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EFFECTIVENESS OF E-BOOKLET EDUCATION IN IMPROVING KNOWLEDGE AND PREVENTION BEHAVIOR TOWARD PREECLAMPSIA AMONG PREGNANT WOMEN

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Abstract

Preeclampsia is a dangerous condition for pregnant mothers that causes significant health problems worldwide. It is characterized by high blood pressure, with readings greater than 140/90 mmHg, occurring after 20 weeks of pregnancy. However, in reality, many pregnant mothers still do not know the methods to prevent preeclampsia. Studies show that the knowledge possessed by pregnant mothers influences their behavior; therefore, mothers with a lack of knowledge tend not to engage in preeclampsia prevention. This research aims to determine the relationship between the level of knowledge of pregnant mothers about preeclampsia and their behavior in preventing preeclampsia in the Padangsari Health Center work area. This study uses a quantitative method with a descriptive correlational design and a cross-sectional approach. The research was conducted in the Padangsari Health Center work area, Semarang City. The sample size consisted of 55 respondents, selected using a non-probability sampling technique, namely purposive sampling. Data analysis was performed using the Chi-Square test. The research instrument was a questionnaire measuring the level of knowledge about preeclampsia and preeclampsia prevention behavior, developed by the researcher and tested for validity and reliability. The results indicate a significant relationship between the level of knowledge and preeclampsia prevention behavior. The statistical test using the Chi-Square test yielded a significance value (sig-p = 0.000) < α (0.05), so Ho is rejected and Ha is accepted.

Keywords: *Knowledge, Prevention, Preeclampsia, Pregnant women*

1. Introduction

Preeclampsia is a dangerous condition for pregnant women and is a major health problem for pregnant women worldwide, characterized by high blood pressure >140/90 mmHg at a gestational age of 20 weeks. If this condition is not treated immediately, it can endanger the safety of the mother and fetus (Usnaini et al., 2020) . The prevalence of preeclampsia cases in Central Java Province has increased every year from 2020 by 25.5%, 2021 by 28.6% and in 2022 by 36.4% (Central Java Health Office, 2022) . The number of pregnant women with preeclampsia in Semarang City in 2020 reached 253, in 2021 it reached 383 and in 2022 it reached 412 pregnant women with preeclampsia (Semarang Health

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Office, 2022) .

Pregnant women who experience preeclampsia need serious attention because preeclampsia that is not treated properly will have a bad impact and can endanger the health of the mother and fetus (Novyanti et al., 2022) .

The level of knowledge is very important because all changes that occur can be responded to appropriately if someone has knowledge. Through knowledge in pregnant women about preeclampsia, it will give rise to preeclampsia prevention behavior from anything that can trigger one of the treatments that can be done, namely early detection, through *antenatal care* (ANC) services or care which is a way to monitor and support the health of normal pregnant women and detect mothers with normal pregnancies so that they do not become abnormal (Novyanti et al., 2022) .

Lawrence Green's theory (1991), as cited in Notoatmodjo (2018), states that a person's health behavior is influenced by three factors, one of which is predisposing factors, which are manifested in the level of knowledge. Although knowledge is one of the key factors that supports behavioral change, in reality, there are still other factors according to Lawrence Green that can influence a person to change their behavior. These other factors include characteristics such as age, occupation, education, economic status, beliefs, values, attitudes, trust, the availability of facilities and infrastructure, as well as support from those around them (Notoatmodjo, 2018).

Based on the results of a preliminary study conducted by researchers on March 30, 2024, by interviewing midwives in the Padangsari Health Center work area, Semarang City, it was stated that the number of pregnant women with preeclampsia was still high. From January 2023 to March 2024, the number of preeclampsia incidents in pregnant women in the Padangsari Health Center work area was 11.1 % (83) pregnant women with a total of 742 pregnant women. The aim of this study is to determine the relationship between the level of knowledge and behavior to prevent preeclampsia in pregnant women in the Padangsari Health Center work area.

2. Method

This type of research uses a quantitative method with a descriptive correlational design and a cross-sectional approach. The study was conducted in the working area of the Padangsari Health Center, Semarang City. The research sample consisted of 55 respondents selected using a non-probability sampling technique, namely purposive sampling. Data analysis was performed using the Chi-Square test. The research instrument consisted of a questionnaire on the level of knowledge about preeclampsia, containing 18 questions, and preeclampsia prevention behavior, containing 14 questions, which were developed by the researcher and tested for validity and reliability. The results showed that the calculated r-value (r count) was greater than the table r-value (r table), indicating that each questionnaire item was valid. The significance level was 5% or 0.05, with an r table value of 0.374. Additionally, the Cronbach's

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Alpha value was greater than the Alpha table value (>0.60), thus the instrument was declared valid and reliable.

3. Result and Discussion

A. Univariate Analysis

1. Respondent Characteristics

Table 1 Respondent Characteristics Based on Maternal Age and Gestational Age in the Padangsari Health Center Work Area in 2024 (n = 55)

Respondent Characteristics	N	Mean	Median	Min	Max
Mother's Age (Years)	55	29.29	28.00	19	42
Pregnancy Age (Weeks)	55	23.87	23.00	9	38

Based on the data analysis in Table 4.1, it is known that the age characteristics of the mothers in this study had a mean value of 29.29, a median of 28.00, and a standard deviation of 5.479. The youngest respondent was 19 years old and the oldest was 42 years old. Meanwhile, the gestational age characteristics in this study had a mean value of 23.87, a median of 23.00, and a standard deviation of 8.353. The youngest gestational age among the respondents was 9 weeks and the oldest was 38 weeks.

Table 2 Respondent of Respondents Based on Parity, History of Preeclampsia, Education and Employment in the Padangsari Health Center Work Area in 2024 (n = 55)

Characteristics Respondents	Frequency (f)	Percentage (%)
Parity		
Primigravida	30	54.5
Multigravida	25	45.5
History of Preeclampsia		
Yes	5	9.1
No	50	90.9
Education		
Elementary (Primary-Junior High School)	12	21.8
Secondary (High School/Equivalent)	19	34.5
Higher (Diploma/Bachelor)	24	43.5
Work		
civil servant	4	7.3
Self-employed	19	34.5
Housewife	31	56.4
Businessman	1	1.8
Total	55	100

Based on the data analysis in Table 2, it shows that the majority of respondents' parity characteristics fall into the primigravida category, with 30 respondents (54.5%). In the category of preeclampsia history, most respondents did not have a history of preeclampsia, totaling 50 respondents (90.9%). In terms of education level, the majority of respondents had a higher education as their last level of education, with 24 respondents (43.6%). Regarding occupational characteristics, the majority of respondents were housewives, totaling 31 respondents (56.4%).

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2. Level of Knowledge

Table 3 Characteristics of Respondents Based on Level of Knowledge About Preeclampsia in the Padangsari Health Center Work Area in 2024 (n = 55)

Level of Knowledge	Frequency (f)	Percentage (%)
Good	31	56.4
Not enough	24	43.6
Total	**55**	**100**

Based on Table 3, it can be seen that out of 55 pregnant women in the Padangsari Health Center working area, the level of knowledge about preeclampsia shows that more than half of the respondents have a good level of knowledge, namely 31 respondents (56.4%), while 24 respondents (43.6%) have a low level of knowledge.

3. Preventive Behavior

Table 4 Respondent Characteristics Based on Preeclampsia Prevention Behavior in the Padangsari Health Center Work Area in 2024 (n = 55)

Behavior	Frequency (f)	Percentage (%)
Positive	32	58.2
Negative	23	41.8
Total	**55**	**100**

Based on Table 4, it can be seen that out of 55 pregnant women in the Padangsari Health Center working area, preeclampsia prevention behavior among pregnant women shows that more than half of the respondents have positive preeclampsia prevention behavior, with 32 respondents (58.2%), while 23 respondents (41.8%) have negative preeclampsia prevention behavior.

B. Bivariate Analysis

1. Relationship between Level of Knowledge about Preeclampsia and Preeclampsia Prevention Behavior

Table 5 Results of Chi-Square Test Analysis of the Relationship between Knowledge Level and Preeclampsia Prevention Behavior in the Padangsari Health Center Work Area in 2024 (n = 55)

Level of Knowledge	Preventive Behavior				Total		P. Value
	Positive		Negative				
	F	%	f	%	f	%	
Good	6%		4%		)%		0,000
Not enough	2%		8%		)%		
Total	2%		6%		)%		

Based on Table 5, it can be seen that pregnant women who have good knowledge and positive

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behavior in preventing preeclampsia total 25 respondents (80.6%), while those who have good knowledge but do not practice preeclampsia prevention total 6 respondents (19.4%). Respondents with low levels of knowledge who practice preeclampsia prevention total 7 respondents (29.2%), and those with low knowledge who do not practice preeclampsia prevention total 17 respondents (70.8%).

The results of the study, after the Chi-Square test was conducted, showed a p-value of 0.000, so Ho is rejected and Ha is accepted. This means that there is a significant relationship between the level of knowledge and preeclampsia prevention behavior.

DISCUSSION

A. Respondent Characteristics

1. Mother's Age

Based on the data from the study listed in table 4.1, the characteristics of respondents based on maternal age showed that the average was 29.29 with the youngest respondent being 19 years old with 1 respondent (1.8%) and the oldest respondent being 42 years old with 1 respondent (1.8%). The results of this study show that the average age of respondents is 29.29 years . This shows that the average age of respondents in this study is in the normal category for a pregnancy. According to (Erida, 2021), pregnancy is greatly influenced by age , and the age range that is not at risk for pregnancy is in the age range of 20 to 35 years. At this age , the reproductive organs develop and have optimal function. Conversely, the incidence increases threefold in women of non-productive age (Erida, 2021).

Age in the range of 20 to 35 years when associated with the incidence of preeclampsia, this age is relatively lower compared to mothers who are pregnant with an age of >35 years. Thus, it is known that maternal age during pregnancy affects maternal and child morbidity and mortality (Mirawati & Kusumawati, 2018).

2. Gestational Age

Based on the data from the study listed in table 4.1, the characteristics of pregnant women based on gestational age obtained an average result of 23.87 with the youngest gestational age of 9 weeks as many as 1 respondent (1.8%) and the oldest respondent age of 38 weeks as many as 1 respondent (1.8%). The results of this study show that the average gestational age of respondents is 23.87 weeks. This shows that the average gestational age of 23.87 weeks is included in the 2nd trimester. According to (Nuraini, 2021) , it is stated that gestational age after 20 weeks is a risk of preeclampsia, a hypertensive condition that can threaten the health of the mother and fetus if not managed properly. Preeclampsia generally develops after 20 weeks of pregnancy, and this risk increases with increasing gestational age (Nuraini, 2021) .

3. Parity

The results of the study showed that more respondents had gravida in the primigravida category, namely 30 respondents (54.5%) compared to multigravida, but there was not much difference, only 5 respondents (9%). According to (Cunningham et al., 2018) , one of the risk factors for preeclampsia is primigravida which has a 3 times greater risk of preeclampsia compared to multigravida. This is in line with the immunological theory that in the first pregnancy, blocking antibodies are formed against

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antigens whose results are not perfect, so that they can inhibit the process of invasion of the mother's spiral arteries by trophoblasts to a certain extent so that as a result it can interfere with placental function. Reduced secretion of the vasodilator prostacyclin by placental endothelial cells and increased breakthrough secretion cause a decrease in generalized vasoconstriction and aldosterone secretion. This is the cause of the increasing incidence of preeclampsia (Putri & Puspitaningrum, 2020) .

4. History of Preeclampsia

Based on the data from the study listed in table 4.2, the characteristics of pregnant women based on a history of preeclampsia, it was found that there were still 5 respondents (9.1%) who had a history of preeclampsia. Previous preeclampsia is a risk factor for preeclampsia, possibly due to the inability of the cardiovascular system to recover from previous preeclampsia, so that when women experience recurrent preeclampsia, it will be worse than those who do not have a history of previous preeclampsia (Nuraini, 2021)

5. Education

The results of this study show that there were 12 respondents (21.8%) who had a low level of education and 24 respondents (43.6%) who had a high level of education. Education is an indicator that can affect the quality of their health. Through the level of education, mothers can understand the information they obtain, especially information on maternal and child health (Rahmadiani et al., 2023) .

The mother's last education can affect the mother's knowledge of diet and pregnancy check-up visits to be able to detect preeclampsia early so that on the other hand, mothers with a high level of education will find it easy to receive and process information, so that it will be easy to behave in good health. Acceptance and understanding of information received by someone who has a high level of education will be better than someone with a low level of education (Erisa & Yuri, 2023) .

6. Work

Based on table 4.2, it can be seen that the respondents with the largest type of work are housewives, namely 31 respondents (56.4%). A person's work activities greatly affect muscle activity and blood flow. This also happens to a pregnant woman, where blood circulation in the limbs can experience various changes along with increasing gestational age due to the enlargement of body parts such as the uterus. This will affect the performance of the heart in adapting during the pregnancy process. The results of other studies state that there is a relationship between the type of work of housewives and the incidence of preeclampsia (Rahmadiani et al., 2023) .

7. Level of knowledge

The level of knowledge of pregnant women about preeclampsia as stated in table 4.3 shows that 31 respondents (56.4%) have good knowledge. The level of knowledge is very important because all changes that occur can be responded to appropriately if someone has knowledge. Through knowledge in pregnant women about preeclampsia, it will give rise to preeclampsia prevention behavior from

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anything that can trigger one of the treatments that can be done, namely early detection, through *antenatal care* (ANC) services or care which is a way to monitor and support the health of normal pregnant women and detect mothers with normal pregnancies so that they do not become abnormal (Novyanti et al., 2022)

8. Preventive behavior

Based on table 4.4, it shows that there are 32 respondents (58.2%) who have positive behavior. Preeclampsia prevention behavior is behavior that can reduce the incidence and reduce the risk of preeclampsia in pregnant women. To be able to enforce this preventive behavior, regular supervision of pregnant women is needed by providing support and paying attention to weight gain, increased blood pressure and urine examination to determine proteinuria (Kurniawati, 2022) .

Preventive behavior in preeclampsia can be said to be good if pregnant women have carried out preeclampsia prevention, namely primary prevention, such as diligently checking their pregnancy at least 4 times, namely 1 time each in the first and second trimesters, and 2 times in the third trimester, routinely checking blood pressure, and doing laboratory tests. Secondary prevention can be seen from the number of respondents who answered that they had enough rest, enough activity, and consumed good foods such as eating fruits and vegetables and reducing foods that are high in fat, salt, protein and taking vitamins during their pregnancy (Medika Iis et al., 2023) .

B. Relationship between Level of Knowledge about Preeclampsia and Preeclampsia Prevention Behavior

Based on the data analysis, it states that there is a relationship between the level of knowledge and preeclampsia prevention behavior. This is evidenced by the results of statistical analysis using the *Chi-Square test* with the results of the analysis with a significance value = 0.000 <α (0.05) this shows a significant relationship between the level of knowledge of pregnant women about preeclampsia and preeclampsia prevention behavior. According to (Usnaini et al., 2020) , pregnant women with a good level of knowledge will be more also good at carrying out preeclampsia prevention behavior.

Pregnant women who have good knowledge about preeclampsia tend to show positive preventive behavior. They better understand the importance of maintaining health during pregnancy, including recognizing early symptoms and having regular check-ups. This good knowledge encourages pregnant women to follow medical advice, regulate a healthy diet, and maintain appropriate physical activity. Thus, educated pregnant women can be more effective in taking preventive measures that can reduce the risk of preeclampsia (Parantika et al., 2021) . On the other hand, pregnant women who have less knowledge about preeclampsia are often unaware of the risks they face, so their preventive behavior becomes negative. They may ignore the importance of health checks or not be aware of the early signs to watch out for or perhaps due to a lack of support and motivation from those closest to them such as family or friends. This lack of understanding can cause them not to take necessary actions, such as paying

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attention to diet or avoiding risk factors that can worsen the condition. As a result, they are more susceptible to complications during pregnancy (Usnaini et al., 2020) .

4. Conclusion and Suggestion

Based on the characteristics of this study, the average age of respondents was 29.29 years with the youngest mother being 19 years old and the oldest mother being 42 years old. Characteristics based on gestational age had an average of 23.87 weeks with the youngest gestational age being 9 weeks and the oldest gestational age being 38 weeks. Based on parity characteristics, respondents were mostly in the primigravida category, namely 30 respondents (54.5%). Characteristics based on preeclampsia history characteristics, most respondents did not have a history of preeclampsia, as many as 50 respondents (90.9%) and the majority of respondents had a high level of education (Diploma/Bachelor/Master) as many as 24 respondents (43.6%). Based on employment status, most respondents were housewives, as many as 31 respondents (56.4%).

The level of knowledge about preeclampsia in this study, more than half of the respondents had a good level of knowledge, namely 31 respondents (56.4%) and a poor level of knowledge, namely 24 respondents (43.6%).

Preeclampsia prevention behavior, more than half of the respondents had positive behavior, as many as 32 respondents (58.2%) and those who had negative behavior were as many as 24 respondents (41.8%).

The results of the study showed that there was a significant relationship between the level of knowledge and preeclampsia prevention behavior in the Padangsari Health Center work area with a p-value of 0.000. With an Odds Ratio of 10.1, which means that pregnant women with a good level of knowledge have a 10 times greater chance of carrying out preeclampsia prevention behavior than pregnant women with a low level of knowledge about preeclampsia.

5. Acknowledgments

Collate acknowledgments in a separate section at the end of the article before the references and do not, therefore, include them on the title page, as a footnote to the title or otherwise. List here those individuals who provided help during the research (e.g., name of foundation, grant maker, donor, providing language help, writing assistance or proof reading the article, etc.).

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