mmHg, with a standard deviation of 4.84. This shows a significant difference, with a p-value of less than 0.05 ($p<0.05$). This means there was a significant reduction in systolic blood pressure before and after the intervention in group B. Meanwhile, the diastolic pressure before treatment was 97 mmHg, with a standard deviation 7.16. The results showed that after treatment, the average diastolic blood pressure in group B was 80 mmHg with a standard deviation of 7.59 and a p-value of 0.000 ($p < 0.05$). This indicates a significant reduction in group B diastolic blood pressure.

Table 3. Differences in Systolic and Diastolic Blood Pressure After Being Given Tempeh Yogurt and Tempeh Spice Juice in Group A and Group B

Group	Blood pressure		Mean	Deviation Standards	P Value
Group A	Systole	Posttest	122	6.15	0.0023
Group B	Systole	Posttest	116	4.48	

Based on the data obtained from group A, a p-value of 0.0023 or $P<0.05$ was obtained for systolic blood pressure in group A and group B, which means that there was a significant difference in the reduction in systolic blood pressure after being given tempeh yogurt and tempeh spice juice.

Discussion

This research is different from previous research, which obtained data that more pregnant women aged less than 20 or more than 35 years experienced hypertension (13 respondents). In contrast, nine

respondents in the 20-35 year age group experienced hypertension. Using the chi-square test, this study found a relationship between the incidence of hypertension in pregnant women and the p-value of 0.032, which was greater than 0.05. Researchers say that those aged <20 or >35 years are more at risk of developing hypertension in pregnancy compared to those aged 20-35 years. Age is related to structural and functional changes in the body. Age 20-35 years is the ripe age for pregnancy, but age 20-35 years also has the opportunity for hypertension because it is caused by changes in body function that are triggered by unhealthy habits and food consumption. The ages that have risk factors for hypertension are <20 years and >35 years. This can affect the cardiovascular system, leading to endothelial dysfunction. Age <20 and >35 years is the age at risk of developing hypertension in pregnancy, this is because age <20 years is when the reproductive organs are not yet fully functioning, so it will affect the body's metabolism and trigger hypertension, while age >35 years is the age at risk for experiencing hypertension during pregnancy is due to the mother's reproductive system whose function is decreasing.

Parity refers to the number of births, whether babies were born alive or died. Parity (para) is the number of children born to a mother, including children born alive and those who died. If parity is more than 4, it is considered unsafe parity. Meanwhile, a parity of four or less is considered safe parity. Based on research results from Sinambela (2018), there is a significant correlation between parity and the incidence of hypertension (preeclampsia). The risk of developing hypertension (preeclampsia-eclampsia) in women who have just become mothers or have a new partner is 6 to 8 times higher than in women who have been pregnant before. Around 85% of cases of hypertension (preeclampsia-eclampsia) occur in the first pregnancy. Parity (para) is the number of children a mother has given birth to, whether live or stillborn, parity > 3 is unsafe, and parity ≤ 3 is safe parity. Older primigravidae are at higher risk for severe preeclampsia. The ideal parity is 2 –3, mothers who have > 3 children are twice as likely to develop hypertension. (Pratiwi et al., 2022) Immunologic theory explains the relationship between parity and the incidence of hypertension (preeclampsia-eclampsia). This theory states that blocking antibodies against placental antigens that are formed in the first pregnancy is the cause of hypertension and can lead to pregnancy poisoning in the majority of primigravida from 28 to 32 weeks of pregnancy, showing an increase in diastolic pressure of at least 20 mmHg which can lead to preeclampsia in pregnancy (Pratiwi et al., 2022)

This is similar to research conducted by Moazzeni (2021), which stated that respondents who had parity three and ≥ four live births had a higher risk of developing hypertension by an HR of 1.25 [95% CI: 1.02-1.55] and 1.39 [1.12-1.72]. The risk and prevalence of hypertension are associated with metabolic changes (weight gain, dyslipidemia, insulin resistance, and increased plasma glucose) that occur during pregnancy. In addition, increased parity can be associated with metabolic diseases such as metabolic syndrome, obesity, T2DM, and CVD. Respondents who have obesity, DM, lipid profile, and also prehypertension are at increased risk factors for hypertension if they have high parity (Moazzeni *et al.*, 2021)

According to Alatas (2019), hypertension can occur due to genetic factors. If a pregnant woman has a family history of hypertension, then the pregnant woman has a greater risk of developing

hypertension during pregnancy. Women who have experienced hypertension in their first pregnancy will experience hypertension in subsequent pregnancies. If there is a pregnancy with children too far apart and a history of hypertension, then in primigravida, the incidence of hypertension will increase four times **(Ratumbuysang, 2014).**

This differs from research conducted by Pratiwi, Leda, et al., 2022 which obtained data from 100 respondents. Most respondents did not have a history of hypertension, totaling 66 respondents (66.0%), and those with a history of hypertension totaling 34 respondents (34.0%). %) (Pratiwi et al., 2022). This can be influenced by the lifestyle and habits of pregnant women in consuming foods that contain too much salt, drinking alcoholic drinks, or smoking.

Hypertension in pregnancy (HDK) often occurs during pregnancy and is classified as the three main causes of maternal death, namely bleeding and infection. Hypertension is a factor that affects around 10% of pregnancies and contributes to maternal and perinatal mortality rates. Hypertension can be a dangerous disease when it occurs in pregnant women because there are no particular signs. This has the potential to cause death for the mother and baby to be born. Several factors can increase the risk of pregnancy hypertension, such as pre-eclampsia, eclampsia, gestational hypertension, chronic hypertension, obesity, severe anemia at gestational age, and hereditary factors. Pregnancy hypertension can disrupt organ function, especially vital organs such as the heart, kidneys, and eyes. Pregnant women who experience hypertension during their first pregnancy will have a higher risk of experiencing preeclampsia in subsequent pregnancies. Pregnant women with hypertension are at high risk of severe complications such as placental abruption, cerebrovascular disease, organ failure, and intravascular coagulation.

Based on the data obtained in Table 3, it was obtained that the p-value was 0.0023 or P<0.005 for systolic blood pressure in group A and group B, which means that there was a significant difference in the reduction in systolic blood pressure after being given tempeh yogurt and tempeh spice juice. This is because the protein content in soybeans contains the amino acid arginine, which acts as a precursor to nitric oxide (NO), which has the effect of opening blood vessels. Nitric oxide inhibits the aggregation (clumping) of blood platelets, thus facilitating smooth blood circulation. Tempeh also contains saponins, which have been proven effective in lowering cholesterol levels. This means that tempeh can reduce LDL cholesterol and total cholesterol levels and increase HD cholesterol levels to improve blood circulation to the heart.

Soybeans in tempeh contain isoflavones, which are phytoestrogens that are structurally similar to estrogen and are thought to show antihypertensive activity by increasing NO and reducing angiotensin and being able to stop the reaction of free radical formation. In soybeans, there are three types of isoflavones: daidzein, glycitein, and genistein. Several studies show that soybeans have a positive effect on blood pressure in people with hypertension (Yang et al., 2015)

Tempeh has several advantages compared to soybeans: it has better digestibility of protein, carbohydrates, and fats, higher vitamin content, and better mineral bioavailability. The germination treatment can increase protein levels (Astawan et al., 2016). The fermentation process by R. oligosporus

that occurs in the processing of soybeans into tempeh can hydrolyze proteins and several other complex compounds into simpler forms, such as amino acids and peptides. Tempeh's hypotensive properties are also caused by tempeh bioactive peptides, capable of acting as ACE (Angiotensin Converting Enzyme) inhibitors. ACE is an enzyme that converts angiotensin I to angiotensin II. Angiotensin has a crucial role in raising blood pressure. So, food prepared from tempeh can affect the lowering of blood pressure (Astawan et al., 2016).

According to research by Evrianasari et al. (2019), giving yogurt to pregnant women with hypertension can significantly reduce blood pressure. The results of research conducted by Misnawati et al. (2021) show that tempeh contains the amino acid arginine, which acts as a precursor to nitric oxide (NO) and contains saponin, which has the effect of opening blood vessels, inhibiting blood aggregation (clotting), thereby facilitating smooth blood circulation.

Tempeh yogurt in this study is made from tempeh and made into a yogurt drink consumed by pregnant women three times as much as 200 ml. This tempeh yogurt can reduce hypertension in pregnancy because it contains protein in soybeans containing the amino acid arginine and also contains lactic acid, which is processed through fermentation using high-quality organism cultures, which have the potential to lower blood pressure. Various studies have proven that giving soybeans can reduce hypertension. Research by Sari et al. in 2023 shows that soybeans can significantly reduce systolic and diastolic blood pressure (Sari et al., 2023). Likewise, research has shown that 500 ml of soy yogurt/tempeh yogurt for three months can reduce systolic blood pressure. And diastolic blood pressure. This was explained in Utari's research in 2022 by administering 160 g of tempeh/day for four weeks, it could reduce LDL, triglyceride, and total cholesterol levels, which are risk factors for hypertension (Utari et al., 2022). Research conducted by Sari (2023) showed that giving tempeh milk (tempeh yogurt) did not significantly affect blood pressure. Because the researchers carried out the intervention for one month, this research obtained insignificant results because it was thought that the research time span was not long enough. (Sari et al., 2023).

Tempeh spice juice in this study is a drink made from steamed tempeh and then added spices such as ginger, cinnamon, palm sugar, and milk consumed for three days, and 200 ml consumed regularly. This spice juice contains soybeans and the amino acid arginine; the spice content combined in this juice also contains compounds in ginger and cinnamon, which have a working mechanism similar to high blood pressure drugs such as ACE inhibitors and calcium-channel blockers (CCB). The decrease in systolic blood pressure is thought to be caused by soy protein, which contains the amino acid arginine, a precursor of nitric oxide (NO) that has a vasodilator effect. Nitric oxide has the property of inhibiting the aggregation (clumping) of blood platelets so that it can improve blood circulation. This research is different from that of Ansarullah et al. (2017), which shows that giving tempe drinks to people with hypertension and hypercholesterolemia has not reduced blood pressure (systolic and diastolic). This is because the length/duration of intervention, especially for hypertension sufferers, is not long, so it does not have the effect of lowering blood pressure.

Based on the results of the research above, researchers assume that the incidence of hypertension during pregnancy, if not treated, can cause preeclampsia in pregnancy, which can hurt the growth and development of the fetus and is dangerous for the mother herself, even causing death. The efforts made in this research are to provide an alternative treatment for hypertension through non-pharmacological treatment, namely by consuming tempeh yogurt drinks and tempeh spice juice.

Conclusions

One treatment that can be applied to reduce pregnancy hypertension is by consuming tempeh yogurt and tempeh spice juice regularly. Tempe yogurt and Tempe juice, a dose of 200 cc/day, are equally effective in reducing blood pressure in pregnant women with hypertension.

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Differences in Postpartum Depression and Breast Milk Production in Postpartum Mothers After Implementing Postnatal Yoga

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A B S T R A C T

Breastfeeding is an important event for women that involves physical and psychosocial changes. One form of physical activity is yoga. Yoga is a type of exercise that is done during the postpartum period. It is hoped that it can help mothers improve their mental health, relax, stabilize their emotions, and be more confident in facing their new role as mothers. This research aims to determine the differences in postpartum depression and breast milk production in postpartum mothers after implementing postnatal yoga. The method in this research is a quasi-experiment with a pretest-posttest control group design. The sample size in this study was 32: 16 control and 16 intervention groups. The sampling technique uses a random sampling technique. The results of the paired sample T-test on postpartum depression during the pretest-posttest in the intervention group showed significant results, namely a p-value of 0.004 (p-value <0.05). Meanwhile, breast milk production in the intervention group showed significant results, namely a p-value of 0.000 (p-value < 0.05). In the control group, postpartum depression showed a p-value of 0.090 (p-value> 0.05), while breast milk production showed a p-value of 0.110 (p-value> 0.05). The conclusion is that there are differences in postpartum depression and breast milk production in postpartum mothers after implementing postnatal yoga.

Introduction

The postpartum period is an essential period for a mother. Women transition into mothers, partners into parents, and partners into families. During the postpartum stage, mothers may be more susceptible to stress. Postpartum mothers can experience psychological disorders around 85%—however, 10 to 15% experience significant symptoms such as depression. Depression during the postpartum period in Indonesia ranges from 50-70%. Depression during the postpartum period has several negative impacts on children's developmental outcomes, one of which is delayed language (Poreddi et al., 2021). Depression during the postpartum period, or what can be called postpartum depression, can also have a severe impact on the mother, baby (e.g., cognitive, behavioral, and emotional development problems), and family members (Teychenne et al., 2021). Suicide and infanticide can result from severe postpartum depression (Liu et al., 2022).

The causes of postpartum depression are influenced by the levels of the hormones estrogen, progesterone, prolactin, and cortisol, which are unstable which are biological factors that result in postpartum depression. The more significant the reduction in estrogen and progesterone levels after

delivering birth, the more likely a woman is to develop depression during the first ten days of postpartum (Indisari., 2017 in Mulyani Cici, Ayu Dekawaty, Suzanna, 2022).

Ways to treat postpartum depression can be done with Psychotherapy, lifestyle adjustments, a supportive environment, or any combination of these are all options. Although medication is an option, many women face challenges as a result of continuing to breastfeed. As a result, exercise can be a viable option for overcoming postpartum depression (Marconcin et al., 2021). Several researchers have studied ways to overcome the psychological problems that occur during the postpartum period, namely by increasing the supportive role of husbands' special training for mothers and babies. Counseling therapy, mood and behavior management, and yoga (Winarni L M et al., 2020). Yoga can be used as a stress-reduction therapy that incorporates the entire human body, and it is more commonly used as a therapy for anxiety or depression than medication therapy since it has fewer adverse effects and more benefits (Nabila T & Endang Dwiyanti., 2022)

During the postpartum period, the body changes hormonally and takes care of itself. Women experience challenges in breastfeeding and caring for newborns (Gila et al., 2021). In the 2015-2020 period, according to WHO, babies aged 0-6 months were exclusively breastfed worldwide, only 44% of the 50% target for breastfeeding (WHO, 2021). The prevalence of infants receiving exclusive breast milk in 2020 is 66.06%. This figure exceeds the Strategic Plan target for 2020 by 40%. The presentation of coverage of babies receiving exclusive breastfeeding in East Java in 2020 is 80.0% of the target of 40% (East Java Health Profile, 2020). In Kediri City, the prevalence of exclusive breastfeeding in 2021 is 51.9% of the target of 40% (Kediri City Health Office, 2022). In 2022, the target for exclusive breastfeeding is 45%, based on data from September, but exclusive breastfeeding is still 33.02% (Central Statistics Agency, 2022). The results of a preliminary study conducted at the Kediri City Health Service at the Balowerti Health Center show that the achievement rate for exclusive breastfeeding in 2021 has reached 36.5% of the target of 40%. At the Ngletih Health Center, the achievement rate for exclusive breastfeeding is still low, reaching 41.2% of the target of 40%.

Failure to breastfeed, since there is an inadequate milk supply, can create a number of issues in the baby's early life (Ravi & Joseph, 2020). WHO is actively promoting breast milk as the best supply of nutrients for infants and toddlers (Fungtammasan & Phupong, 2022). One of the essential factors moms face during nursing that causes them to discontinue breastfeeding is a shortage of breast milk, concern about a lack of breast milk, and the belief that the infant is not complete (Erdoğan & Turan, 2022).

The impact of irregular flow and production of breast milk can cause issues for both mother and baby, such as the emergence of breast abscesses, enlarged breasts, plugged milk ducts, mastitis, jaundice, and frequent screaming (Marmi, 2016 in Yeni et al., 2022). Breast milk production can be increased using both pharmaceutical and non-pharmacological therapies. Safe non-pharmacological therapies such as massage, postpartum exercises, acupressure, therapeutic touch, and mind-body healing are provided. Several research conducted in Indonesia indicate that postpartum yoga and postpartum exercise can be used to help stimulate breast milk production after delivery (Arefti et al., 2022).

One form of physical activity, namely yoga, helps stabilize emotions, strengthen determination and courage, increase self-confidence and focus, and build positive affirmations and strength of mind. Therefore, yoga performed during the postpartum period is expected to help mothers improve their psychological condition, strengthen body muscles, relax, stabilize emotions, and increase their confidence in facing their new role as mothers. With mindful breathing techniques, gentle movements, relaxation, and meditation, yoga can help mothers increase energy and endurance, relieve stress and anxiety, improve sleep quality, and reduce muscle tension and other physical complaints such as back pain. In the area around the thighs and waist (Fatonah et al., 2022). Other benefits of postpartum yoga include increasing breast milk production, fighting post-pregnancy depression, reducing stress, and preventing depression after giving birth (Ekajayanti et al., 2022).

Methods

This research is experimental research, with a pretest-posttest control group design. The sample size in this study was 32: 16 control and 16 intervention groups. The intervention group was given postnatal yoga, and the control group was not given postnatal yoga intervention.

This research involved all postpartum mothers at the Balowerti Community Health Center and Ngletih Community Health Center, Kediri City. The sample for this study consisted of postpartum mothers who met the inclusion criteria at the Balowerti Community Health Center and Ngletih Community Health Center, Kediri City. Inclusion criteria: (1) subjects who consented; (2) postpartum subjects starting on day 28; and (3) subjects with a history of normal labor. This research was conducted at the Balowerti Community Health Center and the Ngletih Community Health Center in Kediri City. The research was conducted from May to July 2023. To assess postnatal depression using the EPDS (Edinburgh Postnatal Depression Scale) sheet and to evaluate breast milk production using an observation sheet containing the respondent's data and the amount of breast milk before and after being given postnatal yoga in the intervention group. The control group was also the same; the only difference was that they were not given a postnatal yoga intervention.

The stages carried out before the research are as follows: (1) The researcher takes care of a preliminary study permit to obtain initial data by bringing a permit from Campus 4 of the Kediri Applied Midwifery Undergraduate Study Program addressed to the Kediri City Health Service. (2) After receiving a reply from the Kediri City Health Service, the researcher arranged for research permits at the Kediri City Investment Service to be addressed to the Head of the Balowerti Health Center and the Ngletih Kediri City Health Center. (3) The researcher submitted a request for initial data regarding the data required by the researcher to the Head of the Balowerti Health Center and Ngletih Health Center. (4) After obtaining initial data, the researcher determined the research location, namely in the Balowerti Health Center and Ngletih Health Center Working Area. The researcher coordinated with the midwives of the Balowerti Health Center and Ngletih Health Center to determine the sample according to the established criteria. Next, the researchers divided the respondents into intervention and control groups using a simple random sampling technique. The following procedure was done: (1) Researchers identify

themselves and share information about their study objectives and methodologies. (2) If the respondent is agreeable, the researcher offers an informed consent form for the respondent to sign. (1) In the intervention group, the researcher administered the EPDS questionnaire to the mother and examined the mother's breast milk production before administering postnatal yoga on the first day. The results were recorded on an observation sheet. (2) Respondents received postnatal yoga intervention four times in two weeks, according to the researchers. (3) The researcher gave the mother the EPDS questionnaire to fill out, examined the mother's breast milk production following postnatal yoga intervention on the 15th day, and documented it on the observation sheet. In the control group, the researcher gave the mother the EPDS questionnaire to complete, examined the mother's breast milk production on the first day, and documented the data on an observation sheet. (2) The researcher handed the mother the EPDS questionnaire to complete and examined the mother's breast milk output on the 15th day, which was noted on the observation sheet. The data is then processed and examined. The paired sample t-test was used to analyze the data.

Results

Table 1. Characteristics of Respondents in the Intervention Group and Control Group

Characteristics	Intervention Group (n=16)		Control Group (n=16)		*P Value*
	F/M	%/SD	F/M	%/SD	
Education					0,480
Baase	5	31,25%	3	18,75%	
Intermediate	6	37,5%	10	62,5%	
Tall	5	31,25%	3	18,75%	
Parity					0,433
Primipara	3	18,75%	6	37,5%	
Multiparous	13	81,25%	10	62,5%	
Work					1,000
Work	3	18,75%	5	31,25%	
Does not work	13	81,25%	11	68,75%	

Based on Table 1, the highest level of education in the intervention group was secondary school, with as many as 6 out of 16 respondents (37.5%). While in the control group, most of the highest level of education was secondary school, as many as 10 of 16 respondents (62.5%). In the intervention group, the majority were multiparous, 13 out of 16 respondents (81.25%). Meanwhile, in the control group, the majority were multiparous, 10 out of 16 respondents (62.5%). In the intervention group, most jobs were not working, 13 out of 16 respondents (81.25%). Meanwhile, in the control group, most jobs were not working, as many as 11 of 16 respondents (68.75%).

Table 2. Postpartum Depression Before and After Postnatal Yoga in the Intervention Group

Postpartum Depression (EPDS)	Intervention Group n=16		P-Value
	Before	After	
Not experiencing depression	8	12	
Possible depression	2	3	
The possibility of depression is relatively high	3	1	
Depression is very possible	3	0	0,016
Total	16	16	

Based on Table 2, which shows the distribution of the frequency of postpartum depression in the intervention group, eight respondents did not experience depression before receiving postnatal yoga, two respondents probably had depression, three respondents probably had relatively high depression,

and three respondents had a very high probability of depression. After receiving postnatal yoga, 12 respondents did not suffer depression, three likely experienced depression, 1 had a reasonably high likelihood of depression, and 0 had a very high probability of depression.

Table 3. Postpartum Depression in the Control Group

Postpartum Depression (EPDS)	Control Group (n=16)		P-Value
	Before	After	
Not experiencing depression	7	4	
Possible depression	4	7	
The possibility of depression is relatively high	3	3	
Depression is very possible	2	2	0,083
Total	16	16	

Based on Table 3, the frequency distribution of postpartum depression in the control group, seven respondents did not have depression prior to receiving postnatal yoga, four respondents probably had depression, three respondents probably had moderate depression, and two respondents had a very high probability of depression. After receiving postnatal yoga, four respondents did not have depression, seven likely experienced depression, 3 had a reasonably high likelihood of depression, and 2 had a very high probability of depression.

Table 4. Differences in Postpartum Depression (EPDS) in both the Intervention and Control Groups

Variabel	(n=16) Group Intervention		(n=16) The Control Group		*P-value*
	Mean	±SD	Mean	±SD	
Postpartum Depression (EPDS)	6,94	3.172	10,00	4.412	0,032

Based on Table 4, The independent t-test was used to determine the difference in postpartum depression between the two groups, namely the intervention group and the control group. The independent tests on postnatal depression in both groups showed significant results, namely 0.032 (p-value < 0.05). This shows that there are differences in postpartum depression between the intervention group and the control group.

Table 5. Mother's Milk Production in the Intervention Group Before and After Postnatal Yoga

Mother's milk production	Group Intervention (n=16)		P-Value
	Before	After	
Not enough	7	0	
Enough	9	12	
More	0	4	0.001
Total	16	16	

Based on Table 5, based on the frequency distribution of breast milk production in the intervention group, seven respondents did not experience a decrease in breast milk production, nine respondents experienced sufficient breast milk production, and 0 respondents experienced greater breast milk production before doing postnatal yoga. After receiving postnatal yoga, 0 respondents experienced less breast milk production, 12 respondents experienced sufficient breast milk production, and four respondents experienced increased breast milk production.

Table 6. Control Group Breast Milk Production

Production of breast milk	The Control Group (n=16)		P-Value
	Before	After	
Not enough	3	0	
Enough	13	16	
More	0	0	0.087
Total	16	16	

According to Table 6, which shows the frequency distribution of breast milk production in the control group, three respondents had no less breast milk production, 13 had enough breast milk production, and 0 had more breast milk production. After two weeks, 0 respondents had reduced breast milk production, 16 had adequate breast milk production, and 0 had increased breast milk production.

Table 7. Differences in Breast Milk Production in both the Intervention and Control Groups

	Group Intervention (n=16)		**The Control Group (n=16)**		**P value**
Variabel	**Mean**	**±SD**	**Mean**	**±SD**	
Breast milk production	737,50	89.405	648,75	54.513	0,002

Based on Table 7, the independent t-test was used to determine differences in breast milk production between the two groups, namely the intervention group and the control group. The independent tests on breast milk production in both groups showed significant results, namely 0.002 (p-value < 0.05). This shows that there are differences in postpartum depression between the intervention group and the control group.

Discussion

According to the findings of the research conducted, it was found that postpartum depression in the experimental group decreased, and the production of breast milk increased. During the postpartum period, physiological changes such as ideal body weight and improved body image compared to conditions experienced during pregnancy can be influenced by physical activity. Physical activity can also help reduce levels of postpartum depression (0zkan et al., 2020).

Yoga-based physical exercise as a holistic behavior has been proven effective in improving psychological well-being, helping to recover physical strength after giving birth, and providing social support to postpartum mothers (Putu et al., 2019). Yoga practice reduces body muscle tension, which is one of the causes of depression. Through physical exercises that calm breathing and relaxation techniques, a person can provide peace of mind without using medication (Murtiyani et al., 2018). Other research explains that after doing yoga, serum cortisol in the blood decreases and changes brain waves to alpha waves. Alpha waves are waves in the brain at 8-13 Hz. Usually, these waves appear when humans rest by closing their eyes at the beginning of bedtime (Winarni, 2020).

Breast milk production can increase after doing postnatal yoga because yoga movements for breastfeeding mothers stimulate the pituitary gland, increasing the hormone prolactin to produce more breast milk (Sutrisna et al., 2023). Breast milk does not come out after giving birth, which usually happens. Therefore, mothers do not need to be confused. Mothers can move around the chest and back to expand breast milk production. (Arefti et al., 2022). Other research results also show that yoga influences breast milk production in postpartum mothers in the Andalas Health Center working area, Padang City (p-value = 0.000) (Yoga., 2019).

Treatment for postpartum depression includes medication, psychological and psychosocial therapy, and non-drug treatments such as exercise, acupuncture, and massage therapy. Other research shows that postpartum mothers who received efflurage massage therapy showed that massage therapy using efflurage techniques was more effective in preventing postpartum depression (Kusumastuti et al.,

2022). According to researchers, in the control group who were not given any intervention, the rate of postpartum depression experienced a change. However, it was not significant because, according to existing theory, other risk factors for postpartum depression include various social and physiological factors (Patel et al., 2012; Wita et al., 2022). According to researchers, some factors influence the control group, namely the environmental conditions of postpartum mothers, the number of children born, and the birthing process.

The success of breast milk production in the control group differs from that of the intervention group. The figures increased in the intervention group. It is possible to conclude that postnatal yoga can affect postpartum depression and breast milk production.

Conclusions

From the research results, it was concluded that (1) Postpartum depression experienced changes before and after being given postnatal yoga in the intervention group for postpartum mothers. (2) Postpartum depression experienced changes in the control group. (3) Postpartum depression levels differed between the intervention and control groups. (4) Breast milk production changed before and after postnatal yoga in the intervention group for postpartum women, and (5) breast milk production changed in the control group. (6) The intervention and control groups produced different amounts of breast milk.

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The Effect of Auricular Acupressure on Uterine Contractions, Fetal Heart Rate, and Length of Labor in the Active Phase of Primigravida

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A B S T R A C T

The still high maternal mortality rate (MMR) in Indonesia, especially in East Java, is caused by indirect causes or other causes such as prolonged labor, so a method is needed to treat cases of prolonged labor such as auricular acupressure. Auricular acupressure (AKAR) is a non-pharmacological method proven effective for uterine contractions, but its side effects on the fetal heart rate (FHR) are unknown. The research aimed to analyze the AKAR method on uterine contractions, FHR, and labor duration in the first stage's active phase. This type of research is truly experimental, with a pretest-posttest control group design. The research subjects were 41 respondents, primigravida active phase first-stage mothers, selected by consecutive sampling and randomly divided into two groups, namely 21 AKAR groups and 20 deep breathing relaxation control groups. The research results of the Friedman test statistical test ρ-value = 0.000 in the AKAR group and ρ-value = 0.000 in the control group, meaning that AKAR influences uterine contractions. The Friedman Test findings show that AKAR does not affect DJJ (ρ-value = 0.618). The Independent Sample Test ρ-value = 0.29 indicates no statistically significant difference between the two groups' labor lengths throughout the first stage's active phase. The AKAR group's average labor time in the first stage of the active phase was 365.40 minutes, with a minimum of 267 minutes and a high of 395 minutes. Conclusion: The auricular acupressure method affects uterine contractions but does not affect the fetal heart rate. There was no difference in the length of labor in the first active phase of labor between the auricular acupressure and deep breathing relaxation groups, so it is recommended that the auricular acupressure method can be used as an alternative complementary care to prevent prolonged labor.

Introduction

The Indonesian Ministry of Health aims to reduce the country's maternal mortality rate (MMR) to 131 per 100,000 live births by 2030. Ensuring that all mothers have access to high-quality healthcare services, including skilled healthcare providers who help with birthing in medical facilities, is one way to expedite the decrease of the MMR. In Indonesia, 90.9% of births occurred in healthcare facilities in 2021; this percentage did not decrease from 2020 but increased. The MMR increased by 7,389 in 2021, with the majority of cases coming from COVID-19 (2,982 cases), bleeding (1,330 cases), hypertension (1,077 cases), and 1,309 other causes (Kemenkes RI, 2022). Prolonged labor is another factor causing maternal death, where these other causes are the highest cause of MMR in East Java Province (Dinkes, 2021).

Any labor period during the first stage of the primigravid active phase that lasts more than six hours is considered prolonged labor. Stage I, Stage II, Stage III, and Stage IV are the four phases of labor. The first stage is separated into an active phase and a latent phase. The first stage of labor lasts 20 hours in primigravida and 14 hours in multigravidas (Swer, 2021; Julia et al., 2023). Labor issues in the first and second phases are caused by an incoordination of contractions that impedes the labor process and increases its duration.

Active mobility and dietary correction are the first lines of treatment for protracted labor at level-one health institutions; if these methods are ineffective, a referral to a second-level health center for an oxytocin drip is made. Although this care has shown to be effective, a cesarean section is used to deliver the fetus if delivery difficulties arise. This affects both the rate of cesarean section deliveries and the rise in MMR.

Acupressure, body acupuncture, nipple stimulation, massage therapy with oxytocin, and active mobilization are non-pharmacological techniques to induce uterine contractions. Mothers cannot employ all of these techniques; for example, women who give birth with broad apertures find it challenging to mobilize because of contractions in their uterus. Maternal mobilization is hampered by body acupuncture, improper pressure on acupressure points results in suboptimal De Qi, and most mothers feel uncomfortable stimulating their nipples. Auricular acupressure, or AKAR, is a diagnostic and therapeutic approach that stimulates particular ear sites to restore normalcy to bodily dysfunction. Neurological reflexes, neurotransmitters, cytokines, the immunological system, and inflammation are all involved in ear stimulation (Hou et al., 2015).

The observed improvement of pain and disease is thought to occur through activating the reticular formation and the sympathetic and parasympathetic nervous systems. Contemporary studies validate the effectiveness of ear acupuncture in relieving pain and reducing anxiety (Gori & Firenzuoli, 2007). This is because the ear is supplied with nerves from cranial and spinal origins, further divided into regions responsible for motor and sensory functions. The motor area pertains to the motor division of the facial nerve (CN VII), which governs the external ear muscles. The sensory area comprises the auricular branch of the vagus nerve (ABVN), the auriculotemporal nerve (a branch of the CN V), the glossopharyngeal nerve, the lesser occipital nerve, and the more significant auricular nerve. These nerves have a direct connection to the brain and impact the functioning of the body's organs (Hou et al., 2015).

Non-pharmacological strategies to invigorate uterine constrictions incorporate dynamic preparation, areola excitement, oxytocin back rub, pressure point massage, and body needle therapy. These techniques cannot be utilized by moms; for example, activation. Moms conceiving offspring with broad openings experience issues assembling because of uterine compressions. Areola excitement: Most moms have an off-kilter outlook on invigorating their areolas. Unseemly tension on pressure point massage guides causes De Qi not to be ideal, and body needle therapy impedes maternal preparation. Auricular pressure point massage (AKAR) is a demonstrative treatment framework in view of the standardization of body brokenness through excitement of explicit focus on the ear. Ear excitement

includes neurological reflexes, synapses, cytokines, the invulnerable framework, and irritation (Hou et al., 2015).

There is currently relatively little research on AKAR in obstetrics, including studies on labor pain, prolonged labor, mother anxiety, and uterine contractions. Additionally, there is a paucity of evidence supporting biomarkers that trigger pain, uterine contractions, and anxiety. Due to these restrictions, further research must be done on AKAR's potential to help women overcome childbirth-related issues. Compared to body acupuncture, AKAR was found to have a significant value ($\rho<0.001$) in lowering labor pain and shortening the time of labor during the first active phase (Alimoradi et al., 2020) Long The active phase of the first stage of labor was significantly lower in AKAR compared control group (176.2 ± 1 minutes vs. 342.8 ± 87.2 minutes, $p<0.001$) and reduced episiotomy pain (Abedi et al., 2017; Jaić et al., 2019), labor pain $\rho=0.001$, anxiety level $\rho=0.0015$ (Mafetoni et al., 2018), and *low back pain* (Vas; et al., 2014) and the latest research reported that A KAR significantly ($\rho=0.0$ 11) increased β-endorphin levels and reduced labor pain. (Setiawandari et al., 2022)

There is still limited research related to acupressure auricular with biomarkers that influence labor and the side effects of AKAR on maternal and fetal health, so it is hoped that AKAR can be applied as a non-pharmacological method to overcome the problem of long labor in type C and D health service institutions that are easily accessible to the public and low cost. Affordable. This study aimed to determine the effectiveness of AKAR on uterine contractions, FHR, and duration of labor during the first stage of the active phase.

Method

This research is true experimental with a pretest-posttest control group design. The research population was all primigravida mothers who were expected to give birth between July and September 2023, 41 people at a midwife's independent practice place, and two enumerators with a registration certificate and a midwife practice permit. The enumerator assists in physical examinations and observing uterine contractions and fetal heartbeat. The research sample was primigravida active phase first-stage mothers. The process of selecting research subjects was conducted via consecutive sampling. Participants who matched the specified criteria were randomly assigned to either the AKAR intervention group or the deep-breathing relaxation control group. Inclusion criteria for this study were as follows: maternal age 20-35 years, gestational age 37-41 weeks, single fetus head position. Variables in the study were auricular acupressure, uterine contractions, fetal heart rate, and length of the first active phase. The intervention group underwent auricular acupressure on Uterine and Shen Men points using the tip of the index finger every relaxation period for 3 minutes from Ø 4 cm to Ø 10 cm. Uterine contractions are measured every 30 minutes for 3 hours, with three assessment indicators: 1) adequate (frequency: 5x/minute, duration: 46-50 seconds, intensity/strength: the uterus hardens during contractions, so you cannot press the uterus with your fingers); 2) inadequate (frequency: 4x/minute, duration: 40-45 seconds, intensity/strength: uterus can still be pressed with fingers); 3) not adequate (frequency: 3x/minute, duration: 30-39 seconds, intensity/strength: uterus can still be pressed with fingers). FHR is

measured every 30 minutes for 3 hours, with three indicators: 1) FHR <120 bpm (bradycardia); 2) FHR 120-160bpm (standard); 3) FHR 160bpm (tachycardia). The length of labor in the active phase of the first stage of labor was observed using the WHO Partograph sheet from a 4-10 cm cervical opening, with two indicators: 1) 6 hours (360 minutes) (normal); 2) >6 hours (>360 minutes) (not normal). Statistical tests using the Friedman test for data with repeated measurements in this study are uterine contractions and fetal heart rate and independent sample tests to determine the effect of auricular acupressure and deep breathing relaxation on the duration of labor in the active phase of the first stage.

The study ethics approval letter was obtained from the study ethics committee of the Faculty of Health Sciences UNIPA Surabaya Ethical Approval No. 108/KEPK, dated 5 June 2023.

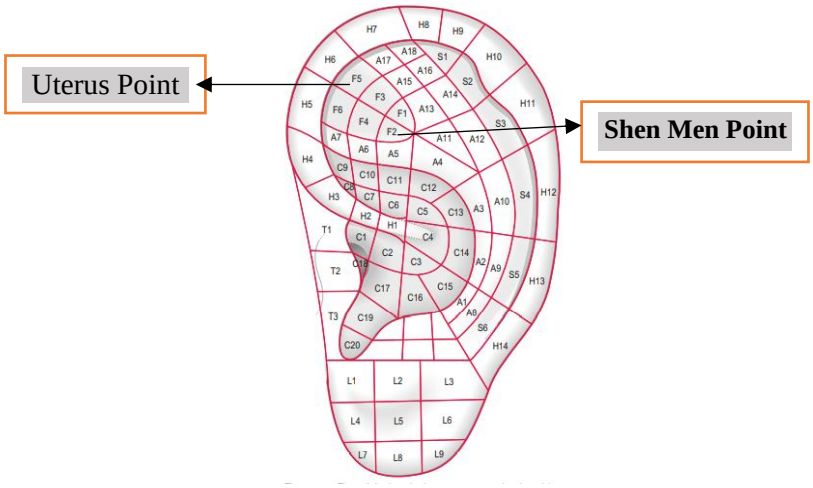

Figure 1. Uterus Point (TF5) and Shen Men (TF 2)

Results

Table 1. Characteristics of Respondents Based on Age, Education, Work, and Gestational Age

Characteristics	Group Auricular Acupressure		Mean (±SD); Median, Min-Mak	Group Deep Breathing Relaxation		Mean (±SD); Median, Min-Mak	ρ value
	N=21	%		N=20	%		
Age (years)							
<20	3	14.30	25.24(±4.80);	4	20.00	24.85(±4.63);	0.783
20-30	15	71.40	25.00(18-34)	13	65.00	24.00(18-33)	
31-35	3	14.30		3	15.00		
Education							
Junior High School	4	19.00		3	15.00		
Senior High School	15	71.50		13	65.00		0.793
Bachelor	2	9.50		4	20.00		
Work							
Housewife	13	61.90		15	75.00		
Private sector employee	4	19.00		2	10.00		0.265
Self-employed	1	4.80		2	10.00		
Civil servants	3	14.30		1	5.00		
Gestational age (weeks)							
37 Weeks	1	4.80	38.86(±0.91);	3	15.00	38.55(±0.88);	
38 Weeks	7	33.30	39.00 (37-	5	25.00	39.00(37-40)	0.956
39 Weeks	7	33.30	40)	10	50.00		
40 Weeks	6	28.60		2	10.00		

**Oneway Test*

Table 1 shows that most respondents in the intervention group and the control group were aged between 20-30 years, namely 15 people (71.40%) in the intervention group and 13 people (65.00%) in the control group. Most of the respondents' education was senior high school, namely 15 people (71.50%) in the intervention group and 13 people (65.00%) in the control group. Most of the respondents' work were non-working/housewives, namely 13 people (61.90%) in the intervention group and 15 people (75.00%) in the control group. In comparison, the gestational age in the intervention group was 38 and 39 weeks of gestation—7 people (33.30%) and mostly 10 people (50.00%) in the control group.

The mean age in the intervention group was 25.24 (±4.80), with a minimum age of 18 and a maximum age of 34. Meanwhile, the mean age in the control group was 24.85 (±4.63), with a minimum age of 18 years and a maximum age of 33 years.

The homogeneity test results with the One-way test ρ-value for age, occupation, education, and gestational age were >0.05, meaning the characteristics of the two groups were homogeneous.

In Table 2, it is known that pre-test uterine contractions in the intervention group were more than half of 13 people (61.90%) with inadequate uterine contractions, as well as in the control group, more than half of 13 people (65.00%) also had inadequate uterine contractions. Post-test uterine contractions in the intervention group (52.38%) were inadequate, while in the control group, the majority of 14 people (70.00%) were also inadequate.

More than half of the uterine contractions 90 minutes later in the intervention group, 12 people (61.90%) were inadequate, while in the control group, most of the 17 people (85.00%) were inadequate.

At the 120th minute, more than half of the uterine contractions in the intervention group, 11 people (52,38%), were adequate, while in the control group, less than half, nine people (45,00%) were inadequate.

At the 150th minute, uterine contractions in the intervention group, 14 people (66.67%) were primarily adequate, while in the control group, less than half, eight people (40,00%) were inadequate.

At the 180th minute, uterine contractions in the intervention group were mainly 16 people (76.19%) adequate, while in the control group, nine people (45.00%) were adequate.

At the 210th minute, uterine contractions in the intervention group, the majority of 19 people (90.48%) were adequate, while in the control group, the majority of 17 people (80.95%0) were also adequate.

The normality test results with Shapiro Wilk ρ-value in both groups were <0.005, meaning that the data in the intervention and control groups were not normally distributed. The results of the Friedman test statistical test ρ-value = 0.000 (<0,05) in the intervention group and ρ-value = 0.000 (<0,05) in the control group, meaning that there is an influence of the auricular acupressure method on uterine contractions.

Table 2. Observation Results of Uterine Contractions in the Intervention Group and Control Group Before and After Intervention

Uterine Contractions	Group Auricular Acupressure (N=21)						ρ value		Group Deep Breathing Relaxation (N=20)						ρ value	
	Adequate	%	In adequate	%	Not adequate	%			Adequate	%	In adequate	%	Not adequate	%		
Pre-test																
30 minutes	0	0.00	8	38.10	13	61.90	0,000 *	0,000**	0	0.00	7	35.00	13	65.00	0,000*	0,000**
Post-test																
60 minutes	0	0.00	11	52.38	10	47.62	0,000*		0	0.00	14	70.00	6	30.00	0,000*	
90 minutes	4	19.05	13	61.90	4	19.05	0.001*		0	0.00	17	85.00	3	15.00	0,000*	
120 minutes	11	52.38	10	47.62	0	0.00	0,000*		5	25.00	9	45.00	6	30.00	0,000*	
150 minutes	14	66.67	7	33.33	0	0.00	0,000*		7	35.00	8	40.00	5	25.00	0.001*	
180 minutes	16	76.19	5	23.81	0	0.00	0,000*		9	45.00	9	45.00	2	10.00	0.001*	
210 minutes	19	90.48	2	9.52	0	0.00	0,000*		17	80.95	8	40.00	0	0.00	0,000*	

**Shapiro Wilk test*
***Friedman test*

Table 3. Observation Results of Fetal Heart Rate in the Intervention Group and Control Group Before and After Intervention

DJJ Observations	Group Auricular Acupressure (N=21)							ρ value		Group Deep Breathing Relaxation (N=20)							ρ value	
	120-160 bpm		Mean(±SD); Min Mak	<120 bpm		>160 bpm				120-160 bpm		Mean(±SD); Min Mak	<120 bpm		>160 bpm			
	N	%		n	%	n	%			n	%		n	%	n	%		
Pre-test																		
30 minutes	21	100.00	144.67(±3.18); 138-148	0	0.00	0	0.00	0.002*	0.618**	20	100.00	144.50(±3.17); 138-148	0	0.00	0	0.00	0.003*	0.182**
Post-test																		
60 minutes	21	100.00	145.05(±2.80); 138-148	0	0.00	0	0.00	0.002*		20	100.00	145.00(±2.79); 138-148	0	0.00	0	0.00	0.002*	
90 minutes	21	100.00	145.71(±2.15); 140-148	0	0.00	0	0.00	0,000*		20	100.00	146.009±1.58); 140-148	0	0.00	0	0.00	0,000*	
120 minutes	21	100.00	144.67(±3.18); 138-148	0	0.00	0	0.00	0.002*		20	100.00	144.80(±3.33); 138-148	0	0.00	0	0.00	0.001*	
150 minutes	21	100.00	145.05(±2.80); 138-148	0	0.00	0	0.00	0.002*		20	100.00	145.009 ± 2.79); 138-148	0	0.00	0	0.00	0.002*	
180 minutes	21	100.00	145.71(±2.12); 140-148	0	0.00	0	0.00	0,000*		20	100.00	144.90(±2.93); 138-148	0	0.00	0	0.00	0,000*	
210 minutes	21	100.00	143.33(±3.86); 138-148	0	0.00	0	0.00	0.001*		20	100.00	142.60(±3.61); 138-148	0	0.00	0	0.00	0.002*	

**Shapiro Wilk test*
***Friedman test*

In Table 3, it is known that the observation results for Fetal Heart Rate (FHR) in the intervention group were 21 people (100%) with normal FHR (120-160 bpm), as well as FHR in the control group, were 20 people (100%) with normal FHR (120- 160bpm). No one experienced FHR < 120 bpm and >160 bpm.

In the intervention group, the average increase in FHR was 1-2bpm, with the highest rank being 90 minutes of FHR. The Shapiro Wilk test results from the seven FHRs in the intervention group ρ-value = <0.05, meaning the seven FHR data above are normally distributed. The statistical test results using the Friedman Test ρ-value = 0.618 (>0,05) means that the auricular acupressure method does not affect FHR, so it is safe for the fetus.

In the control group, the average increase in Fetal Heart Rate was 1-2bpm, with the highest rank at 90 minutes of Fetal Heart Rate. The Shapiro Wilk test results from the seven Fetal Heart Rates in the control group ρ-value = <0.05, meaning that the seven Fetal Heart Rate data above are normally distributed. The statistical test results using the Friedman Test ρ-value = 0.182 (>0,05) means that the deep breathing relaxation method does not affect the Fetal Heart Rate, so it is safe for the fetus.

Table 4. Length of Labor in the First Stage of Primigravida Active Phase in the Intervention Group and Control Group

Length of Labor in the First Stage of the Active Phase	**Group Auricular Acupressure (N=21)**		**Group Deep Breathing Relaxation In (N=20)**		**ρ value**	
	N	**%**	**N**	**%**		
6 hours (≤360 minutes)	13	61.90	9	45.00	0.311*	0.293#
> 6 hours (>360 minutes)	8	3.81	11	55.00		
Mean(±SD)	365.40(±65.60)		395.55(±79.38)		0.241*	
Median; Min-Mak	360.00;267-395		396.00;270-540			
Total	21	100.00%	20	100.00%		

**Wilk Shapiro test*
#Independent samples test

In Table 4, it is known that in the intervention group, the majority of 13 people (61.90%) had a duration of labor of ≤360 minutes, whereas in the control group, the majority of 13 people (65.00%) had a duration of labor of >360 minutes.

The average duration of labor in the active phase of the first stage of labor in the auricular acupressure group was 365.40, with a minimum duration of 267 minutes and a maximum duration of 395 minutes. The average duration of labor in the active phase of the first stage in the deep breathing relaxation group was 395.55, with a minimum duration of 270 minutes and a maximum duration of 540 minutes. The average difference between the two groups was 30 minutes and 15 seconds.

Shapiro Wilk test results ρ-value = 0.311 (pre-test) and ρ-value = 0.241 (post-test), meaning the data is usually distributed. The results of the Independent Sample Test ρ-value = 0.293 (>0.05) mean no significant difference between the length of labor in the active phase of the first stage of labor in the auricular acupressure group and the deep breathing relaxation group.

Discussion

Friedman Test statistical test ρ-value = 0.000 in the intervention group and ρ-value = 0.000 in the control group, meaning that the auricular acupressure method influences uterine contractions. The statistical test results using the Friedman Test ρ-value = 0.618 means that the auricular acupressure method does not affect FHR, so it is safe for the fetus.

The results of the Independent Sample Test ρ-value = 0.293 means that there is no significant difference between the length of labor in the active phase of the first stage of labor in the auricular acupressure group and the deep breathing relaxation group. The average duration of labor in the active phase of the first stage in the auricular acupressure group was 365.40, with a minimum duration of 267 minutes and a maximum duration of 395 minutes.

Auricular acupressure is a method carried out by stimulating the outer earlobe at the Uterus point, Oxytocin point, and Prostaglandin point, using the tip of the index finger above each relaxation period for 3 minutes from Ø 4 cm to Ø 10 cm. Auricular stimulation of the Uterine and Prostaglandin points is connected to the central nervous and neurovascular systems. Uterine point auricular acupressure activates the posterior pituitary to release oxytocin. The direct action of oxytocin on the myometrium produces regular and effective contractions, while the indirect action of oxytocin on the basal decidua increases $PGF_{2\alpha}$ production. Prostaglandins ($PGF_{2\alpha}$ and PGE_2) are important bioactive metabolites for arachidonic acid involved in labor. PGE_2 is found mainly in the amnion and chorion. In contrast, PGF2α is found in the decidua basalis and endometrium, so it is reported that the decidua is the source of this uterotonic agent (Yanuarman, 2008.).

$PGF_{2\alpha}$ increases intracellular concentrations by stimulating the release of stored calcium, resulting in uterine contractions. When the uterus contracts, it pushes the fetus into the cervix, sending nerve signals to the brain and causing oxytocin secretion. Oxytocin stimulates myometrial contraction by lowering the threshold for action potential generation and inducing an influx of intracellular calcium. A positive feedback cycle is propagated as contractility becomes more intense and there is more oxytocin release. $PGF_{2\alpha}$ helps oxytocin bind to its receptors. Increasing levels of $PGF_{2\alpha}$ and the hormone oxytocin cause an increase in uterine activity and pain-stimulating terminal nerve fibers, which causes auricular acupressure stimulation to influence uterine contractions and duration of labor.

Research on acupressure and uterine contractions has been widely conducted in Indonesia and abroad. The effect is not only on increasing uterine contractions but also on cervical dilatation. Research on auricular acupressure on reducing the duration of labor carried out by Setiawandari et al. (2023) reported that there was no significant difference in the length of labor in the active phase of the first stage between the auricular acupuncture and deep breath relaxation groups, meaning that auricular acupuncture was as effective as the deep breath relaxation method for reducing the duration of labor, the first phase of the active phase with an average difference of 42.15 minutes (Setiawandari et al., 2023).

The auricular acupressure method affects uterine contractions, where the results of observations carried out for 3 hours of uterine contractions are adequate and do not cause pathological uterine

contractions, namely hypotonic or hypertonic. This affects the fetal heart rate. The results of this study report that the fetal heart rate is normal and does not cause fetal distress (bradycardia or tachycardia). However, so far, there has been no research on the effects of auricular acupressure on fetal heart rate, the general research outcomes are on the results end of the birthing process. Research conducted on healthy adults reported that auricular acupuncture on the left sympathetic point caused a significant decrease in heart rate $p<0.05$ and activated the parasympathetic nervous system when healthy people lay relaxed. This is because stimulation of acupuncture points in the ear of the vagus nerve will increase parasympathetic activity, and HF (High Frequency), modulated by parasympathetic activity, can increase (Trinh et al., 2023). Of course, there is a difference between the fetal heart rate and the heart rate of a healthy adult. Therefore, follow-up research is needed regarding the effects on the fetal heart rate by using fetal heart rate detection tools that are more sophisticated than the funandoscope and Doppler.

Conclusions

This study concludes that auricular acupressure affects uterine contractions. However, it does not affect the fetal heart rate. There is no difference in the length of labor in the active phase of the first stage of labor between the ear acupressure group and the deep breathing relaxation group, with a difference in the average length of labor in the active phase of the first stage of labor in both group 30 minutes 15 seconds.

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Anxiety Level of Ovarian Cancer Patients After Being Given SEFT (Spiritual Emotional Freedom Technique)

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A B S T R A C T

Ovarian cancer is the case with cancer most common cancer in the world, with 240,000 new cases every year. There are three ways to respond emotionally to cancer patients that are rejection, anxiety, stress, and even depression. As many as 28.8% of cancer patients experience anxiety. When anxiety is not handled, it can even cause stress and depression that influence the expectations and quality of life of patients. Spiritual Emotional Freedom Technique (SEFT) is therapy That uses spiritual elements to reduce psychological and physical problems caused by emotional or psychosomatic causes. Research purposes: This is to analyze the worried patient's ovarian cancer level after SEFT. Type research used in research This is a quantitative study with the method pre-experimental approach One Group Pretest- Posttest Where the population in this study is patients with ovarian cancer at the Indonesian Cancer Foundation, East Java Coordinating Branch—taking sample done with technique Purposive sampling according to the inclusion criteria with a total of 26 patients. Intervention therapy SEFT is done 4-5x times each Sunday for two weeks. The instruments used were the HARS questionnaire sheet, observation sheet, and SOP for implementing SEFT. The data analysis used is the parametric Paired T-test. The result obtained is P -value = 0.000 < (α = 0.05), which means that H0 is rejected and H1 is accepted. Where the conclusion is that the Spiritual Emotional Freedom Technique (SEFT) affects reducing anxiety if done regularly and continuously. The intervention focuses on reducing problem psychological Problems caused by emotional or psychosomatics. So, the body will experience relaxation, and the patient will become calm.

Introduction

Health reproduction is interpreted as health, in a way, physical, mental, and complete social welfare for all related things with systems and functions as well as reproductive processes. It is not only a condition free from disease. Women's reproductive organs are one of the frequent areas where hormones, infections, cysts or myomas, and cancer cause various possible diseases. Cancer is a natural disease, not infectious, or NCD (Non-non-communicable disease), which become the cause of death of most giant men around the world; globally, almost 1 in 6 deaths is caused by cancer (WHO, 2018). About 70% of cases of death consequence disease cancer occur in low-income countries. Frequent cancers experienced by women are breast cancer, cervical cancer, and Ovarian Cancer (Stelzle et al., 2021).

Ovarian cancer is the case with cancer most common cancer in the world, with 240,000 new cases every year (Chatterjee et al., 2021). World Cancer Research Fund International (2018) incidence of new

ovarian cancer enhancement reached 300,000. In Indonesia, Ovarian Cancer there is the number of 15 cases per 100,000 women (Stelzle et al., 2021), whereas According to Global Cancer Incidence, Mortality and Prevalence (Globocan) data, figures incident ovarian cancer in 2020 was 14,896 cases and numbers death reached 9,581 cases. Based on data from the Surabaya City Health Office, figures for cancer during the final year are still fluctuating. In 2018, there were 2,379 cases, in 2019, it rose to 3,035, and in 2020 it decreased to 2,619 cases. Based on the data obtained from Premier Hospital Surabaya, in 2021, there were 95 cases of ovarian cancer (Hartawan et al., 2021), in 2022, there will be 87 cases of ovarian cancer, and by 2023, starting in January – June there were 50 cases ovarian cancer. In general, there are three methods for responding to cancer in an emotional way that is rejection, anxiety, stress, and even depression. Results show that as many as 28.8% of patients with cancer experience worry (Br. Sitepu & Wahyuni, 2018).

Anxiety related to cancer can increase pain, affect sleep, cause nausea and vomiting, and disturb quality of life, and severe anxiety can even shorten the life of a patient (Lina et al., 2019). Based on the results of interviews conducted at the Indonesian Cancer Foundation Branch Coordinator East Java with patients who have ovarian cancer, as many as nine patients disease cancer is something fatal and complex disease healed so that matter This causes the emergence of negative thoughts and so on, giving rise to anxiety in sufferers cancer. Other factors mentioned that patients feel anxious and stressed because of the condition they are experiencing that causes pain and boredom. Because of the care of Consequences illness patients, cancer often suffer twofold than most diseases, which means that besides cancer themselves, they also suffer worry, even depression. Remember the possible impact of worry about the so done proper handling to increase the number of patients with ovarian cancer, some studies have already been done to overcome worry. One of them with non-pharmacological therapy uses the *Spiritual Emotional Freedom Technique (SEFT)*(Rumambi et al., 2023). This study aims to analyze the worried patient's ovarian cancer level after SEFT.

Methods

This research was done by one of the Surabaya branches of the Indonesian Cancer Foundation. This study type is a quantitative design study and is an experimental one-group pre-and post-test. Population in a study population of as many as 39 who had ovarian cancer at the East Java branch of the Indonesian Cancer Foundation. Technique taking a sample, namely purposive sampling, sample study: As many as 26 respondents with criteria for cancer patients stages 1-3, experiencing anxiety disorders, can communicate well, have comprehension awareness, and are willing to be respondents (Djaali, 2020). Data collection takes the form of a questionnaire, namely the HARS (Hamilton Anxiety Rating Scale). Before giving Respondent SEFT therapy, given the HARS questionnaire, and after being given SEFT for 15-25 minutes, Given the HARS questionnaire again. On research, this is using ethical clearance to party Committee Ethics Faculty Science and Health UNIPA with number Ethics 112-KEPK/FSK/IV/2023 dated 17 October 2023.

Results

This variable is what is measured as the level of anxiety in Respondents with Ovarian Cancer. Results measurements can seen in the table under

Table 1 Anxiety Level Before (*Pre-Test*) and After (Post-Test)

Anxiety Level	*Pre-Test*		*Post-Test*	
	Amount	**Percentage**	**Amount**	**Percentage**
No Worried	0	0%	5	19.2%
Worry Light	8	30.8%	11	42.3%
Worry Currently	8	30.8%	10	38.5%
Severe Anxiety	10	38.5%	0	0%
Total number	26	100%	26	100%

Source: Primary data for 2023

Table 2 Anxiety Level Analysis Table Patient Ovarian Cancer Before (Pre-Test) and After (Post-Test)

Variable ***N = 26***	**Mean: Median** **Min-Max**	***Std. Deviation (SD)***
Pre-Test	3, 08: 3.00 2-4	0.845
Post-Test	2, 19: 2.00 1-3	0.749

Source: Primary data for 2023

Table 1 above shows that the results of the HARS questionnaire regarding the level of worry before treatment were obtained from respondents who experienced worry heavy, medium, and light. In contrast, on the results after giving treatment, some respondents experienced worry heavy, just obtained respondents with moderate worry, anxiety light, and no existing worry. Most of the pre-test respondents experience heavy anxiety, namely 38.5% (10 respondents). During the post-test, respondents who experienced worry heavily experienced a declined level of worry, moderate six respondents and anxiety light four respondents.

Table 3. Results of the Anxiety Data Normality Test Patient Ovarian Cancer

	Kolmogorov-Smirnov [a]			**Shapiro-Wilk**		
	Statistics	**Df**	**Sig.**	**Statistics**	**df**	**Sig.**
Anxiety Pretest	,124	26	,200 *	,932	26	,088
Anxiety Posttest	,155	26	,107	,912	26	,030

*. This is a lower bound of the true significance.

Based on Table 3, mark signification is known. Sig *Pretest* was 0.088 more significant than 0.05 (0.088 > 0.05), and the value of Sig *Post-test* significance amounted to more than 0.030 significant from 0.05 (0.030 > 0.05). It can interpreted that the normality test *Shapiro Wilk* above is normally distributed because mark significance is more than 0.05 or *sig >0.05*, so fulfil condition For next with the Parametric *Paired T-Test.*

Table 4. Homogeneity Test Table

Levene Statistics	**df1**	**df2**	**Sig.**
1,091	1	50	,301

Based on Table 4 above, it is known that the mark significance of Sig. of 0.301 is considerable at 0.05 (0.301>0.05). Thus, the homogeneity test levene above concluded that the data is homogeneous.

Table 5. Statistical Test Results Influence Spiritual Emotional Freedom Technique Against Worry Patient Ovarian Cancer

Tests	***n***	**Statistics Descriptive**	**Paired T-Test**		
		M (Std.D)	***t***	***Df***	**Sig (2-failed)**
Pre-Test	26	3.08 (0.845)	8,402	25	0,000*
Post-Test	26	2.15 (0.732)			

* $p < 0.05$ Significance value

Based on Table 5 shows the average value level worry *Pre-Test* with value (*M (Mean) 3.08* with mark *Std.D (Standard Deviation) 0.845)* and value *Post-Test* or after given SEFT intervention *(M (Mean) 2.15* with mark *Std. D 0.732)* with *p-value 0.000* where $p < 0.05$ so results from *the Paired Sample T-Test* test shows significant figure between mark *Pre-Test* and score p*ost-test.*

Discussion

The frequency and percentage of worry can be known based on research done before treatment. The *pretest* results show that 38.5% (10 respondents) have category worry weight, 30.8% (8 respondents) with worry moderate, and 30.8% (8 respondents) with worry light. So, from exposure, it is known that the level of worry patients with ovarian cancer is heavy. Worry is feelings of anxiety, worry, and fear that are not clear, as if something threatening accompanies a response (Keliat, 2020).

Based on research that has been done on 26 respondents after given intervention of SEFT (Spiritual Emotional Freedom Technique), it is known that after given intervention, there is a change in the level of anxiety experienced by respondents, namely as many as ten respondents (38.5%) and anxiety mild 11 respondents (42.3%). That matter shows that there is a change in anxiety levels in respondents after the intervention SEFT. This matter is in line with Sri Maryatun's research (2020), which shows that SEFT (Spiritual Emotional Freedom Technique) is capable of lowering stress levels in patients with cancer cervix with a mark of P 0.001 and obtained the average stress level before given therapy of 20.58 and after given the average therapeutic stress level was 11.50. SEFT (Spiritual Emotional Freedom Technique) is a helpful intervention to reduce feeling hostile to someone stressed and to change emotions. SEFT (Spiritual Emotional Freedom Technique) merges system energy, body, and spirituality. The series procedures carried out is Set-Up (neutralizes negative energy in the body), Tune-In (directs mind at the place of pain), and Tapping (knocking light with two end fingers on the dots certain in the body man) (Anggraini & Safinatunnajah, 2021)

Based on research conducted by Feinstein (2021), when somebody is fear-tapping is done on a point *acupoint*, then declined activity Amygdala, in other words, decline activity wave brain, p it also stops response fight or flight to participants (Keten Edis & Kurtgöz, 2024). Then, the effect of relaxation will neutralize all tension and emotions experienced by the individual. This effect is the same response when somebody is stimulated with needle acupuncture on the meridians. Temporary, according to(Feinstein, 2021), if seen from the aspect reaction physiological to SEFT (Spiritual Emotional Freedom Technique) knock light (tapping) on the 12 meridian points of the body that can stimulate or push the Pituitary Gland to emit hormone endorphins, where are hormones the will give effect calm as well as give rise to feeling happy. Doing so can reduce feelings of anxiety.

Some respondents state that many changes are experienced and experienced after it, especially changes in worry or felt and felt anxiety, more calm and relaxed. So, the researcher assumes that the level of worry experienced declines after intervention SEFT (Spiritual Emotional Freedom Technique) because the effect of therapy makes the patient feel more relaxed and comfortable. Consequences from endorphin hormones are produced so that he can lower the tension he experienced. The breast cancer diagnosis causes a high level of suffering and distress in patients who experience difficulties in coping

(Leão et al., 2022).

Results research that has been done for two weeks, intervention SEFT (Spiritual Emotional Freedom Technique) influential to decline worry with proved it analysis test results use Paired T-Test was obtained results P-value 0.000 < (a = 0.05) so can concluded that intervention SEFT (Spiritual Emotional Freedom Technique) has significant influence to decline level anxiety in patients ovarian cancer.

Spiritual spiritual-emotional Freedom Technique (SEFT) combines Spiritual Power with Energy Psychology. Almost 90% of the Spiritual Emotional Freedom Technique (SEFT) is Emotional Freedom Technique (EFT), Which is intended to be the point. Need is a known energy psychology technique that uses tapping, starting from the TFT Roger Callahan, the EFT Gary Craig, his PET Steve Walls, and David Lake, who use points with the same tapping. Tapping is a knock light with two end fingers on the specific points inside the body. This point is the key from "The Major Energy Meridians," which, if we tap several times, will impact the neutralized disturbance emotion or pain we are feeling because of the flow of body energy that usually and in balance returns and stimulates or tapping directly. Specific points acupuncture influences the expenditure of cortisol.

This matter is in line with research conducted by Anggraini & Safinatunnajah (2021), where a knock on the Hypothalamus Pituitary Adrenal (HPA) alternates between stop system alarm response nerve sympathetic and relaxing system nerve parasympathetic, so lower rate hormone cortisol. A lower rate of cortisol can relax and stabilize blood pressure, hemodynamics become regular, and blood circulation smoothly, making somebody relax.

There is a decline in anxiety in respondents, making respondents become more sincere and accepting of the pain suffered moment. Several respondents also pointed out optimistic thoughts and did not tend to think about bad things that would happen later. According to Kusnanto et al. (2016), optimism can make stressful situations Something that must faced and resolved because That individual will resolve and face the problem that exists compared to an individual who is thinking sour or pessimistic. This matter is in line with a study by Mugihartadi (2020) titled "Influence Spiritual Therapy Emotional Freedom Technique (SEFT) To Reducing Anxiety Levels in the Elderly During the Covid-19 Pandemic" that part significant respondents elderly aged 71-80 years as much as 54.4%. There is an influence of SEFT therapy against the level of anxiety in the elderly during the Covid-19 pandemic in the Village Grantung with p-value = 0.000 (p-value < 0.05).

Conclusions

Spiritual Emotional Freedom Technique (SEFT) affects reducing anxiety if done regularly and continuously. The intervention focuses on reducing problem psychological Problems caused by emotional orpsychosomatics. So, the body will experience relaxation, which will cause the patient to become calm.

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The Associated Factors with Breastfeeding Self-Efficacy Among Breastfeeding Women in Kalimantan Utara

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A B S T R A C T

Exclusive breastfeeding is important for the quality of children's health. Nevertheless, the proportion of exclusive breastfeeding at the Malinau City Health Center stands at a mere 45.6%, falling short of the 50% benchmark set by the World Health Organization (WHO). nursing self-efficacy is a significant element that affects nursing behavior. This study aims to determine the factors related to breastfeeding self-efficacy. This study was cross-sectional, with a sample of 147 mothers obtained by purposive sampling. Breastfeeding Self Efficacy (BSE) is measured using the Breastfeeding Self Efficacy Short-Form. Data was analyzed using the Chi-Square test. The results showed that there was a significant relationship between breastfeeding problems (p value=0.001), family support (p value=0.001), and health worker support (p value=0.001) with breastfeeding self-efficacy. It is concluded that breastfeeding problems, family support, and health worker support were factors related to breastfeeding self-efficacy in breastfeeding mothers. Therefore, health workers and families are expected to support mothers when they have breastfeeding problems.

Introduction

The 2017 Indonesian Demographic and Health Survey (IDHS) found that 35.73% of infants aged 0 to 6 months were exclusively breastfed, according to the study by BKKBN (2017). The 2018 Riskesdas findings revealed that the rate of breastfeeding among infants aged 0 to 5 months in Indonesia was 37.3%, which falls short of the WHO benchmark of 50% (Kemenkes, 2018). This problem occurs not only at the national level but also at the district/city level. Malinau is one of the districts in the North Kalimantan Province that has low coverage of exclusive breastfeeding. Based on the health profile data of the Malinau district in 2019, only 40.2% of infants get exclusive breastfeeding.

Breastfeeding is related to the health and nutrition of infants, infants who do not get exclusive breastfeeding have a greater percentage of experiencing illness > 3 times in 6 months (Celent, 2017). Various factors have been shown to influence exclusive breastfeeding maternal education level, use of pacifier bottles, infants age category 4-5 months, baby age category six months, mother's knowledge, and mother's attitude (Bagaray, 2020; Ratu, 2020). An important and influential factor in exclusive breastfeeding is self-efficacy. Breastfeeding Self-Efficacy refers to the mother's viewpoint and beliefs

about breastfeeding her baby and estimates whether the mother chooses to breastfeed or not, how much effort is expended, whether the mother has a self-reinforcing mindset or not, and attempts to respond to adversity breastfeeding emotionally (Dennis, 2010). The study's results revealed that the higher the self-confidence of breastfeeding mothers, the more correct their breastfeeding behavior would be. However, if the mother has low self-efficacy towards her ability to breastfeed, her breastfeeding behavior will be even lower (Isyti'aroh, 2019). Mothers who have low breastfeeding self-efficacy are proven to tend to use other alternative ways to deal with breastfeeding problems, such as giving formula milk (Keemer, 2013).

Breastfeeding Self Efficacy (BSE) or breastfeeding self-efficacy certainly cannot be formed without any influence or support from outside or from within states that in choosing, carrying out, and maintaining behavior, individuals consider four sources of information, namely Performance Achievement, Vicarious Experience, Verbal Persuasion, and Physiological Responses (Dennis, 2010). Positive experience of breastfeeding: the mother will believe herself to be able to breastfeed well, but if the mother has a bad experience with breastfeeding, the chances of failure to perform exclusive breastfeeding will be greater. Mothers who have breastfeeding problems are more likely to have low breastfeeding self-efficacy compared to mothers who do not have breastfeeding problems (Titaley, 2021). In addition to experiences and problems with breastfeeding, social support is a factor that is significantly related to breastfeeding self-efficacy. The existence of verbal support from other significant others, such as family and health professionals, encourages mothers to continue breastfeeding their babies. Data on factors influencing self-efficacy, especially in North Kalimantan, is minimal, even though scientific evidence-based information is needed to plan and prepare health programs to increase exclusive breastfeeding coverage.

Method

This study is an observational design research conducted in the working region of the Malinau City Public Health Center using a cross-sectional approach. Based on the Health Profile 2020 of Malinau District, this particular public health facility in Malinau has the lowest rate of exclusive breastfeeding coverage compared to other public health centers. Specifically, it serves a total of 305 infants who are under six months old. The study population consisted of 404 mothers with infants aged 0-12 months attending the Malinau City Public Health Center. A sample of 147 breastfeeding mothers was selected using the Lemeshow formula to calculate the sample size and the non-probability sampling technique. The inclusion criteria consisted of selecting moms with infants between the ages of 0 and 12 months who had given birth to more than one child (multipara). The variables examined in this study were the breastfeeding experience, difficulties encountered during breastfeeding, the level of support from family members, and the level of assistance received from healthcare professionals.

The dependent variable in this study is Breastfeeding Self Efficacy (BSE). Data was collected through a questionnaire. Measuring the level of Breastfeeding Self Efficacy (BSE) using the Breastfeeding Self Efficacy Short-Form contains 14 statement points using a scale Likert, namely

the range 1-5. Scale 1 is used if the client feels insecure the same once, while a scale of 5 is used if the client feels very confident (Dennis, 2010). The data obtained is processed by editing, coding, data entry, and cleaning stages. Bivariate analysis using the chi-square test with a p-value <0.05

Results

The results of the respondent's descriptive data showed that of the 147 respondents, the distribution of the age group of respondents is most prevalent in the age range of 20-35 years, with a total of 113 people (76.9%). The education level of most respondents is Senior High School/equivalent, namely 49.7%. The complete data can be described as follows.

Table 1. Frequency Distribution of Infant Mothers

Respondent Characteristic		**Frequency**	**Percentage (%)**
Maternal Age	<20	4	2.7
	20-35	113	76.9
	>35	30	20.4
Occupancy	Unemployment	122	83.0
	Employment	25	2.7
Education Level	Under educated	2	1.4
	Elementary/ equivalent	21	14.3
	Yunior High School/ equivalent	23	15.6
	Senior High School/equivalent	73	49.7
	Higher Education	28	19.0
ANC	≥ 4 times	122	83.0
	< 4 times	25	17.0
Following breastfeeding class	Yes	137	93.2
	No	10	6.8
Maternal Book Record	Have	145	98.6
	Did not have	2	1.4
Breastfeeding Self Efficacy	Higher	86	58.5
	Lower	61	41.5
	Total	**147**	**100**

Table 2. Results of Bivariate Analysis of the Relationship Between Independent Variables with Breastfeeding Self-Efficacy

Variable		**Breastfeeding Self Efficacy**				**Total**		***P-value***
		High		**Low**				
		f	**%**	**f**	**%**	**N**	**%**	
Breastfeeding experience	Good	39	65.0	21	35.0	60	100.0	0,184
	Bad	47	54.0	40	46.0	87	100.0	
Breastfeeding problem	Have no problems	60	77.9	17	22.1	77	100.0	0,001
	Unrelated to any diseases	7	31.8	15	68.2	22	100.0	
	related to any diseases/breast anatomy problems	12	52.2	11	47.8	23	100.0	
Family support	Both	7	28.0	18	72.0	25	100.0	
	High	58	75.3	19	24.7	77	100.0	0,001
	Low	28	40.0	42	60.0	70	100.0	
Health workers Support	Supportive	60	75.0	20	25.0	80	100.0	0,001
	Not Supportive	26	38.8	41	61.2	67	100.0	
Total		**86**	**58.5**	**61**	**41.5**	**147**	**100.0**	

Table 1 shows that of the 147 respondents, the majority had high breastfeeding self-efficacy (58.5%) and a history of following breastfeeding class (93.2%). Table 2 shows respondents with a high BSE, the highest proportion is those who do not have breastfeeding problems (77.9%).

The results of this study also found that mothers who had breastfeeding problems that were not related to disease (31.8%), had breastfeeding problems related to anatomic conditions (52.2%), and who had both types of breastfeeding problems (28.0%), they also have low Breastfeeding Self Efficacy. The results of bivariate analysis for breastfeeding problems and Breastfeeding self-efficacy (BSE) value = 0.001, less than p-value <0.05, means there was a significant relationship between breastfeeding problems and Breastfeeding self-efficacy (BSE). The Chi-square test also showed a significant relationship between family and health worker support and Breastfeeding self-efficacy (BSE).

Discussion

The result showed that most had high Breastfeeding self-efficacy (58.5%). The study of Kabariyah (2023) explained that Breastfeeding Self-Efficacy (BSE) could explain self-efficacy regarding maternal choices, whether to choose to continue breastfeeding (choice of behavior), maternal effort for breastfeeding, mother's mindset that affects and shapes her emotional response to breastfeeding her infants. A study stated that successful performance could increase self-efficacy and could reduce the occurrence of failure (Titaley, 2021). Mothers who have successfully breastfed their babies fully will have increasing confidence and evaluation of their efficacy. Glassman et al. (2014) found that if mothers have higher self-confidence, opportunities for exclusive breastfeeding are also higher. Reasonable confidence will make someone willing and able to learn to do things in proper behavior.

This study found that there was a correlation between having a breastfeeding problem and BSE (value = 0.001). These results are in line with the research, which stated that one of the factors associated with the level of breastfeeding self-efficacy is the problem of breastfeeding (Titaley, 2021). Challenges encountered during breastfeeding might diminish breastfeeding self-efficacy (BSE), as moms who lack determination and resilience in overcoming these obstacles are more likely to discontinue breastfeeding prematurely and transition to formula milk (Komalasari, 2016).

One of the solutions for mothers who experience breastfeeding problems is to carry out counseling with health workers to overcome breastfeeding problems. Breastfeeding counseling has been proven to help mothers choose and decide on alternative solutions to the problems they are experiencing, Mothers who get lactation counseling have better breastfeeding abilities by 3.85 times when compared with mothers who did not receive counseling (Ambarwati, 2014).

Other variables related to BSE are family support and support from health workers (value = 0.001). The support of health workers plays a vital role in the mother's self-confidence in breastfeeding because health workers are people whom mothers trust, are considered capable of providing appropriate and accurate information regarding breastfeeding, and can provide solutions to problems encountered. This study's results align with another study that states a relationship exists between health worker

support and breastfeeding self-efficacy (Nankumbi, 2019). In addition to the family, health worker support can be shown through counseling; through counseling, mothers could have a better understanding and skill in breastfeeding correctly. The better the support given by health workers, the more the success of breastfeeding will increase (Kusumawati, 2021; Kurniawati, 2020).

The support of a close family is also important. The existence of family support could increase the self-efficacy of mothers in giving exclusive breastfeeding to their infants. Without the support of the family, especially the husband, the mother will feel that she is struggling alone in breastfeeding. As a result, mothers are prone to feeling hopeless and feel that they are no longer able to breastfeed their infant, especially when mothers have to face various problems that arise during the breastfeeding process (Annisa, 2015). The findings of this study are consistent with those of another study, which found a relationship between breastfeeding mothers' self-efficacy during exclusive breastfeeding and their support network (Vitasari, 2018). The results of previous studies stated that assisting health workers in the breastfeeding process only takes place in the short term in the first month, but the support regularly continuity from family, thus family support is an important factor for a mother's continuity in breastfeeding (Gutierrez-de-Teran-Moreno, 2022)

Conclusions

It was concluded that there was a significant relationship between breastfeeding problems (p-value =0.001), family support (value = 0.001), and health worker support (p-value = 0.001) with Breastfeeding self-efficacy (BSE) in breastfeeding mothers. Based on this, it is recommended that families and health workers continue to provide support, motivation, and information if mothers face breastfeeding problems.

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The Relationship Between Giving Pilis (Rice, Turmeric, Sand Ginger, Ginger, Lime) and Postpartum Maternal Health

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A B S T R A C T

The use of traditional herbs is intended for postpartum health care and recovery. To see the benefits of using these ingredients, it is necessary to study the relationship between the provision of traditional ingredients and the health impacts on postpartum mothers who use them. This study aims to determine the relationship between giving pilis (rice, turmeric, sand ginger, ginger, lime) and the health of post-partum mothers. This type of quantitative research uses a correlational analytical research design using a cross-sectional approach. The sample in this study was 43 postpartum mothers in the ten public health centers of the Bangkalan Madura district. The data collection technique uses an observation sheet instrument. Sampling used simple random sampling nonparametric statistical analysis with analysis tests using Chi-Square. The research results showed a relationship between giving pilis (rice, turmeric, sand ginger, ginger, lime) and the health of post-partum mothers, as evidenced by a p-value of 0.000 < 0.05. In conclusion, giving pilis to postpartum mothers continues to be maintained because of its perceived health benefits, which are in line with the expectations of the Bangkalan community. Suggestion: The development of traditional medicine from a pharmacological perspective must be carried out so that people can use traditional medicine according to standards. After development by pharmacologists, a postpartum mother treatment policy based on local, family, and community wisdom can be formulated.

Introduction

The postpartum phase commences immediately after the expulsion of the placenta. It concludes when the uterus regains its customary pre-pregnancy condition, lasting for six weeks or 42 days (Agustin, 2021). During the recovery period, the mother will experience many physical and physiological changes and cause much discomfort at the beginning of the postpartum period, which does not rule out the possibility of becoming pathological if not followed by good care (Sunarti, 2022).

According to Sitepu, in 2024, the global maternal mortality rate (MMR) is projected to reach 303,000. The Maternal Mortality Rate (MMR) in the Association of Southeast Asian Nations (ASEAN) is 235 deaths per 100,000 live births. Based on data from the Indonesian Demographic and Health Survey (SDKI), Indonesia's Maternal Mortality Rate (MMR) rose from 228 per 100,000 live births in 2002-2007 to 359 per 100,000 live births in 2007-2012. According to Qomari (2022), they were told that in the period from 2012 to 2015, the Maternal Mortality Rate (MMR) in Indonesia declined to 305 deaths per 100,000 live births. In 2019, there were a total of 4,221 occurrences of maternal fatalities in the country (Katmini, 2018). Meanwhile, postpartum mothers in Bangkalan Regency in January –

December 2022, while data from the Sepulu Community Health Center was 654 people. Based on a preliminary study conducted in the Ten Bangkalan Community Health Center Work Area, out of 54 postpartum mothers, 43 still use pilis to relieve health symptoms that mothers may experience after giving birth, including frequent headaches, blurred vision, or even dizzy eyes.

The research results of Ningsih Safari et al. (2022) regarding giving pilis (rice, turmeric, sand ginger, ginger, lime) to the health of postpartum mothers show that there are two types of postnatal care, namely modern and traditional medicine, namely giving pilis (rice, ginger, lime, turmeric and sand ginger) and param mixed to be applied to the stomach, forehead, arms and thighs (Zumaidar, 2019). In Krueng Kluat village, it is believed that the utilization of traditional medicine postpartum can enhance blood circulation, strengthen the abdominal muscles, heal wounds in the uterus and vagina, act as a contraceptive, restore the mother's physical well-being and health after childbirth, and aid in weight reduction (Hegemur, 2023).

According to Rania (2019), efforts to provide pilis (rice, turmeric, sand ginger, ginger, lime) for the health of postpartum mothers, which are placed on the mother's forehead using traditional postpartum medicine, can facilitate the flow of postpartum blood, tighten the abdominal muscles, healing wounds in the uterus and vagina, as a contraceptive, restoring fitness and health to the mother's body after giving birth and losing weight.

According to research by Windayanti (2017), traditional community knowledge about the properties and uses of medicinal plants can provide valuable information in selecting and obtaining raw materials for medicinal plants for postpartum mothers by providing pilis (rice, turmeric, sand ginger, ginger, lime) for health. The postpartum mother is placed on the mother's forehead, which can improve blood flow after giving birth, tighten the abdominal muscles, and heal wounds in the uterus and vagina as a contraceptive (Rahmawati., 2024). This study aims to determine the relationship between giving pilis (rice, turmeric, sand ginger, ginger, lime) and the health of post-partum mothers.

Method

The type of research used is an analytical correlation. This design uses a cross-sectional approach, the research was conducted at ten Bangkalan Madura Community Health Centers, a population of 54 people with a sample of 43 normal postpartum mothers without any complications, and according to the inclusion and exclusion criteria set by the researchers. The sampling technique uses random sampling.

The method for making pilis is 100 grams of rice, 50 grams of turmeric, 50 grams of ginger, 50 grams of sand ginger, squeeze the juice of 1 lime, mash all the ingredients (rice, turmeric, sand ginger, ginger, lime) together until combined. It becomes smooth; after it is smooth, the crushed material is doused or mixed with enough warm water, and finally, the stuff is smeared with pilis on the forehead.

The data collection technique uses primary data through checklist sheets and observations, with data collection procedures, In the first stage, the researcher carries out an ethical test with certificate number 076-KEPK/MEI-2023, in the second stage, the researcher provides an informed consent sheet or agreement sheet to be signed by the respondent, the second stage thirdly, collecting data to provide

accurate data for researchers, the fourth stage is collecting data by observing the administration of pilis to respondents and assessing the health of postpartum mothers, the final step is preparing a report.

Next, normality tests were carried out using Kolmogorov-Sminov and Shapiro-Wilk, and homogeneity was measured using one-way ANOVA. Next, statistical tests were carried out. In this study, we used the correlation test with chi-square.

Results

Table 1. Frequency Distribution of Respondent Characteristics

Characteristics	(F)	(%)
age		
<20	0	0
21-35	42	97,7%
>35	1	2,3%
Education		
Elementary/Junior High School	0	0
Senior High School	28	65,1%
Diploma/Bachelor	15	34,9%
Parity		
Primipara	25	58,1%
Multipara	18	41,9%
Grande multipara	0	0
Work		
Does not work	12	27,9%
Private	9	20,9%
Self-employed	13	30,2%
ASN	9	20,9%

Characteristic data from 43 respondents, mostly aged 21-35 years, 42 respondents (97.7%), high school education, 28 respondents (65.1%), self-employed work, 13 respondents (30.2%), parity, namely primipara 25 respondents (58.1%)

Table 2. Frequency Distribution of Respondents Based on Pilis Giving

Giving Pilis	(F)	(%)
Routine Giving	22	51,2%
Non-Routine Giving	21	48,8%

The results showed that the majority of respondents gave pilis regularly, 22 respondents (51.2%)

Table 3. *Frequency Distribution of Respondents Based on Post-Partum Maternal Health*

Post Partum Maternal Health	(F)	(%)
Good	25	58,1%
Enough	18	41,9%
Not enough	0	0

The results showed that the majority of respondents' health level was good, with 25 respondents (58.1%)

Table 4. *Cross Tabulation: Giving Pilis to Post-Partum Maternal Health*

Post Partum Maternal Health / Giving Pilis	Good		Fair		Less		Total	
	F	%	F	%	F	%	F	%
Routine Giving	20	46,5%	2	4,6%	0	0	22	51,2%
Non-Routine Giving	5	11,6%	16	37,2%	0	0	21	48,8%
Total	25	58,1%	18	41%	0	0	43	100%

The results showed that the majority of respondents who regularly gave Pilis had good health results, namely 20 respondents (46.5%), the remaining health was fair, namely two respondents (4.6%).

The majority of respondents who gave pilis did not routinely get good health results, namely, 16 respondents (37.2%), and the rest were in good health, five respondents (11.6%)

Table 5. Respondent Data Normality Test

	Kolmogorov-Smirnov[a]			***Shapiro-Wilk***		
	Stat	**df**	**Sig.**	**Stat**	**df**	**Sig.**
Post Partum Maternal Health	0.190	43	0.00	0.898	43	0.001

The results showed that the data was not normally distributed because the significant value was 0.05> the significant value of giving pilis and postpartum maternal health. Significant value is 0.001<0.05.

Table 6. Respondent Data Homogeneity Test Results

Levene Statistic	**df1**	**df2**	**Sig.**
.008	1	41	.930

The significance value (Sig.) is 0.930. Because of the Sig value. 0.930 > 0.05, then as is the basis for decision-making in the homogeneity test above, it can be concluded that the variance of the data above is the same or homogeneous

Table 7. Statistical Analysis Test Results *Chi-Square*

Chi-Square	19.414
df	1
Asymp. Sig.	.000

Asymp.The sig value is 0.000 < 0.05. Thus, it can be interpreted that H0 is rejected and H1 is accepted, which means a relationship exists between giving pilis (rice, turmeric, galangal, ginger, lime) and post-partum maternal health.

Discussion

Pilis is a concoction made from natural ingredients, namely turmeric, and lime, but some also add sand ginger, mint leaves, and ylang-ylang to make pilis. People believe pilis has the property of preventing white blood from rising upwards and preventing blurred vision. Pilis is placed on the forehead 0-40 days after giving birth. Pilis is still safe because it uses natural ingredients (Supandi, 2017).

In line with research by Ningsih Safari et al. (2022) on giving pilis (rice, turmeric, ground ginger, ginger, lime) to the health of postpartum mothers, it shows that there are two postpartum treatments, namely modern and traditional medicine, namely giving pilis (rice, ginger, lime, turmeric, sand ginger), and param, mixed and rubbed on the stomach, forehead, arms, and thighs. The people of Krueng Kluat village believe that using traditional medicine after giving birth can improve blood flow after giving birth, tighten the abdominal muscles, heal wounds in the uterus and vagina, as a contraceptive, restore fitness and health to the mother's body after giving birth, and reduce weight (Inayatul Milah, 2021).

According to Septianingrum (2019), traditional community knowledge about the properties and uses of medicinal plants can provide valuable information in selecting and obtaining raw materials for medicinal plants for postpartum mothers by providing pilis (rice, turmeric, sand ginger, ginger, lime) for health postpartum mothers, which is placed on the mother's forehead, which can improve postpartum blood flow, tighten abdominal muscles, and heal wounds in the uterus and vagina, as a contraceptive.

According to research, Purba (2021) shows that the types of traditional medicinal ingredients commonly used by mothers during the postpartum period are uyup-uyup (97.3%), pilis (27%), gastric tapel (24.3%), turmeric acid. (18.9%), walikan (16.2%), sand ginger rice (5.4%), param (5.4%), and galing singset (2.7%). From this herb, respondents stated that they could feel the benefits of the herb in the form of increasing breast milk production with the uyup-uyup herb (88.8%), maintaining eye health, and eliminating dizziness with the pilis herb (70%), tightening and slimming the stomach with the tapel herb. stomach (100%) and stamp extraction (100%), restore the position of the stomach with Walkman concoction (100%), and relieve pain with tamarind turmeric concoction (85.7%), and sand ginger rice (100%) and param (100%). According to respondents, the side effects of this concoction are stomach ulcers (22.2%) in the form of itching around the stomach and pilis (20%), which can make the eyes sting.

According to research by Fuadi (2017) entitled Ethnobotany and Identification of Medicinal Plants for Postpartum Women in Krueng Kluet Village, North Kluet District, South Aceh, it is stated that the use of traditional medicine after giving birth can facilitate the flow of postpartum blood, tightens the abdominal muscles, heals wounds in the uterus and vagina, as a contraceptive, restores fitness and health to the mother's body after giving birth, and reduces weight (Windayanti, 2017).

According to research by Zumaidar et al. (2019) entitled Plants as Traditional Post-Birth Medicine by the Acehnese in Pidie Regency, it is said that the Pilis concoction has been mixed and then formed into a round shape like a cake which is dried in the sun then melted with water and then rubbed all over the body. Its benefits include warming the body, brightening skin color, eliminating black spots during pregnancy, reducing wrinkles, refreshing the body, eliminating pain and fatigue in the body's muscles, providing a fresh aroma, and functioning to eliminate body odor.

Conclusions

Giving pilis by postpartum mothers in the work area of the Sepuluh Bangkalan District Health Center, Madura, beliefs and culture, as well as family support, are very dominant. On average, postpartum mothers who undergo pilis always feel the benefits for their body health after being given pilis regularly. Apart from the cost being not too expensive, postpartum mothers also do not need to go to a health facility or look for other alternatives in postpartum care. The development of traditional medicine from a pharmacological perspective must be carried out so that people can use traditional medicine according to standards. After development by pharmacologists, a postpartum mother treatment policy based on local, family, and community wisdom can be formulated.

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Acute Toxicity Test of Mulberry Leaf Extract (Morus rubra L) as a Basic Ingredient of Candida Albicans Antifungal on Rattus Norvecigus

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A B S T R A C T

Previous research on the effectiveness of mulberry leaves in the growth of candida albicans showed that C. albicans is inhibited in vitro. Mulberry leaf extract is used as a basic ingredient for treatment. In addition to being tested for effectiveness, testing is needed to ensure the level of acute toxicity in experimental animals in determining toxicity levels. The study aimed to test the acute toxicity of mulberry leaf extract on Rattus Norvecigus media in determining the level of toxicity before becoming the basic ingredient of VVC antifungal. The research method uses an experimental laboratory post-test-only control group design with a 9 Rattus Norvegicus media. The average dose is not lethal using LD50 values. Research analysis using ANOVA is One Way to determine the difference in the average weight change of experimental animals. The study's results did not show any deaths of experimental animals or toxic symptoms in administering mulberry leaf extract doses of 0 mg, 100mg, 1000 mg, 1600mg, 2900mg, 5000mg. LD50 value >8g/kg BW, included in the non-toxic category (5-15 g/kg BW). The ANOVA statistical test showed a P-value of 0.781 > a P-value of 0.05, that is, there was no difference in the average change in body weight in the experimental animal group given different treatment doses in each group. The research concludes that mulberry leaf extract does not show a lethal dose of acute toxicity, so it is safe to use as a basic ingredient in treatment sourced from natural ingredients.

Introduction

Vulvo Vaginal Candidiasis (VVC) is the most common condition in the presence or absence of symptoms (Swari et al., 2020), with a world prevalence of 1/3–3/4 of the population. Direct examination of 400 women to identify the cause of VVC was found to be 59.6% caused by Candida albicans, and the average occurred in women of childbearing age (29 years) (Djohan et al., 2019). Candida albicans in the form of yeast can survive well in the vaginal epithelium, but after morphotyping, switches to invasive hyphae forms and is regulated along with genes that code for virulence factors such as aspartyl proteases and candidalysin are secreted beyond tolerance limits, to trigger an intense inflammatory response and tissue damage (Marrazzo, 2002). Common predisposing factors for candidiasis are personal hygiene, pregnancy conditions, comorbidities such as endocrinopathy and autoimmune, consumption of antibiotics, and systemic corticosteroids (Marrazzo, 2002). Common symptoms of VVC are vaginal itching, vulvar edema, fissures, and excoriation accompanied by thick and thick vaginal discharge (Sobel et al., 1998). There are also non-physiological symptoms such as depression, helplessness, and decreased quality of life (Talapko et al., 2021). According to clinical practice

guidelines, VVC can be treated with topical or oral antifungals. Azol group is a treatment that is often given to cases of VVC, however, static activity of azole can make RVVC (Recurrent Vulvo Vaginal Candidiasis) or VVC recurrent (Willems et al., 2020). A marked increase was obtained in C. albican's resistance to antifungal agents (Moshfeghy et al., 2020). The degree of antifungal azole resistance varies widely and may be influenced by prescription patterns aimed at prophylaxis and treatment (Workowski et al., 2021). In particular, azole treatment can reduce clinical recurrence during administration in RVVC patients, however, there is usually no change in long-term use. In addition, the safety risks of fluconazole use are characterized by liver toxicity, drug interactions, and warnings during pregnancy (Bitew & Abebaw, 2018). Therefore, alternative tapes known as complementary therapies are needed to reduce VVC and RVVC effectively. Using natural materials in the current era is becoming a major concern in preventing or treating a disease. Plant-derived compounds are gaining widespread attention in identifying alternatives to microbial control (Lírio et al., 2019).

Mulberry plant (Morus alba) in Asian countries is used as an infusion and herbal treatment because of its content, such as flavonoids, amino acids, vitamins, and other nutritious nutritional elements (Farr et al., 2021). Berry compounds show antimicrobial activity that can protect against pathogenic bacteria in humans. The antimicrobial mechanism of berries is bacterial anti-adherence in epithelial cells, a prerequisite for colonization and infection of some pathogenic bacteria (Yang et al., 2020). Flavonoids are ingredients often found in plants that are useful as antimicrobials. The function of flavonoids is to keep cells from degradation, stress, anti-cancer, and antimicrobial. Flavonoids can actively help provide nutrients by trying to produce natural enzymes to fight disease (Latifah et al., 2022).

Identification of phytochemical components in Morus Rubra L ethanol extract showed the presence of triterpenoids, alkaloids, sugars, glycosides, tannins, resins, phenols, flavonoids, and saponins (Hidayatunnikmah et al., 2022). Previous research on the phytochemical identification of Morus Rubra L Extract showed the content of carbohydrates, monosaccharides, galactose, amino acids, fatty acids, phenol components, flavonoids, and tannins. The results of antibacterial screening at extract concentrations of 500 mg/dl, 250 mg/dl, and 125 mg/dl showed an obstacle in the development of Staphylococcus Aureus (Thiriloshani & Bharti, 2018), while other studies identified phenol 671.8 g-1 and anthocyanin 615.5 g-1, red mulberry extract was shown to suppress the growth of gram-positive (L. lactis, M. luteus and S. aureus) and gram-negative (S. typhimurium and E. coli) bacteria (Khan, 2021). In addition to antibacterial identification, mulberry leaf extract reduced the titer of pathogenic viruses such as human coronavirus (HCoV 229E) and cytopathogenic effects (Dimitrijevic et al., 2022). Previous research related to antifungals has shown that phenol components have antifungal properties. Most plants that exhibit antibacterial properties will also have antifungal properties (Hidayatunnikmah et al., 2022).

There are few studies on the incidence of VVC related to using red mulberry leaves as an antifungal candida albicans. Mulberry leaves are one of the plants that grow easily and are found in many areas in Indonesia, so more complex utilization needs to be done. Previous years of research have

shown the effectiveness of mulberry leaf extract on the development of C. albicans fungi in vitro (Memete et al., 2022) and compounds that work effectively in inhibiting the growth of C. albicans in this study, namely flavonoids (Miljković et al., 2018). Previous research showed that mulberry leaf extract was ineffective in inhibiting the growth of lactobacillus acidophilus at acidic or alkaline pH conditions. Lactobacillus acidophilus is a good bacteria found in the vaginal mucosa to stabilize physiological conditions. The use of mulberry leaf extract can inhibit the growth of C. albicans but does not inhibit the growth of lactobacillus acidophilus bacteria in the vagina. Mulberry leaf extract is the basic ingredient used to prevent and treat VVC. In addition to being tested for effectiveness, further testing is needed to ensure safety in experimental animals. The formulation of the problem is how the level of toxicity of Mulberry leaf extract as the basic ingredient of C. albicans antifungi, both in acute toxicity tests in experimental animals Rattus Norvecigus.

Method

This research method aims to analyze the acute toxicity of Mulberry leaf extract as the basic ingredient for making new product formulations that will be an alternative to the antifungal that causes VVC, namely the C. albicans strain. Experimental Laboratories research design using Rattus Norvegicus media with Post-Test Only Control Group Design approach.

The first step is the preparation of mulberry leaf extract. The leaves are picked from the tree, separated by branches, then dried and mashed using a blender. 500 g of powder was obtained from the Mulberry leaf simplisia, after which maceration was carried out using 99% PA ethanol for 72 hours. The resulting mixture will be filtered using filter paper, and the Filtrate obtained will be heated with a rotary evaporator to get a concentrated extract. Furthermore, the extract is stored in a clean, airtight place and a desiccator until the extract is used.

The second step is Acute Toxicity Studies, which will determine the median oral lethal dose of LD50 from the extract in experimental animals. Experimental animals were satisfied for one night, and the evaluation of LD50 administration was carried out in 2 phases. In the first phase, nine mice were randomly placed in 3 groups, each consisting of 3. Group I, II, and III will be given extracts at doses of 10, 100, and 1000 mg/kg body weight orally. The second phase is determined from the results obtained in the first phase. In the second stage, three mice are included in 3 groups, each consisting of 1 mouse. Groups I, II, and III were given extracts at 1600, 2900, and 5000 mg/kg body weight, respectively. Both phases were observed for 24 hours for signs of toxicity and death. The LD50 value is calculated as the average of the highest nonlethal dose (no death) and the lowest lethal dose (where death occurred).

Statistical Analysis The data is expressed as an average weight and analyzed using Way Analysis (ANOVA). P- value in this study is 0,05. The hypothesis in this study is Ho: There was no average change in body weight of experimental animals after being given mulberry leaf extract, and Ha: there was an average change in body weight of experimental animals after being given mulberry leaf extract.

Results

Mulberry leaves come from the family medicinal plant, Faculty of Science and Health, Universitas PGRI Adi Buana, Surabaya. Mulberry leaves that have been picked, cleaned, washed, aerated overnight, and then dried by drying them. After drying the leaves in the blender so that they become simplisia. Simplisia of mulberry leaves obtained as much as 500 grams. Furthermore, the extraction of mulberry leaf simplisia using the maceration method is carried out using 400 grams of mulberry leaves with 96% ethanol solvent as much as 1600 ml. The extraction process is allowed to stand for five days. Occasional stirring is carried out. The liquid that has been obtained is then filtered and allowed to stand for one day, then filtered again and taken to the filtrate. The filtrate obtained is evaporated so that a concentrated extract is obtained. Mulberry leaf extract is made with as much as one series of dilutions, which has been proven to inhibit the growth of Candida albicans by 100%.

The results of acute toxicity tests on nine experimental animals divided into three groups in Phase I and three in Phase II will be described in the table below.

Table 1. Number of Deaths of Experimental Animals on Observation for 24 Hours After Oral Administration of Mulberry Leaf Extract Preparations

Group	Phase	Mulberry Leaf Extract Dosage (mg/kg BW)	Number of experimental animals	Number of Dead Animals	Number of Live Animals	Percentage of dead animals (%)
A	I	10 mg/kg body weight	3	0	3	0
B		100 mg/kg body weight	3	0	3	0
C		1000 mg/kg body weight	3	0	3	0
D	II	1600 mg/kg body weight	1	0	1	0
E		2900 mg/kg body weight	1	0	1	0
F		5000 mg/kg body weight	1	0	1	0

Table 2. Observation of Toxic Symptoms for 24 Hours After Administration of Mulberry Leaf Extract

Group	Phase	Mulberry Leaf Extract Dosage (mg/kg BW)	Number of experimental animals	Toxic symptoms
A	I	10 mg/kg body weight	3	After oral administration of mulberry leaf extract, rats did not show toxic symptoms of a substance such as increased activity, convulsions, tremors, ataxia.
B		100 mg/kg body weight	3	After oral administration of mulberry leaf extract, rats did not show toxic symptoms of a substance such as increased activity, convulsions, tremors, ataxia.
C		1000 mg/kg body weight	3	After oral administration of mulberry leaf extract, rats did not show toxic symptoms of a substance such as increased activity, convulsions, tremors, ataxia.
D	II	1600 mg/kg body weight	1	After oral administration of mulberry leaf extract, rats did not show toxic symptoms of a substance such as increased activity, convulsions, tremors, ataxia.
E		2900 mg/kg body weight	1	After oral administration of mulberry leaf extract, rats did not show toxic symptoms of a substance such as increased activity, convulsions, tremors, ataxia.
F		5000 mg/kg body weight	1	After oral administration of mulberry leaf extract, rats did not show toxic symptoms of a substance such as increased activity, convulsions, tremors, ataxia.

Table 1 explains the results of observations of giving mulberry leaf extract in phase I for 24 hours in 3 groups, of which each group, there were three experimental animals with doses of mulberry leaf extract 10 mg/kg body weight, 100 mg/kg body weight, 1000 mg/kg bodyweight it was found that the number of deaths of experimental animals was 0 (0%) all experimental animals namely 9 remained alive. No deaths were obtained in these experimental animals. Meanwhile, observations of giving mulberry leaf extract in phase II for 24 hours in 3 groups, of which, in each group, there was one experimental animal from the results of phase 1 observations who experienced the most weight gain with doses of mulberry leaf extract 1600 mg/kg body weight, 2900 mg/kg body weight, 5000 mg/kg bodyweight it was found that the number of deaths of experimental animals was 0 (0%) all experimental animals namely three remained alive.

Based on table 2 shows the results of the observation of phase I toxicity symptoms after administration of mulberry leaf extract at a dose of 10 mg/kg body weight, 100 mg/kg body weight, and 1000 mg/kg body weight for 24 hours each in 3 groups with three experimental animals in each group were obtained rats did not show toxic symptoms of a substance such as increased activity, convulsions, tremors, ataxia. Meanwhile, observations of giving mulberry leaf extract were in phase II for 24 hours in 3 groups which each group, there was one experimental animal from the results of phase 1 observations who experienced the most weight gain with doses of mulberry leaf extract 1600 mg/kg body weight, 2900 mg/kg body weight, 5000 mg/kg bodyweight it was found rats did not show toxic symptoms of a substance such as increased activity, convulsions, tremors, ataxia.

Table 3. Observation of Changes in Body Weight of Experimental Animals During Mulberry Leaf Extract Administration

Group	Phase	Mulberry Leaf Extract Dosage (mg/kg BW)	Code of experimental animals	Initial Weight Loss	Final Weight Loss	Symptoms
A	I	10 mg/kg body weight	1	155	161	Healthy
			2	148	156	Healthy
			3	124	128	Healthy
B		100 mg/kg body weight	4	143	154	Healthy
			5	145	153	Healthy
			6	121	130	Healthy
C		1000 mg/kg body weight	7	131	136	Healthy
			8	144	143	Healthy
			9	152	164	Healthy
D	II	1600 mg/kg body weight	2	156	184	Healthy
E		2900 mg/kg body weight	4	154	187	Healthy
F		5000 mg/kg body weight	9	164	172	Healthy

Table 3 shows an increase in body weight in experimental animals after being given mulberry leaf extract for 24 hours at stage 1 and stage II with dose. The average weight gain of experimental animals in the phase I group was as much as 6 grams, and in phase I group A, the most weight gain was found in animals with code number no 2 with a weight gain of 8 grams. In phase I, group B, the average weight gain of 9.3 grams, the highest weight gain, was found in animals with code number 4. In Phase 1 group C, the average weight gain was 5.3 grams; the highest weight gain was found in animals with code number 9, as much as 12 grams. In the phase II group, the average weight gain was 17 grams. The highest weight gain was found in animal No. 9, as much as 18 grams,

Table 4. One Way Analysis (ANOVA)

	Sum of Squares	Number of experimental animals	Mean Square	F	Sig
Between Groups	830.250	5	166.050	.899	.537
Within Groups	1108.000	6	184.667		
Total	1938.250	11			

Based on table 3 shows the results that the results of the statistical analysis test obtained a significance value of P 0.537 > 0.05, which means that Ho's hypothesis is accepted that there was no average change in body weight of experimental animals after being given mulberry leaf extract.

Discussion

The main ingredient used in this study was Mulberry Leaf extract (Morus Rubra L). Morus Rubra L or Red Mulberry is a plant that belongs to the Moraceae family and has the characteristics of easy fall, fast-growing, and tree height from small to medium size to 15-20 m high. The growth of mulberry fruit in Indonesia is one of the plants that grows wildly. Its use is relatively small in Indonesia because of the lack of public ignorance of the pharmacological benefits of mulberry plants. The mulberry leaves used in this study are young mulberry leaves. Previous studies showed that the total polyphenol content found in young leaves is higher than in old mulberry leaves.

Mulberry leaves (Morus Rubra L) that have been identified will be sorted to remove dirt and rotten leaves. After sorting, washing the leaves with running water is carried out, then drying them, which aims to remove the moisture content still contained in the simplisia. The following process is drying under the sun but giving a net protector above it so that it is not directly exposed to sunlight, which can damage the content in mulberry leaves due to excessive heating. Dried mulberry leaves will be mashed until they form a fine powder. Then, the fine powder is sifted to obtain the same particle size, usually called simplisia

Mulberry leaf simplisia is then extracted to attract the chemical content in the simplisia. The extraction process, namely powder making, wetting, and watering, is carried out by maceration. Maceration is a process of making simpliasia extract using 96% ethanol solvent with a volume of 2000 ml. It is carried out several times by shaking or stirring at room temperature. The maceration process on mulberry leaf powder is carried out by soaking it with a solvent for 24 hours. After 24 hours, screening is carried out to obtain the filtrate. Then, the remaining residue is rewashed using the same solvent. This is done continuously and obtained filtrate, whose color is pale so that its chemical content can be extracted optimally. The maceration method is simple, so it is easy to do.

After the maceration process, the thickening or concentration process is continued using a rotary evaporator. The working principle of the tool is based on pressure drop so that the solvent can evaporate at temperatures below its boiling point. The purpose of using a rotary evaporator is to remove the solvent in the filtrate so that a thick extract is obtained from mulberry leaves (Morus Rubra L). Previous research by (Hidayatunnikmah et al., 2022) showed that the concentration of mulberry leaf extract that can inhibit the growth of Candida albicans is 80%, 95%, and 100%. The content contained in mulberry leaves are alkaloids, flavonoids, and polyphenols. Bioactive compounds can be found by extracting

these plants. Previous research has shown that bioactive compounds of alkaloids, flavonoids, and polyphenols can act as antimicrobials.

In this study, the experimental animals used were Rattus Norvegicus. The rats used were first acclimatized for two weeks, intended so that the experimental animals could adapt to the surrounding environment. During the acclimatization process and observation, mice are weighed daily to determine the weight changes that occur. The average body weight of experimental animals used was 1.5 grams. After the acclimatization process, in stage I, white rats will be grouped into three groups containing three white rats having different doses: group A with a dose of 10 mg/kg body weight, group B with a dose of 100mg/Kg body weight, group C with a dose of 1000 mg/kg body weight and each rat will be given a preparation of test materials that have been adjusted to their respective body weights. According to the dose, the extract is administered orally using a sonde. Observation will be conducted for 24 hours to find out the dead test animals and see toxic symptoms, which generally occur in tremors, ataxia, high heart rate, convulsions, and decreased activity, and observation of white rat body weight in each group. The results of phase I observations in the three groups of experimental animals, dosed 10 mg/Kg body weight, 100 mg/Kg body weight, and 1000 mg/Kg body weight, showed no dead animals were found and showed symptoms of toxicity. The results of weight observation in experimental animals obtained an increase. The increase in body weight was due to the immunostimulant content in mulberry leaf extract, previous studies showed that the effect of mulberry leaf extract on the immune system was evaluated using different experimental models such as carbon clearance assay, cyclophosphamide-induced neutropenia, neutrophil adhesion assay, effect on serum immunoglobulin, rat mortality test, and indirect hemagglutination test. Morus alba methanol extract was administered orally at low and high doses of 100 mg/kg and 1 g/kg, respectively. Ocimum sanctum (100 mg/kg, PO) was used as the standard drug. Morus alba extract at both doses increased serum immunoglobulin levels and prevented death in rats (Bharani et al., 2010).

After obtaining the results of observations in stage I, proceed with conducting toxicity tests in stage II. Observation of phase II with higher doses of 1600 mg/kg body weight, 2900 mg/kg body weight, and 5000 mg/kg body weight in each group of experimental animals. The phase II experimental animal group contains one experimental animal per group, based on the results of the phase 2 experiment, which has the highest weight change in each group. The extract is administered according to the dose given orally using a sonde. Observation will be carried out for 24 hours to find the dead test animals and see toxic symptoms and weight changes. The results of 24-hour observations in each group in phase II found that all experimental animals did not experience death toxic signs, and there was an increase in body weight in each experimental animal.

Observations made to determine the dose of LD50 in rats that had been given mulberry leaf extract showed no mortality and clinical symptoms of toxicity. With no deaths in experimental animals, the f factor, obtained in the Thomson and Weil formula tables, is not obtained, so the LD50 value cannot be calculated. The criteria for acute toxicity testing conducted to assess LD50 are based on expert agreement: if the maximum dose does not cause death in test animals, then LD50 is said to be a pseudo

LD50 or not a real LD50 (Loomis TA, 1987). If the dose reached up to 5000 mg/kg bodyweight does not cause death, then acute toxicity testing does not need to be continued using higher doses (BPOM RI, 2022). From the study results, the pseudo LD50 value > 8 g / kg body weight for mulberry leaf extract, where the pseudo dose is included in the non-toxic category (5-15 g / kg body weight). Based on body surface area, the dose converts to the maximum human dose in experimental animals. Experts agree that if there is no death in test animals at the maximum tidal dose, then it is clear that the compound falls under the criteria of "practically non-toxic" (Hafid & Rahayu, 2022).

Conclusions

Research on acute toxicity tests on mulberry leaf extract using rattus norvecigus experimental animal media conducted for 24 years showed no deaths in experimental animals and no symptoms of toxicity. There was an increase in body weight in experimental animals, which showed that mulberry leaf extract had a good impact on being used as an herbal treatment ingredient. A score of LD50 mulberry leaf extract from the test results in this study was >8g / kg BW, which showed that the value was included in the category of not causing toxicity (5-15 g / kg BW).

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The Relationship Between Knowledge and Parental Behavior in Children's Sex Education

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A B S T R A C T

Parents are the leading figures in providing sex education, sex education is important considering the large number of cases of sexual violence against children. The behavior of providing sex education to children must be patient and repeated over and over again so that the child understands. Parents can also teach children to protect themselves and dare to say no when someone tries to make their child undress. Objective: To determine the relationship between knowledge and parental behavior in providing child sex education in Kesambi Hamlet, South Prupuk Village, Margasari District, Tegal Regency. Method: This type of research is quantitative with a cross-sectional approach. Population 62 Respondents. The sampling technique is simple random sampling, done by randomizing each neighborhood. Data was collected using a questionnaire, and analysis was carried out using the Chi-Square test. Results: This study showed that 43 (69.4%) had good knowledge, and 44 (71.0%) respondents had positive behavior. Moreover, based on the Chi-Suqre test, p (0.00) was found. There is a relationship between knowledge and parental behavior in providing child sex education in Kesambi Hamlet, South Prupuk Village, Margasari District, Tegal Regency.

Introduction

The problem of Child Sexual Abuse (CSA) or sexual abuse of children in Indonesia is still relatively high. Based on data from the Child Protection and Online Information System (SIMFONI PPA), from January 1 to July 31, 2020, the number of children who were victims of sexual violence reached 2,556 children per year, with a total of 4,116 cases. The number of cases continued to increase in August to 4,833 cases (KPPPA, 2021). In 2018, a study conducted by Ipsos Global Advisory on 27 world countries, 32% of sexual harassment is a problem in all countries surveyed, and 28% is a matter of sexual violence. Of the 27 countries, Peru is the country with the most significant percentage, with 58%, considering that sexual harassment is a significant problem facing women (Ipsos, 2018). At the Tegal district police station, based on records from the Tegal Police Criminal Investigation Department, there were 11 cases of violence against women and children (Amirudin, 2020).

Sexual violence often occurs without being known by parents; children are generally afraid to report what they are experiencing. Perpetrators may use threats of persuasion and pity to lure children or prevent children from telling their parents (Handayani, 2017). Sexual exploitation of minors by those closest to them, even by the victim's own family, is commonplace. The increase in cases of violence is clear evidence of children's lack of knowledge regarding the sex education they should receive from

their parents from the age of one year (Yafie, 2017). Children also have a high level of curiosity, if children do not find the answer to their curiosity, they look for information from other sources, which is not necessarily true (Ratnasari & Alias, 2016).

Parents are an informal school in education (Hero, 2018). Parents As the leading figures in providing sex education, parents must understand and understand the things that cause and give rise to negative things for their children. Parents must provide and teach their children this sex education correctly because the influence of sex education is long-term for a child, so providing sex education from an early age is very important (Sari et al., 2021). Sex education is essential, considering the large number of cases of sexual violence against children (Ratnasari & Alias, 2016). Sex education, if received at an early age, has a significant influence on a child's life, one of which is maintaining the health of their body from people who have bad intentions towards children. However, most people still think that sex education is not suitable for underage children (Yafie, 2017)—a lack of education about sex from parents and parents do not know enough about sex education. Children can search for information related to sex through various sources such as books, magazines, films, and the internet, quickly making children confused and biased because it is obtained from inappropriate sources (Ratnasari & Alias, 2016).

The impact of not being given education at an early age results in high levels of sexual violence against children. This phenomenon shows the importance of understanding sex education in early childhood (Sulistianingsih, 2016). The behavior of providing sex education to children must be patient and repeated over and over again so that the child understands. However, not all parents can explain this easily to their children and tend to avoid giving sex education to children because parents still think that sex education is taboo (Utami, 2005). For young children, of course, the behavior of providing sex education is given according to their developmental age. For example, parents briefly introduce their child's genitals. When bathing a child, parents can explain the hair, the head, hands, feet, stomach, and genitals (Adisti, 2020). Parents give children the understanding that if someone tries to touch them without their parent's knowledge, then the child must scream, run away, or try to protect themselves and immediately report it to their parents (Hasiana, 2020). Children aged 7-10 experience rapid development and begin exploring the outside world. Children think not only about themselves but also something outside of themselves (Sheikh, 2021). Ages 7-10 years are a group that is vulnerable to sexual violence (Setyowati et al., 2017). At this age, parents can provide information about the development of genitals through tools related to children, such as books. Parents can also teach children to protect themselves and dare to say no when someone tries to make their child undress (Camelia, 2016).

Results of a preliminary study conducted in the RW 002 area in Hamlet Kesambi, South Prupuk Village, by interviewing five parents, stated that three people already knew about sex education. In contrast, two people did not know about sex education. When children ask about sex, for example, "Where do babies come from?" some parents are still confused about explaining and choose to remain silent if their children start asking about sex and assume that sex education is only given to school children. Many parents' behavior in providing sex education is still not applied to their children, such as

not separating beds at the age of 7, not forbidding their children from bathing together with the opposite sex, allowing their children not to wear clothes when leaving the house, allowing their children to go to bed. in the room without the owner's permission and letting his child play with gadgets without his supervision. When interviewed, several parents said they still did not know what sex education should be conveyed to their children. Based on the description above, researchers are interested in doing this study regarding the relationship between knowledge and behavior of parents in providing sex education to children in the Hamlet Kesambi, South Prupuk Village, Margasari District, Tegal Regency.

Method

This research is an analytical survey research type with a cross-sectional approach. The research was conducted in Kesambi Hamlet, South Prupuk Village, Margasari District, Tegal Regency. This research aims to determine the relationship between knowledge and parental behavior in providing child sex education in Kesambi Hamlet, South Prupuk Village, Margasari District, Tegal Regency—research time in June 2023 for one week.

The target population in this study is all parents (mothers) residing in Kesambi Hamlet, South Prupuk Village, Margasari District, Tegal Regency, totaling 458 people. This study's target population is all parents with children aged 7-10 years residing in the hamlet. Kesambi, South Prupuk Village, Margasari District, Tegal Regency, totaling 74 people. Inclusion criteria: Parents (mothers) with children aged 7-10 years and parents residing in Kesambi South Prupuk Hamlet, Margasari District, Tegal Regency, willing to be respondents as stated in the informed consent sheet. Exclusion Criteria: Parents (mother) who are sick, parents (mother) who have died.

The sample in this study was 62 people, and the data collection technique used was simple random samples by drawing lots in each RT. This draw uses a shuffle method by giving numbers on small pieces of paper according to your needs. This research analysis uses the Chi-Square statistical test. The research uses a questionnaire instrument in the form of a statement. The first is a questionnaire about parents' knowledge of sex education, and the second is about parents' behavior in providing sex education (Putri, 2022).

In carrying out the research, the researcher has applied for permission and received approval from Ethical Clearance No.227/VI/2023/Komisi Bioetik from Universitas Islam Sultan Agung Semarang.

Results

Table 1. Description of Parental Knowledge About Children's Sex Education

Parental Knowledge	**F**	**%**
Not enough	19	30.6%
Good	43	69.4%
Amount	**62**	**100%**

Source: Primary Data, 2023

Table 1 shows that 19 respondents (30.6%) had poor knowledge, while 43 respondents (69.4%) had good knowledge.

Table 2. Description of Parental Behavior in Providing Children's Sex Education

People's Behavior in Giving	F	%
Negative Behavior	18	29.0%
Positive Behavior	44	71.0%
Amount	**62**	**100%**

Source: Primary Data, 2023

Table 2 shows that 18 respondents (29.0%) had negative behavior, while 44 (71.0%) had positive behavior.

Table 3. Relationship Between Knowledge and Parental Behavior in Providing Children's Sex Education

Parental Knowledge About Children's Sex Education	Parental Behavior in Providing Children's Sex Education				
	Negative Behavior	Positive Behavior	Amount	P value	OR
Not enough	13	6	19	0,00	28,889
Good	5	38	43		
Amount	18	44	62		

Source: Primary Data, 2023

Based on Table 3, the results of this research show that the results of testing Using the SPPS Chi-Square test, the results obtained a significance p-value of 0.00 (< 0.05), indicating that there is a significant relationship between knowledge and parental behavior in providing child sex education in Hamlet Kesambi, South Prupuk Village, Margasari District, Tegal Regency and OR = 28.889, meaning that more excellent good knowledge will provide positive behavior in providing children's sex education.

Discussion

Knowledge is an important thing that parents must have in protecting their children from sexual crimes. Adequate parental knowledge can help in providing sexual violence prevention education to their children (Salloum et al., 2020). Education Sex is a form of providing the right experience to children to help them adapt to their life in the future. As a result of providing experience to the child, the child will acquire an excellent mental attitude towards sexual problems and hereditary problems (Aziz, 2015). Sex education allows children to understand their physical condition, knowledge about the opposite sex, and knowledge about avoiding sexual violence. Children can learn about sex education from an early age, through sex education for children, children can obtain accurate information about sex, and hopefully, children can avoid negative sexual behavior and dangerous behavior (Jatmikowati, 2015). The objectives of sex education are given according to different developmental ages. At toddler age, the aim is to introduce your sexual organs, such as explaining other parts of the body, including their functions and how to protect them. At school age, starting from 6-10 years, the aim is to understand gender differences (male and female), inform about human origins, and clean the genitals properly to avoid germs and disease (Ratnasari & Alias, 2016). Sex education for early childhood is also an essential stepping stone towards broader knowledge that children will experience at a later age (Irsyad, 2019).

Parents should be the primary source for children to gain an understanding of sexual education. Sexual education efforts from parents and teachers can prevent sexual violence against children (Justicia, 2016). Sex education is challenging to apply to children because it is still considered taboo in society, let alone teaching it, and even talking about it is very difficult. Therefore, many children are at risk of experiencing sexual violence (Amalia, 2018). However, sexual education needs to be given to

children through parents and teachers because, at that time, children are curious about where they can search for information through several media, such as the internet, if their parents cannot provide clear information (Padmadiani, 2021). They are providing sex education with an understanding of healthy sexual behavior using lecture, discussion, and brochure methods (Helmi, 2015). Parents must give sex education to their children as early as possible. They are precisely starting when children are 3-4 years old because, at this age, children can carry out two-way communication, understand their body organs, and continue to introduce internal body organs (Ratnasari & Alias, 2016). The impact, if children are not given sexual education from an early age, is the possibility that children will experience sexual harassment, where as time goes by, sexual harassment not only occurs in adults but is currently the target of perpetrators of sexual harassment.(Dermawan et al., 2023).

It is essential to give sex education to every human being, especially elementary school-age children. Providing sex education for elementary school-age children will be a preventive measure against various possible sexual harassment incidents in the future (Insiyah, 2020). It is felt that sex education is essential to be integrated into the learning of elementary school-age children. The urgency is that there is concern if children find out about pornography first from a society that is irresponsible and beyond the control of parents. Therefore, educators should immediately provide this knowledge to children and teenagers, whether they have reached puberty before their minds are filled with incorrect knowledge that leads to sexual deviation (Muhimmah, 2022). Teaching sex education to children should be sensitive to the expressions seen in children. Because sometimes children talk about sex not through their words but with expressions. There are several strategies that educators can use in teaching sex education to children to make children comfortable with their bodies. When the child is comfortable with his body, children will enjoy our activities (Ifadah, 2021).

Providing sex education must be age-appropriate at the age of 3-5 years. In this age range, teaching about body organs and the function of each body organ is the most appropriate time to teach this, which is while bathing. It is hoped that people will avoid disrespectful references to their genitals in society. For example, like a vagina or penis, do not use other words like "apem" or "bird" (Ratnasari & Alias, 2016). At the age of 7-10 years, sex education is given by separating their beds and teaching them to keep their genitals clean; children are accustomed to asking permission when going into their parents' room (Erliani, 2017). At this age, your little one is taught how to protect himself. Parents can teach children to refuse to undress even if there is a reward or to refuse to have their genitals touched by friends (Ratnasari & Alias, 2016). At the age of 11-12, provide more detailed information about what will change in the child's body as puberty approaches, which tends to differ for each individual. At the age of 12-14 years, the sexual urge during puberty increases; therefore, parents should teach what the reproductive system is and how it works (Ratnasari & Alias, 2016)

Parents also introduce body parts that no one should touch and are the child's most valuable personal possessions. This part is from the shoulders to the knees, and no one should see or touch the child's genitals. If someone tries to touch the child's body appropriately, teach them to scream and run away from the person. With the many incidents that happen to school-age children related to cases of

sexual violence, parents should supervise their children more closely, both in social situations in the real world and in the virtual world. Parents can cooperate with the school to supervise their children. Moreover, it can limit cell phone use (Ligina, 2018). Mothers can also control children's activities, such as making friendships and watching what children watch (Maulida, 2020). Children may get inaccurate information from mass media, such as TV shows with lower levels of education (Jatmikowati, 2015).

The reason why parents do not provide sexual education to children is that parents lack knowledge of how to provide sexual education according to the child's age, so parents usually get angry, rebuke, and change the topic of conversation. After all, parents feel awkward talking about sex, even though sexual education is not always about sexual intercourse (Sulfasyah & Nawir, 2017). Apart from a lack of knowledge, people in general feel it is taboo to talk about matters relating to sexuality. This is because it is based on heterogeneous cultural and social factors in society, which prohibit discussing sexuality in public (Suteja, 2019).

Understanding sex education for children from an early age is sufficient knowledge for parents, such as telling children what kind of contact is not good, allowing them to act according to their nature, instilling shame in children from an early age, and teaching children about -things that people should not touch. Sex education for children not only teaches sex knowledge but also seeks to provide children with an understanding of the natural organs and instinctive functions that appear according to their age, as well as guidance on the care and maintenance of internal organs (Chomaria, 2014).

Parents' perceptions about sex education, which is still taboo to discuss, must be eliminated first. If parents have a negative perception about sex education, which is still taboo, then parents cannot explain to their children about sex education itself. The opinion of parents and society that sex education is taboo can be caused by the level of education of the parents. A mother's practice of providing sex education to her child is influenced by her personal beliefs about how important it is to provide sex education from an early age. If the mother believes that sex education from an early age will positively impact her child, then the mother will provide that education, and vice versa (Aprilia, 2015).

According to Aqidah (2020), the research results, namely knowledge of preventing sexual violence in school-aged children, were categorized as good at (66.7%). Giving children the correct knowledge will allow them to adapt well to their sexual attitudes in the future, and providing this knowledge will allow them to have the correct logical inclination towards sexual and reproductive issues. Having good knowledge about the importance of early childhood sex education will also influence the mother's attitudes and behavior toward her child. Parents will be brighter and wiser in facing and responding to problems regarding early sex education, which must be given to children according to their age (Zolekhah, 2021). Efforts to provide children with the correct knowledge to prepare them to adapt well to their sexual attitudes in future life. Providing this knowledge will enable children to acquire the correct logical tendencies toward sexual and reproductive issues or a means of applied sex education (Putri, 2018).

According to Mayola (2021), the results of the research were that parents' knowledge about sex education for preschool-age children was categorized as good at (59.4%) and the implementation of

children's sex education was categorized as good at (66.1%). Having parents who have a good application of sex education does not necessarily mean they have sufficient knowledge because we make the application without realizing it. Parents' knowledge in carrying out sex education includes what is suitable for parents to convey based on the child's characteristics in terms of age, mindset, behavior, and gender. Parents' ability to convey sex education lies in how it is delivered, what model they choose, and what language they use. With preparation in the form of knowledge and skills, the quality of sex education in the family will be improved. Increasing sex education in the family will increasingly reduce children's chances of sexual deviation (Insiyah & Hidayat, 2020).

Research results by Fisnawati et al. (2015) show that parents' knowledge about sexual health in children aged 7-12 years is in the medium category, namely 185 people (50.1%). Seventy-four parents had a negative attitude toward preventing sexual violence against children (20.1%), and 111 people (30.1%) had a positive attitude. The higher the level of education and the more information a person receives, the higher their knowledge, especially about sexual health in children aged 7-12 years. The more positive the attitude that is formed, the more likely parents are to properly and correctly prevent sexual violence against their children. One of the factors that can influence mothers in providing sex education to children is the knowledge gained by mothers about sex education that parents received in the past, which will indirectly influence the way parents educate their children. Parents are so confused about sex they never discuss sexual feelings and desires about someone. No one thought they would teach children about sex. Parents fear seeing their children become sexual creatures because they are not sure about explaining it to their children (Sulistianingsih, 2016)

Research results by Anjani (2017) showed that 19 (88.2%) working mothers had good knowledge about early sex education for children aged 3-6 years, and 30 (88.8%) mothers had exemplary implementation. In this application, mothers work in providing early sex education to children well because mothers can apply the knowledge gained well to children, such as teaching children and telling them things that other people can and cannot do to them and telling other people what they are doing. Just as other people do to their bodies, working mothers can get sex education from various media.

Research results in Sulistianingsih's (2016) knowledge data showed that the average value of mothers' knowledge about sex education for children was 65.5 ± 9.5. In the behavioral data, the average value of maternal behavior in providing sex education to children was 75.63 ± 10.33. Cases of sexual violence against children increase every year. This condition is caused by children not being provided with adequate sexual education by their parents. Providing sexual education by parents can protect children from cases of sexual violence. Sex education is essential for children as an effort to prevent sexual violence.

Conclusions

Most parents in Kesambi Hamlet, South Prupuk Village, Margasari District, Tegal Regency know about children's sex education well. Most parents in Kesambi Hamlet, South Prupuk Village, Margasari District, Tegal Regency have positive attitudes regarding providing children's sex education. There is a

significant relationship between knowledge and parental behavior in providing child sex education in Kesambi Hamlet, South Prupuk Village, Margasari District, Tegal Regency.

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Implementation of Home Visit Program in an Effort to Improve the Nutritional Status of Toddlers in Developing Countries: Scoping Review

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A B S T R A C T

Malnutrition in toddlers is still a severe problem in developing countries. This study aims to determine how the home visit program is implemented in an effort to improve the nutritional status of toddlers in developing countries. This study used the scoping review framework from Arksey and O'Malley (2005). The articles chosen are published from 2010 to 2019 in developing countries. The article was obtained from the PubMed, Wiley, EBSCO, ScienceDirect, and Google Scholar databases. Article selection process using the Mendeley and Covidence applications. Five of the 159 articles selected showed that a combined home visiting program could rehabilitate underweight 5x faster (OR= 4.74, 95% CI= 2.47-9.09), significantly reduce moderate malnutrition (-3.3 vs. -1.5; $p < 0$, 0001) and severe malnutrition (-3.8 vs. -1.8; $p < 0.001$) and 55% of children achieved recovery z-score ≥ -1 which took an average of 14 weeks. Additionally, wasting was reduced by 27% (aOR: 0.73, 95% CI: 0.55–0.97), underweight by 40% (aOR: 0.60, 95% CI: 0.47–0.75), and stunting by 27% (aOR: 0.73, 95% CI: 0.57–0.93). This study concludes that the home visit program is an effective and significant strategy to reduce the incidence of underweight, moderate and severe malnutrition, stunting, and wasting in toddlers only when combined with other programs. Several research gaps were also identified, which could be confirmed through further research.

Introduction

Malnutrition is still a severe problem, especially in developing countries. Data from the United Nations International Children's Emergency Fund (UNICEF, 2019) states that the global prevalence of malnutrition among toddlers in 2018 was 40.1 million (5.9%), wasting 49.5 million (7.3%) and stunting 149 million (21.9 %). Asian and Eastern European countries have the highest overweight sufferers at 14.9%, South Asian countries have the highest wasting sufferers at 15.2%, and South Asian countries have the highest stunting sufferers at 34.4%. Developing countries, especially Asian countries, dominate the three types of malnutrition.

Malnutrition in toddlers can cause decreased immune function, susceptibility to infection, reduced growth and development, and lower Intelligence Quotient (IQ) values, leading to increased child mortality (Le Roux et al., 2010; Narayan et al., 2019). About one-third of deaths in toddlers are caused by malnutrition (Ravi & Singh, 2016). In addition, toddlers who suffer from malnutrition, especially wasting sufferers, have 3.60 times the risk of diarrhea (Marita et al., 2022). Poor feeding factors cause malnutrition in children (Afriyani et al., 2022).

One of the efforts that can be made to overcome malnutrition in toddlers is by implementing a home visit program (Attanasio et al., 2022). The implementation of this program can be seen through the results of research conducted in various countries. The study results show that home visit programs in developed countries, especially the United States, can significantly improve the development and health of children in some instances, including increasing body weight to reach normal in early childhood (Peacock et al., 2013). Therefore, this study aims to conduct a scoping review of articles on the implementation of home visit programs in an effort to improve the nutritional status of toddlers in developing countries**.**

Method

Scoping reviews are conducted to map relevant articles or summarize various evidence to provide an overview of a broad topic. The topic of discussion in this study is the implementation of the home visit program in an effort to improve the nutritional status of toddlers. A scoping review was prepared using the framework from Arksey O'Malley (2005). The systematic stage was performed by identifying scoping review questions using the PEOs framework (Population: children, Exposure: home visit, Outcomes: nutritional status of children) to help facilitate the search process and identify key concepts in an effective search strategy. Relevant articles were identified by establishing inclusion and exclusion criteria. The inclusion criteria are: 1) Papers published between 2010-2019. 2) Papers published are in Indonesian and English. 3) Original papers published in peer-reviewed journals as well as gray literature. 4) Papers discussing internal home visit efforts to improve the nutritional status of toddlers aged ≤ 5 years. 6) Research conducted in developing countries. The exclusion criteria are: 1) Opinion papers, review papers, letters, book reviews, reports, unpublished documents, guidelines, or published in peer-reviewed and gray journals literature. 2) Paper discussing the definition of toddler nutrition. 3) Paper discussing the nutritional prevalence status of children under five. 4) Papers discussing factors causing the nutritional status of toddlers. 5) Papers discussing the impact of the nutritional status of toddlers. Search for articles using PubMed, Wiley, EBSCO, ScienceDirect, and Google Scholar. The article search strategy used keywords with the help of Boolean operators (AND, OR). The article search strategy is as follows:

"((((((((((home visit) OR (home care)) OR (home-based)) AND (nutritional)) OR (malnutrition)) OR (undernutrition)) OR (malnourishment)) OR (malnourished)) AND (toddler)) OR (preschool)) OR (children)) OR (young children)) OR (children under five year))."

This research uses the Mendeley and Covidence applications in the article selection process. The searched articles were saved into Mendeley's bibliography machine and then moved to the Covidence application. This application made it easy for reviewers to select articles, starting from the articles taken to making flowchart prisms.

Results

The data-based article selection process found 159 articles with relevant titles to the topics discussed in this study. A total of 39 articles had duplicates, so that the remaining 120 articles were identified. Based on the results of the abstract screening, 101 articles were irrelevant, and 19 articles were left. Then, the full-text article screening was performed, and assessed its feasibility. There were 14 articles excluded because five articles discussed therapy for children >5 years, three articles discussed enteral therapy, 1 article discussed causal factors, two articles were conducted in developed countries, 1 article was in Spanish, and two articles were not fully accessible full-text. The final results of the selection of articles were five articles that were relevant to the study conducted. The flowchart prism in the selection of articles is as follows:

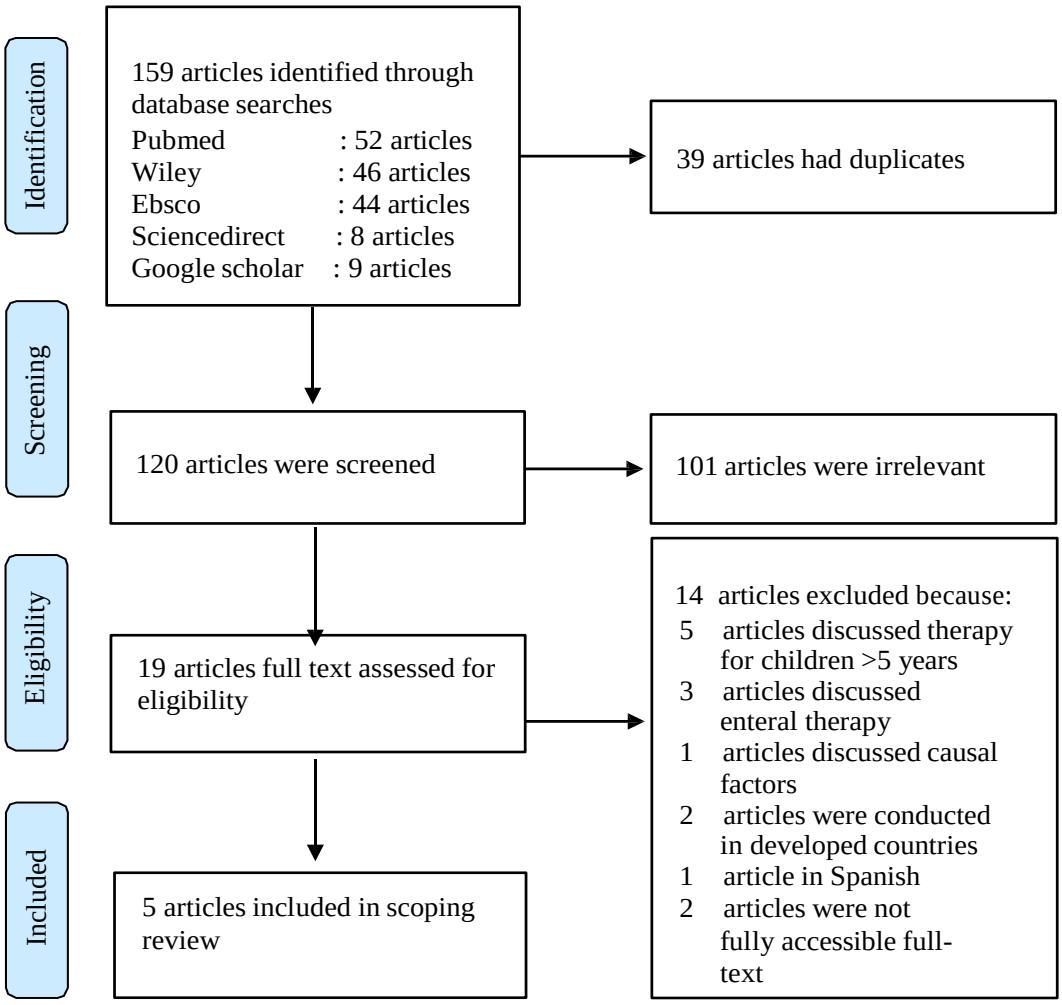

Figure 1. Flowchart Prism

The five articles that have been selected were then performed by data mapping in two stages, which were data charting and critical appraisal. The data charting process was conducted as follows:

Table 1. Charting Data

No	Title/Author/Year	Country	Aims	Databased	N	Samples	Method	Data Collection	Intervention	Type of rehabilitation	Home visiting officer	Procedure	Constraints	Result	Score CA
1.	Home visits by Mentor Mothers (MM) in providing timely recovery for malnourished children in South Africa (Le Roux et al., 2010).	South Africa	Evaluate whether the Philani program (home visit by MM) can rehabilitate malnutrition children in a timely manner through home visits.	PubMed	788 (536 intervention groups and 252 control groups)	Children aged 0-5 years who weigh less than their age	Quantitative RCT research with statistical data analysis used Chi-square tests, t-tests, Fisher's exact test, Wilcoxon two-sample test, Discrete-time survival analysis models, and Discrete-time versus continuous-time models.	Data collection was carried out for one year (2006-2007) by weighing (children aged ≤5 years), observations, interviews, and filling out forms that were completed at each home visit.	Home visits for 12 months	Underweight	Mentor Mothers, who received four phases of training: 1) watching experienced MMs implement the intervention in an inspiring manner, learning how to approach a family and build trust; 2) attending a month of training that covered nutrition; essential child health including HIV and TB, weighing of babies and completion of growth charts; how to recognize signs of abuse and crises; and how to encourage depressed mothers to be more active and engaged with their children; 3) learning how to help mothers bond with their children and improve the consistency of healthy daily routines; and 4) implementing their first round of home visits independently in their neighborhoods.	Home visits are carried out every month for 20-60 minutes. During the visits, the MM weighed the participating child and discussed his progress with the mother. The MM also ensured the mother had the social l grants she might be entitled to and understood proper nutrition and hygiene. MM stressed the importance of breastfeeding, the appropriate time to introduce solids, frequent feeding, and a mixed diet including vegetables and fruit. MMs did not distribute food supplements. MM checked to see if immunizations were up to date and if the child was dewormed. MM also helps with emergencies, such as breathing difficulties and severe dehydration in children, by taking them to the nearest clinic or health center.	MM cannot get consistent steps in the child's height measurement, so it is difficult to get accurate measurements. Other obstacles are found because home visits are often done in huts.	A total of 233 children were successfully rehabilitated through home visits by MM. This strategy is effective for rehabilitating underweight children and requires significantly faster rehabilitation time (5 times) compared to underweight children receiving standard care.	12/14
2.	Home-based treatment of acute malnutrition in Cambodia's urban poor (Harris & Jack, 2011).	Cambodia	Reviews the outcomes of a community nutrition program designed to rehabilitate children under the age of 5 years with moderate or severe acute malnutrition living in a poor urban community in Phnom Penh, Cambodia.	PubMed	159 children	Children under the age of 5 years with moderate or severe acute malnutrition living in a poor urban community in Phnom Penh, Cambodia	Quantitative research with a retrospective review approach used statistical analysis of paired t-test data.	Data was collected using Clinical Records from the Trotrung Ning Akphiwat Sokhapheap Neak Krekra (TASK) program from January 1999 to November 2006.	Home visit program and home-based treatment	Moderate malnutrition and severe malnutrition	Nurses and nutrition clinic nurses	Each child on the program was visited at home by one of the nurses; severely malnourished children were visited at least twice per month (or, on occasions, daily if they were acutely unwell and the parents had refused hospital admission). Moderately acutely malnourished children were visited at least monthly. During these visits, the nurse checked the general health of the child, the hygiene conditions in the home, the vaccination record, and the dosages of any current medications and reviewed previous health and nutrition lessons (education, counseling, and food demonstrations including following the practice of positive deviance in the family from the community nutrition workers). Food support was given to the mother each month, and transport and hospitalization costs were reimbursed.	Difficulties in ensuring how much contribution to the nutritional combination of local products (food made by mothers to children who experience malnutrition) for individual nutritional rehabilitation because they share food rations with other family members.	The TASK (community-based nutrition program) effectively rehabilitates children with moderate and severe malnutrition. It is proven that all samples have been successfully rehabilitated, As many as 87 children only need 14 weeks for the rehabilitation process, with an average increase in body weight of 4 grams/kg/day.	12/14

No	Title/Author/Year	Country	Aims	Databased	N	Samples	Method	Data Collection	Intervention	Type of rehabilitation	Home visiting officer	Procedure	Constraints	Result	Score CA
3.	Effect of women's group participation and counseling through home visits on linear growth of rural East Indian children (caring trial) (Nair et al., 2017).	East India	To find out the influence of Su-Poshan Karyakarta (SPK) on home visits and participate in women's group meetings on children's linear growth.	Science Direct	5781 pregnant women and 3001 infants were born from pregnant women recruited	Third-trimester pregnant woman and her baby until 18 months old	A quantitative RCT study with a cluster-randomized controlled trial used statistical analysis of linear regression models and a two-way scatter plot.	Data was collected for two years (2013-2015) by conducting interviews, distributing questionnaires, measuring anthropometry, and observing each home visit.	Home visits and participatory women's groups	Stunting	Six supervisors and 60 female community-based workers called Su-Poshan Karyakarta (SPK). SPKs and supervisors received 14 training days during the intervention period and attended supervision meetings twice a month. The SPKs recruited had a minimum of 10 years' schooling, were married, preferably from a tribal community, and were paid a monthly stipend of INR3000.	Home visits are carried out in the third trimester of pregnancy and every month for children. Group meetings are held every two weeks. During home visits, children receive growth monitoring, counseling, young child feeding practices, illness prevention, nutrition and health education, and referral support in case of illness or acute malnutrition.	The existence of dietary insufficiency in pregnancy and the limited ability of SPK to impact the provision of clean water and main services in the village means that intervention is not significant for stunting.	Home visits by Su-Poshan Karyakarta (SPK) and group meetings reduced the stunting but did not have a significant effect. Another effect found that toddlers who died and children who were underweight at 18 months were less.	13/14
4.	The influence of women's group Participatory Learning and Action (PLA), counseling through home visits and crèches (child care) on children with undernutrition aged ≤3 Years in East India (Gope et al., 2019).	East India	Evaluating the effects of two community-based strategies to reduce malnutrition among children under three years in rural Jharkhand and Odisha, eastern India.	EBSCO	4668 mothers and their children aged 0-36 months	Mothers and their children aged ≤3 years	A non-random quasi-experimental quantitative study with a control study used a cross-sectional design. The data analysis methods used were descriptive statistics, principal component analysis, and logistic regression.	Data collection was carried out for five years (2012-2017) by conducting interviews and anthropometric measurements at the beginning and end of the survey.	Women's group Participatory Learning and Action (PLA), home visits and crèches (child care)	Wasting, underweight, and stunting	Community-based facilitator and two workers for crèches. All facilitators received 12 days of training on the PLA meeting cycle and counseling. They subsequently had fortnightly review meetings with supervisors (one supervisor for 15 facilitators), during which they discussed problems and solutions to issues encountered during counseling.	PLA meetings and home visits are carried out 8-10 times monthly. Officers provide counseling, nutrition, and health education, helping solve nutritional problems. For crèches, staff provide free care and facilitate a healthy environment.	Officers have difficulty ensuring the correctness of respondents' answers because mothers' responses to questions about behavior may be influenced by their desire to provide appropriate answers after being given the intervention.	PLA, home visits, and crèches are effective at reducing undernutrition in children ≤3 Years of age. Strategy 1 (PLA and home visits) reduces wasting by 34% and underweight by 25%, while strategy 2 (PLA, home visits, and crèches) reduces wasting by 27%, underweight by 40%, and stunting by 27%.	11/14
5.	Effects of nutritional supplements and home visits on the growth and development of children in Madagascar (Galasso et al., 2019).	Madagascar	Determine whether the selected intervention package can significantly change severe malnutrition and developmental delays in children in Madagascar.	Wiley	3738 (1248 pregnant women and 490 children)	Pregnant women (second or third trimester) and infants younger than 12 months	A quantitative RCT study with a cluster-randomized controlled trial used statistical analysis of robustness and Linear Regression data.	Data was collected prospectively for two years (2014-2016) with five questionnaires at three times. It is also carried out using measurements, observations, and interviews.	Lipid-based nutrient supplementation (LNS) and home visits	Severe malnutrition and stunting	Community health workers with criteria had at least lower secondary education, lived within the site, and received ten days of intensive training after the administration of the baseline survey and refresher training, with particular emphasis on listening and communication skills, problem-solving for exclusive breastfeeding, the introduction of complementary feeding, and food security.	Home visits are carried out once during pregnancy, every month for children aged 0-8 months, every two months for children aged 9-12 months, and quarterly visits for children aged 12-24 months. Officers provide a standard of care program with monthly growth monitoring and nutrition education, intensive nutrition counseling, lipid-based nutrient supplementation (LNS), and cooking demonstrations. LNS is given weekly, and mothers are instructed to mix 10 g of sachets of supplement into their children's typical food twice daily.	1) Temporarily, there is migration in communities that receive home visit interventions due to weather shocks and economic constraints. 2) The mother lacks responsiveness in-home visits, such as insufficient time, being available to engage with officers, and being interested in the topics discussed. 3) The respondent's inability to act according to advice from officers, such as not having enough money to buy food and not having the time or ingredients to provide special complementary foods. 4) There is a low frequency of visits by supervisors to officers due to high costs and logistical constraints in reaching villages.	Nutritional supplements and home visits do not significantly affect severe malnutrition but are effective in reducing stunting in children aged 6-18 months.	13/14

After going through the data charting process, a critical appraisal of the five articles that have been selected will be done. The critical appraisal process in this study used the 2018 version of the Mixed Methods Appraisal Tool (MMAT) framework. MMAT is a tool used to critically assess the quality of articles with qualitative research methodologies, randomized controlled trials, non-randomized studies, descriptive quantitative studies, and mixed methods studies (Hong et al., 2018). The results of the critical appraisal show that the highest score of 13/14 is in article [3,5], and the lowest score of 11/14 is in article [4]. Article [1,2] scored 12/14.

Discussion

Based on the analysis of the five articles, several themes were found, including effective implementation of home visits, types of rehabilitation of toddlers' nutritional status on home visits, home visit officers, procedures for conducting home visits, and constraints on implementing home visits.

1. Implementation of effective home visits.

   Based on the analysis, home visits are an effective and significant strategy to improve toddlers' nutritional status [1,2,3,4,5]. The results showed that home visits can reduce wasting by 27%, underweight by 40%, and stunting by 27% in toddlers [4]. Other findings that are in line with this study stated that 233 children with underweight [1] and 159 children with moderate and severe malnutrition [2], as well as the prevalence of stunting and underweight among 18 months children, were successfully rehabilitated by home visit [3]. However, the authors found a different finding in one article, where the results of home visits proved not to affect severe malnutrition significantly but were effective in reducing stunting in children aged 6-18 months [5].

   The statistical analysis in each trial indicated that the duration required to rehabilitate underweight children using a home visit program within a span of 3 months was nearly five times quicker in the intervention group compared to the control group (odds ratio = 4.74, 95% confidence interval = 2.47-9.09). The recovery duration at six months was comparable across all intervention groups (OR = .90, 95% CI = .58-1.41), and this similarity persisted at nine months (OR = 1.31, 95% CI = .69-2.48) and 12 months (OR = 1.27, 95% CI = .56-2.86). [1]. Statistical analyses conducted on a combination of nutritional education programs, regular home visits, and food support revealed a noteworthy disparity between the average admission z-scores (–3.3) and the average outcome z-scores (–1.5; $p < .001$, paired t-test) for the group of children with moderate malnutrition. This was also observed in the group of children who were extremely malnourished, with a mean difference of -3.8 compared to -1.8 in the comparison group ($p < .001$). The children who failed to comply with the program nonetheless exhibited a significant average gain of 0.9 points in their admission z score ($p < .001$, paired t-test), as determined by their nutritional measurements during their final clinic visit. Children who received immunizations had significantly superior results compared to children who did not receive immunizations (z-score, –1.3 vs. –2.1; $p < .001$, Student's t-test). Infants who were 12 months old or younger upon admission showed more favorable outcomes compared to those older than 12 months (z-score, -1.3 vs. -1.8; $p < .01$), despite having worse initial anthropometric

characteristics. There was no disparity in the outcome between male and female children. Out of the total of eighty-seven children, fifty-five percent of them achieved recovery z-scores of -1 or higher. On average, it took these children a period of fourteen weeks, with a standard deviation of fourteen weeks, to reach this outcome. The average rate of weight increase during therapy was 4 grams per kilogram per day and there was no significant difference between moderately and very acutely malnourished children [2].

Consistent with previous research findings, statistical analyses of the PLA program and home visits revealed a 34% reduction in wasting among children under three (adjusted Odds Ratio [aOR]: 0.66, 95% confidence interval [CI]: 0.51–0.88) and a 25% decrease in underweight (aOR: 0.75, 95% CI: 0.59–0.95). However, there was no significant change observed in stunting (aOR: 1.23, 95% CI: 0.96–1.57). Meanwhile, the implementation of the PLA program, home visits, and crèches resulted in a 27% reduction in wasting (adjusted odds ratio [aOR]: 0.73, 95% confidence interval [CI]: 0.55–0.97), a 40% reduction in underweight (aOR: 0.60, 95% CI: 0.47–0.75), and a 27% reduction in stunting (aOR: 0.73, 95% CI: 0.57–0.93). The user's text is "[4]." The study included five intervention groups: a standard-of-care program with monthly growth monitoring and nutrition education (T0); T0 with additional home visits for intensive nutrition counseling by a community worker (T1); T1 with the addition of lipid-based nutrient supplements (LNS) for children aged 6-18 months (T2); T2 with the inclusion of LNS for pregnant or lactating women (T3); and T1 with fortnightly home visits to promote and encourage early stimulation (T4). None of the intervention groups had any significant impact on anthropometry measures or child development outcomes. However, when compared to children in the T0 intervention group, the youngest children (<6 months at the start) in the T2 and T3 intervention groups who were fully exposed to the child LNS dose showed higher length-for-age Z scores. The effect was significant, with an increase of 0.210 standard deviations (SD) for T2 and a borderline increase of 0.216 SD for T3. Additionally, these children had a lower prevalence of stunting, with a decrease of 9.0% for T2 and 8.2% for T3. It is worth noting that supplementing mothers did not provide any additional benefits [5].

Research findings indicate that statistical tests conducted on the home visit and participatory women's group program revealed measurement results for a total of 1253 children (92%) in the intervention clusters and 1308 children (92%) in the control clusters. These results showed that the mean length-for-age Z score at 18 months was -2.31 (SD 1.12) in the intervention clusters and -2.40 (SD 1.10) in the control clusters. After adjusting for other factors, the difference between the two groups was found to be 0.107 (95% CI -0.011 to 0.226, p=0.08). The intervention had no substantial impact on the linear growth of youngsters. In the intervention clusters, there was an increase in the number of pregnant women and children who achieved the minimum dietary diversity. The adjusted odds ratio for women was 1.39 (95% CI 1.03–1.90) and for children was 1.47 (1.07–2.02). Additionally, more mothers in these clusters practiced handwashing before feeding their children, with an odds ratio of 5.23 (2.61–10.5). Furthermore, there was a decrease in the number of

underweight children at 18 months, with an odds ratio of 0.81 (0.66–0.99). Lastly, there was a reduction in infant mortality, with an odds ratio of 0.63 (0.39–1.00) [3].

Nonetheless, in general, from the findings of the above articles, home visits can still be considered an effective strategy for rehabilitating malnourished toddlers. This is because home visits make the time needed to rehabilitate malnourished toddlers faster [1,2]. In underweight toddlers who receive home visit care, the time needed to rehabilitate is five times faster than in underweight toddlers who receive standard care [1]. The success of home visits in rehabilitating toddlers who are moderately and severely malnourished only takes 14 weeks, with an average weight gain of up to 4 grams/kg/day [2].

The findings above are in line with the guidelines from the World Health Organization (WHO), which states that most severely malnourished children who do not have medical complications can be treated in their community or home without being admitted to a health facility. Furthermore, WHO says this step can identify cases of severe malnutrition in children by 80% and can prevent the death of hundreds of thousands of children if done with the right approach (World Health Organization et al., 2004). A similar opinion is also stated in the guidelines for effective home-based care for severely malnourished children, which state that home-based care for severely malnourished children is a viable, acceptable, effective, and economical option (Gupta et al., 2006).

2. Types of rehabilitation of toddler nutritional status at home visits.

Based on the analysis, it was found that several types of malnutrition were successfully rehabilitated by home visit programs, including underweight [1,4], moderate malnutrition [2], severe malnutrition [2,5], stunting [3,4,5], and wasting [4]. The results showed that 233 children were rehabilitated through MM's home visit program. This strategy is effective for rehabilitating underweight children and requires significantly faster rehabilitation time (5 times) compared to underweight children receiving standard care [1]. In line with research conducted in India and Bangladesh, it has also proven that home visits effectively reduce stunting and increase body weight in toddlers (Vazir et al., 2013; Nahar et al., 2012). Most recent evidence on the effectiveness of nutritional interventions in toddlers comes mostly from home visiting programs, and only a few use a group-based approach (Yousafzai et al., 2014; Yousafzai, 2017).

3. Home visiting officer.

Implementing home visit programs must be performed by trained personnel, both non-medical and medical personnel. Overall, based on the five articles the author analyzed, officers who conduct home visits are primarily paraprofessionals (trained non-medical personnel) [1,3,4,5]. However, there are also home visits conducted by nurses along with nutrition clinic nurses [2]. The analysis results of the five articles, home visits conducted by paraprofessionals only and home visits conducted by a combination of nurses and nutrition clinic nurses, gave positive results at the end of the survey [1,2,3,4,5]. It is in line with the results of research conducted by Le Roux et al. (2011), which states that the selection of MM paraprofessional officers in conducting home visit programs

is the right strategy to provide the knowledge and support needed to families in improving the practice of fulfilling nutrition in malnourished children.

Paraprofessionals conducting home visits are given special training on children's health, nutrition, and other related topics [1]. Besides, they are also educated on how to be good listeners and communicate [5]. This training period is different for each article, including ten days [5], 12 days [4], and 14 days [3] of the training period. Likewise, the criteria that paraprofessionals must meet to be able to make home visits include residents who live in the area [1,3,5], Indigenous people/Indigenous people [3], have studied at least the same as a junior high school [3,5], married [3], have children who are not malnourished, committed to providing services to the community, can work in teams, are disciplined, have good communication skills and interpersonal skills [1]. It is in line with the WHO's recommendation that it is necessary to provide training to community workers who perform identification and home-based care for children who are severely malnourished (World Health Organization et al., 2004).

4. Procedure for conducting home visit activities.

The analysis results show that the procedure is similar in all articles, although not all home visit procedures are precisely the same from one article to another. It is due to a combination of programs in several articles, such as a combination of nutritional education, regular home visiting, and food support [2], participation in women's group meetings in the home visit program [3], a combination of the PLA program, home visits and crèches (child care ages 6-36 months) [4] and a combination of nutritional supplement programs with home visits [5]. Based on the guidelines for effective home-based care for children with severe malnutrition, it is stated that the home-based care model can be in the form of daycare, nutritional supplements based on local products/home (residential nutrition centers), and home care (domiciliary care) (Gupta et al., 2006).

The results of the study show that the combination of the home visit program with other programs has proven to be effective in overcoming the problem of malnutrition in toddlers (Yousafzai & Aboud, 2014; Grantham-Mcgregor et al., 2014; Morris et al., 2012). The same research also states that the key to the success of managing malnutrition in toddlers is fast and precise management in overcoming complications and rehabilitation using proper feeding guidelines at home and in the hospital with supplementary food in the form of Ready Therapeutic Food (RUTF) (Setiyani & Utami, 2020).

The frequency of home visits in the implementation of this program, the authors describe based on the analysis of each article as follows: home visits are performed every month for children aged ≤5 years who are underweight, with the duration of each visit taking approximately 20-60 minutes [1]. Children aged ≤4 years with severe malnutrition received home visits two times per month, while children aged ≤4 years with moderate malnutrition received home visits once a month [2]. Children aged ≤18 months who are stunted receive monthly home visits [3]. Children aged 0-36 months who suffer from wasting, underweight, and stunting receive home visits every month, as many as 8-10 visits [4]. Then, for children who suffer from severe malnutrition and stunting, home visits are

conducted every month for children aged 0-8 months, every two months for children aged 9-12 months, and for children aged 12-24 months, quarter visits are made [5]. The frequency of home visits conducted based on each article aligns with the guidelines for effective home-based care for severely malnourished children, which state the frequency of follow-up visits every week and every month during the home-based care period (Gupta et al., 2006).

Types of home visit services provided to respondents by home visiting officers include: checking general conditions [1], monitoring growth [3,5], weighing [1], counseling [1,3,4,5], providing nutrition and health education [1,2,3,4,5], helping to solve problems around nutrition [1,4], providing dietary supplements [5], providing food support such as 10 kilos of white rice, five cans of 155 grams of fish, and 1 liter of cooking oil, one sachet of 100 grams/day supplement contains approximately 440 kcal, 28.7 grams of protein, 22.6 grams of fat, and 35.4 grams of locally produced carbohydrates. Likewise, mothers who are not breastfeeding are given formula milk and powdered soy milk [2], cooking demonstrations [2,5], implementing positive deviant practices in the family [2], providing nutritional services [5], observing household hygiene [2], provide free services and facilitate a healthy environment in the crèches program, as well as provide referral support to health care centers [3]. In line with research from Le Roux et al. (2011), which states that during home visits, officers carry out weighing of children, discuss child development with mothers, and understand proper nutrition and hygiene, officers also emphasize the importance of breastfeeding, the right time to introduce solid foods, recommending that frequent breastfeeding and a mixed diet that includes fruits and vegetables, checking the latest immunization status, checking if the child has worms, and providing referral support to the Philani health clinic or local public health clinic.

Based on the guidelines for practical home-based care for children with severe malnutrition, it is stated that effective home-based care procedures must be comprehensive and can handle nutritional, medical, social, and economic aspects such as providing health education, increasing household food security, dietary supplement therapy based on local/home products, promoting community participation, nutritional motivation and counseling, and conducting child monitoring (anthropometric measurements for weight gain calculation and monitoring of diet, appetite, lethargy and danger signs) (Gupta et al., 2006). Moreover, the management of severe malnutrition in home-based care can be done by improving the quality of food and health care, increasing knowledge and practice of nutrition, promoting exclusive breastfeeding for the first six months of a child's life, promoting the practice of supplementary feeding for children aged 6-24 months (such as providing RUTF or supplements based on local/home products), providing Communication, Information and Education (CIE) as needed, increasing the supply of clean water and sanitation, and improving hygiene practices to protect children against infectious diseases (World Health Organization et al., 2004).

In implementing the home visit program, all officers involve the mother and child spouses for the success of the program [1,2,3,4,5]. Article [1] explains the reasons for home visiting officers to involve mothers in the program due to the role of a mother in caring for children, such as the role of

the mother in breastfeeding, the role in feeding the child including introducing the correct solid food, the role in regulating and creating habits in the home such as sleeping habits and habits of hygiene and healthy living habits, the role in protecting children from infection, accidents and trauma, and the role of mothers in seeking health care for children when needed. In this case, the authors have a different opinion. The authors feel that it is necessary to involve parents and other family members, not only mothers, in implementing the home visit program. This is because parents and family members are essential to adequately feeding children. This statement aligns with the research results by Januarti Hidayathillah (2020), which state that parents, like fathers and other family members, greatly influence nutrition fulfillment and prevent malnutrition in toddlers. Jesmin et al. (2011) also mentioned in the results of their research that the father's education, the child's birth weight, the mother's height, the mother's knowledge of nutrition, and the frequency of breastfeeding are the direct factors that have the most significant influence on the incidence of stunting in children aged 0-59 month.

5. Constraints on conducting home visits.

The analysis of the five articles found several obstacles in implementing the home visit program. Constraints that arise are not only from the factor of home visit officers but also from respondents who are given home visits. Constraints that arise from the factors of home visiting officers include: the difficulties faced by home visiting officers in obtaining accurate measurements for very young children, home visit officers unable to obtain consistent measurements of children's height [1], limited ability of home visiting officers to influence the provision of clean water and primary services in areas with home visit programs [3], difficulties of health workers in determining how much the contribution of nutrition combined with vegetables and animal protein (household products) for rehabilitation nutrition of children individually due to sharing food rations with other family members [2], difficulties faced by home visiting officers in ascertaining the correctness of respondents, because there is a possibility that the mother (respondent) in responding to questions about health behavior is influenced by the desire to give the desired answers after intervention [4], and the low frequency of visits by supervisors to home visiting officers due to high costs and logistical constraints in reaching villages (intervention areas), causing the home visit program to fail to achieve consistent benefits for child growth [5].

Some of the obstacles that arise from respondents who are given home visits include temporary migration of people who receive home visit interventions due to weather shocks and economic constraints, low responsiveness of mothers (respondents) in-home visits, for example, not having enough time and availability to engage with home visiting officers and interest in the topic discussed, the respondent's inability to act on the advice of the home visiting officer e.g. insufficient money to buy food, no time to prepare ingredients and provide special complementary foods [5]. Moreover, home visits to huts are also an obstacle to implementing the home visit program [1].

Conclusions

This study concludes that the home visit program is an effective and significant strategy to reduce the incidence of underweight, moderate malnutrition, severe malnutrition, stunting, and wasting in toddlers only when combined with other programs. Several research gaps were identified in this study, including: (1) The success of the home visit program was achieved due to support or collaboration with other programs, not purely due to the home visit program. Therefore, this program requires extensive resources, both in terms of funding and human resources. (2) There are different obstacles to implementing the home visit program, so it is necessary to study further programs to anticipate the obstacles. (3) All home visiting officers only involve mothers in the program, even though parents like fathers and other family members are very influential in fulfilling toddler nutrition. (4) Of the five articles analyzed, no qualitative research discussed the topic of the home visit program. Based on the research gap, the authors hope that this can become a reference for further researchers to conduct further research related to the home visit program that involves the above research gap.

This scoping review used a systematic approach to identify articles relevant to the implementation of a home visit program to improve the nutritional status of toddlers. However, in article search, this study only used four databases and one gray literature with relatively narrow article search keywords. A broader search can lead to a more profound identification of the article. However, this study aims to conduct a review by filtering information about the implementation of the home visit program in an effort to improve the nutritional status of toddlers, which has been described in this article to provide an overview of the topic.

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