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Influence of Infographic-Based Booklet on Pregnant Women's Knowledge About Hypertension in Pregnancy

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ABSTRACT

Background: Hypertension in pregnancy is a cause of maternal and infant morbidity and mortality. One of the prevention efforts that can be done by increasing the knowledge of pregnant women about hypertension in pregnancy using infographic-based booklet media. Objective: to analyse the effect of Infographic-based Booklet Media on increasing pregnant women's knowledge about hypertension in pregnancy. Methods: *Combine Method*, namely the method Research and Development (R&D) with the model Borg and Gall development simplified by the Center for Policy Research and Educational Innovation Research Team of the National Education Department Research and Development Agency to design modules and quantitative research methods and continued with a research design *pre experimental (one group pre test and post test).* The research was conducted at Kaluku Bodoa Health Centre in November 2024 to January 2025. Samples, 70 pregnant women, sampling techniques using *purposive sampling* based on inclusion and exclusion criteria. *Data analysis using Paired-t test to analyse the difference in respondents' knowledge before and after the intervention.* Results: analysis of knowledge using descriptive tests obtained more maternal knowledge in the less category as many as 50 respondents (71.4%)in the , 55 respondents (78.6%) moderate category. The , meaning that there is an effect of infographic-based booklet media on increasing the knowledge of pregnant women about hypertension in pregnancy. Conclusion: *paired t-test* analysis obtained an average pretest value of 42.237 and a post-test value of 62.333 with a difference value of 20.0959 and value of a *sig.* 0.000 <0.05infographic-based booklet media can be used as educational in increasing the media knowledge of pregnant women regarding the prevention of hypertension in pregnancy.

Keywords: *Booklet, Infographics, Knowledge, Pregnant Women, Pregnancy Hypertension*

1. INTRODUCTION

Hypertension is a cardiovascular disease that affects many people worldwide (Garovic et al., 2022; Zhang & Zhong, 2023). Hypertension is a high prevalence disease and the number is increasing every year. Globally, between 8 and 10% of pregnant women experience hypertension in pregnancy (Parsa et al., 2019) . Pregnant women's blood pressure rises above 140/90 mmHg. This condition usually appears around 20 weeks of pregnancy, but can also appear earlier (Awaludin et al., 2022; Noraisa Hida et al., 2022) .

Epidemiological data show that the incidence of hypertension during pregnancy is associated with the overall quality of local health services. Hypertension in pregnancy is the second leading cause of death after haemorrhage and contributes to maternal and foetal morbidity. Hypertension in pregnancy is a complication of pregnancy that occurs in 5-10% of pregnancies worldwide (Gholami et al., 2022) . Hypertension is a complication that occurs in 2-8% of pregnancies worldwide. Globally, the incidence of hypertension during pregnancy increased by 10.92% from 1990 to 2019. In countries and regions with low sociodemographic and human development indicators, the incidence of hypertension during pregnancy increases with age. Gestational hypertension is the most common form of hypertension during pregnancy, occurring in 6-17% of healthy nulliparous women and 2-4% of women giving birth. The highest prevalence occurs in patients who have had hypertension in pregnancy, multiple pregnancies, or obesity since the previous pregnancy before becoming pregnant. Approximately 10-50% of patients initially diagnosed with gestational hypertension progress to pre-eclampsia within 1 to 5 weeks. Meanwhile, the number of deaths due to hypertension during pregnancy was approximately 27,83,000 in 2019 (Gholami et al., 2022; Gingras-Charland et al., 2019) .

Data from the Ministry of RI in 2020 there were 15.46% of pregnant women who experienced hypertension in pregnancy, decreased in 2021 by 15% of pregnant women and experienced an increase in 2022, namely 16.20% (Suratun et al., 2022) . This shows that hypertension is one of the health problems that often appear during pregnancy and can cause complications in 2-3% of pregnancies (Saedan et al., 2022; Suratun et al., 2022) . Hypertension in pregnancy is an important risk factor for maternal cardiovascular disease (Saedan et al., 2022) . The risk of developing cardiovascular disease is reported to be 2 times greater in women with a history of hypertension during pregnancy than in normotensive women (Kusumawaty Jajuk et al., 2021) . Patients with hypertension in pregnancy are reported to have a 4.2 times higher risk of heart failure. The risk of coronary artery disease is 2.5 times higher, and the risk of stroke is 1.8 times higher. The risk of developing hypertension later in life is also increased by 2.3 to 6.7 times. Hypertension in pregnancy is associated with an increased risk of cardiovascular disease by 67% (Widiati & Rahmawati, 2022) .

Hypertensive disease in pregnancy (HDK) is one of the leading causes of maternal infant . Approximately 15-25% of women diagnosed early with hypertension in pregnancy will develop pre-eclampsia and eclampsia, gestational hypertension, and chronic hypertension-and morbidity and mortality (Campbell et al., 2022; Garovic et al., 2022) . With good management, hypertension will not progress or cause harm, and may disappear after birth. However, if left untreated, hypertension during pregnancy can be dangerous (Widiati & Rahmawati, 2022) . Efforts to deal with the problem of hypertension in pregnancy require material and moral contributions from health workers, especially midwives who have been endowed with high intellectual abilities (Gholami *et al.*, 2022). Moral contributions can be made by health education activities at the health centre which are expected to increase the knowledge of pregnant women and have an impact in reducing maternal and infant mortality (Saedan et al., 2022; Suratun et al., 2022) .

Optimization of health services in providing hypertension therapy in pregnant women is a necessary step to reduce morbidity and mortality in mothers and infants (Talebi et al., 2022) . In an effort to reduce maternal and infant mortality, namely through an approach by increasing the knowledge of pregnant women about hypertension during pregnancy (Coyne et al., 2021) . Knowledge can be obtained through various ways, such as learning, reading, observing, or experience. One way to increase knowledge about the prevention of hypertension in pregnant women is through health education (Gholami et al., 2022) .

Health education for pregnant women is very important to improve the knowledge of pregnant women. Good knowledge is a factor that will determine the health status of pregnant women. Health education is an effort to change human behaviour through an educational approach (Yulianingsih et al., 2023) . Providing knowledge and socialization to the community can be more easily understood with media support. Various types of media that can be utilized include electronic media such as radio and television, as well as print media such as booklets, infographics, leaflets, *flip charts*, comics, and others (Hanye et al., 2023; Rahma Kusuma Dewi et al., 2022) .

In this study, activities to improve the knowledge of pregnant women by utilizing media, namely infographic booklet media. According to (Mc Sween-Cadieux et al., 2021) infographics are visual communication media that can combine graphics and information. Infographic media is designed to provide information, attract readers' attention, conclude, and take actions relevant to its content (Bradshaw & Porter, 2017) . The reference in the preparation of the infographic booklet is sourced from the Akumosa Guidebook for Hypertension in Pregnancy and several articles from the Ministry of Health (Kesumawati et al., 2020) then the researcher reviews the content and material followed by the preparation of an infographic booklet using simple language to be easily understood by respondents.

Based on research (Umaroh et al., 2023), that Infographic media has aesthetic value and visual work according to the information to be conveyed so that readers can enjoy it. Infographic media, which consists of animation or video, can provide a form of information that is interesting, effective, and easily accepted by students. In line with research (Umaroh et al., 2023) , that the use of infographic media becomes more interesting, easier to understand, and has unique characteristics in conveying information based on facts in the desired format.

Based on preliminary studies conducted at Kaluku Bodoa Health Centre. Of the 5 pregnant women who came to check their pregnancy, 3 pregnant women with complaints of headaches and palpitations, and the midwife found that they had high blood pressure. Very rarely, pregnant women who come to the health centre do not know that they have hypertension during pregnancy. Mothers come with complaints of persistent headaches, upper abdominal pain, and swelling in some parts of the body. In addition, most pregnant women in the area knew about hypertension during pregnancy. They also did not know about the classification of hypertension and its treatment. Thus, health education about hypertension in pregnancy is needed.

The difference between this research and previous research is that this infographic media focuses more on presenting material about hypertension in pregnancy to readers in a more concise and clear manner because it is accompanied by supporting information images. As well as illustrating information about hypertension in pregnancy that has little text and acts as a visual summary. While previous studies both aim to urge people to make a change that is related to health by using a visual and image, but no one has focused on discussing hypertension in pregnancy. Therefore, based on the explanation above, researchers are interested in paying attention to pregnant women to provide information about hypertension in pregnancy through health education so that the knowledge of pregnant women becomes even better. So, the authors will conduct research with the title "The Effect of Infographic Media on Pregnant Women's Knowledge of Hypertension in Pregnancy".

This study will measure the level of knowledge of respondents at the C1 and C2 levels, namely after the respondent reads the infographic booklet media can remember and understand the material that has been obtained.

Methods

This research design is to use the *Combine Method*, namely the R & D method with the Borg and Gall development model which is simplified by the Center for Policy Research and Educational Innovation Research and Development Agency of the Ministry of Education to design modules and quantitative research methods with a research design *pre experimental (one group pre test and post test).* This research was conducted in the Health Centre Working Area Kaluku Bodoa . The research was conducted from November to January 2024. The population in this study were pregnant women in the Kaluku Bodoa Health Centre Working Area. The population was all pregnant women in the Kaluku Bodoa Health Centre working area. Sample calculation using the formula infinite *population* , obtained a sample size of 70 pregnant women by *purposive sampling* based on inclusion and exclusion criteria. Data analysis using paired t-tests. This study has received Ethical approval from the Ethics Committee of the Faculty of Public Health, Hasanuddin University with number protocol : 3227/UN4.14.1/TP.01.02/2024 Date: 05 November 2024.

2. RESULTS AND DISCUSSION

Table 1. Characteristics of Respondents

Characteristics	n	(%)
Age		
< 20 years	11	15,7
20-35 years	58	82,9
≥ 35 years	1	1,4
Education		
Higher Education	51	72,9
Low Education	19	27,1
Pregnancy Age		
UK 1-13 weeks	5	7,1
UK 14-27 weeks	61	87,1
28-40 weeks UK	4	5,8
Parity		
Primiparous	33	47,1
Multiparous	37	52,9
Grandemultipara	0	0
Total	**70**	**100.0**

Based on table 1 above, it can be seen that the age of mothers is more at the age of 20-35 years as many as 58 respondents (82.9%) compared to age <20 years and age >35 years. As for education, most of them have high education as many as 51 respondents (72.9%) compared to mothers who have low education. For gestational age in mothers more at the gestational age of 14-27 weeks, namely 61 respondents (87.1%) while for parity more in multiparous mothers as many as 37 respondents (52.9%).

Table 2: Distribution of Respondents' Knowledge Before and After Getting Booklet Infographic-Based About Hypertension in Pregnancy

Knowledge	Pre-test		Post-test	
	n	%	n	%
Good	2	2.9	4	5.7
Simply	18	25.7	55	78.6
Less	50	71.4	11	16.7
Total	**70**	**100.0**	**70**	**100.0**

Table 2 shows that before the intervention, the mother's knowledge was more in the poor category, namely 50 respondents (71.4%) and experienced changes in the increase in knowledge after the intervention, namely the moderate category as many as 55 respondents (78.6%).

Table 3. Normality Test

Group	Value	df	p-value
Pre-Test	0,969	70	0,079
Post-Test	0,973	70	0,140

Shapiro-Wilk

Based on table 3 above, it is known that the df value in each group is 70 samples. Furthermore, the normality test results show the sig value for the pretest of 0.079 and the sig value for the post test of 0.140 is greater than the alpha value of 0.05, so it can be concluded that the data is normally distributed.

Table 4. Effect of Infographic Booklet Media on Increasing Maternal Knowledge about Hypertension in Pregnancy

Group	Mean	Difference	df	p-value
Pre-Test	42,2374	20,0959	69	0,000
Post-Test	62,3333			

*** paired t-test**

Based on table 4, the average value at the pretest value of 42.237 < post-test 62.333, it can be interpreted that there is an average difference in the intervention results between the pretest and post test results with a difference value of 20.0959. From the table above, it is known that the sig. value is 0.000 <0.05, it can be concluded that there is an average difference between the pretest and post test intervention results, which means that there is an effect of infographic booklet media on increasing maternal knowledge about hypertension in pregnancy.

3. DISCUSSION

The characteristics of the respondents listed in table 1 include age, education level, gestational age, and parity. Most of the respondents, 82.9%, were in the age group of 20-35 years, which has a lower risk of hypertension than those aged below 20 years or more than 35 years. Based on the opinion of Cunningham et al. (2021) in *Williams Obstetrics*, pregnant women who are less than 20 years old are more prone to pre-eclampsia because their vascular system is still immature and their cardiovascular adaptation is not optimal. In contrast, pregnant women over 35 years old are more at risk of chronic hypertension as well as pre-eclampsia, which is influenced by reduced vascular elasticity and increased incidence of comorbidity such as obesity and diabetes.

The variation in respondents' education level was quite diverse, with the majority (72.9%) having a higher education background. This factor potentially affects the extent to which they can understand the information conveyed through the infographic booklet. Referring to the concept of *health literacy* proposed by Nutbeam (2000), individuals with higher education levels generally have better health literacy, making it easier to understand and apply medical information. In this study, the infographic booklet as an educational medium was better understood by the group with higher education than those with lower education. However, even with a high level of education, understanding and experience of hypertension in pregnancy can still vary, so repeated and comprehensive education is still needed.

Most respondents were in their second trimester of pregnancy (14-27 weeks), with a percentage reaching 87.1%. This condition indicates that the implementation of educational interventions is at the optimal time, considering that the second trimester is a phase where pregnant women are more physically stable and more ready to receive information than the first or third trimester. In the first trimester, symptoms such as nausea and vomiting can inhibit the mother's ability to absorb information. Meanwhile, in the third trimester, the mother's focus is more on labour preparation, so the effectiveness of receiving education may decrease.

The distribution of respondents' parity showed that 47.1% were mothers who were experiencing their first pregnancy (primiparous), while 52.9% were in the multiparous category. First pregnancy (primiparous) is a stage filled with various changes, both physically, emotionally, and psychologically for a mother. Lack of experience makes pregnant women in this group tend to feel anxious and have limitations in understanding aspects of pregnancy, including the potential risk of hypertension during pregnancy. Therefore, effective education is needed to improve mothers' understanding and readiness to face various possibilities during pregnancy.

One educational approach that can be applied is the use of infographic-based booklets. Infographics combine visual elements with information presented in a concise and clear manner, making it easier to understand, especially for primiparous mothers who are still in the early stages of understanding pregnancy. Based on the theory *Health Literacy* proposed by Nutbeam (2000), a person's level of understanding of health information is strongly influenced by the way it is delivered. In this context, infographic booklets are able to simplify complex medical information to be more digestible and visually appealing.

In addition, pregnant women who are experiencing their first pregnancy are generally more active in seeking information to maintain the health of themselves and their foetus. The use of infographic booklets is one of the effective media because it not only presents information systematically, but also increases the absorption and retention of knowledge. Referring to Mayer & Moreno's (2003) research in *Cognitive Theory of Multimedia Learning*, the combination of text with visual elements is proven to improve understanding and memory of the information received. Overall, there is a close relationship between first pregnancy and education using infographic-based booklets. Primiparous mothers need a source of information that is easy to understand and interesting, while infographic booklets offer a suitable method to deliver education on hypertension in pregnancy. Therefore, this approach may help to increase the awareness, understanding, and readiness of mothers to better cope with the pregnancy process. Although multiparous women who have had previous pregnancies already have some understanding of hypertension in pregnancy, they still need additional education to improve their understanding of risk factors and effective preventive measures. According to Rosen et al. (2019) in *Maternal-Fetal Medicine*, the second trimester is a phase where the physical and psychological conditions of pregnant women tend to be more stable.

Table 2 reveals a significant increase in the knowledge of pregnant women regarding hypertension in pregnancy after they received the infographic-based booklet. The increase was especially evident in the group of mothers who previously had insufficient knowledge. The researcher's assumption is due to the effective delivery of information through infographics, which are more easily understood by many people. Infographics allow for faster comprehension as they combine text and images, making information easier to understand and remember. The change in knowledge level that only reached the moderate category after the intervention can be influenced by several factors. First, the limited time in receiving and understanding the material from the booklet can cause pregnant women to not fully master the information conveyed. Second, low level of education and background knowledge can affect the speed of understanding of medical concepts, including hypertension in pregnancy. Thirdly, lack of experience or previous exposure to health information may mean that pregnant women need more time and additional education sessions to improve their understanding. Therefore, repeated educational interventions are needed to ensure that the information can be absorbed more optimally.

Research by (Putri et al., 2024) reported that infographic media can significantly increase the average knowledge of pregnant women. In line with research conducted by (Ambarawati et al., 2022) reported that there was an effect of infographic education on nutrition on the knowledge of pregnant women in preventing LBW births. This is evidenced by looking at the results of the pre and post test that has been done. Before being given education, the knowledge of pregnant women was 17 respondents in the moderate category, 11 respondents in the good category and 9 respondents in the poor category. Meanwhile, after being given education as many as 35 people were in the good category, and 2 people were in the poor category of knowledge about nutrition to prevent LBW birth. In addition, the reduction in the number of respondents with poor knowledge indicates that this intervention was successful in reducing ignorance about hypertension in pregnancy among pregnant women. This also indicates the success of counselling methods using visual media, such as infographics, in

improving people's understanding of the importance of medical knowledge during pregnancy.

Based on table 3, the average value at the pretest value of 42.237 < posttest 62.333, it can be interpreted that there is an average difference in the intervention results between the pretest and post test results with a difference value of 20.0959. From the table above, it is known that the sig. value is 0.000 <0.05, it can be concluded that there is an average difference between the pretest and post test intervention results, which means that there is an effect of infographic booklet media on increasing maternal knowledge about hypertension in pregnancy.

Health education for pregnant women is very important to improve the knowledge of pregnant women. Good knowledge is a factor that will determine the health status of pregnant women. Health education is an effort to change human behaviour through an educational approach (Yulianingsih et al., 2023) . Providing knowledge and socialization to the community can be more easily understood with media support. Various types of media that can be utilized include electronic media such as radio and television, and print media such as booklets, infographics, leaflets, flip charts, comics, and others (Hanye et al., 2023; Rahma Kusuma Dewi et al., 2022) . In this study, activities to improve the knowledge of pregnant women by utilizing media, namely infographic booklet media. According to (Mc Sween-Cadieux et al., 2021) infographics are visual communication media that can combine graphics and information. Infographic media is designed to provide information, attract readers' attention, conclude, and take actions relevant to its content (Bradshaw & Porter, 2017) .

Based on research (Umaroh et al., 2023) , that Infographic media has aesthetic value and visual work according to the information to be conveyed so that readers can enjoy it. Infographic media, which consists of animation or video, can provide a form of information that is interesting, effective, and easily accepted by students. In line with research (Umaroh et al., 2023) , that the use of infographic media becomes more interesting, easier to understand, and has unique characteristics in conveying information based on facts in the desired format. According to another theory put forward by Susilowati (2016), health promotion cannot be separated from the media because the message is conveyed through media such as books, which makes the message more interesting and easy to understand, so that targets can learn the message until they understand it and then make a decision to adopt it into positive behaviour. Based on the above theory, it can be concluded that infographic-based booklet media as health promotion media has the ability to influence people to adopt the behaviour of pregnant women.

Research conducted by Setyowati and Wahyuni (2019) is in line with the findings of this study where the research findings show the effect of health education on systolic and diastolic blood pressure with a p value <0.05. Another study conducted by Sumah (2019) found that there was a significant difference between pre- and post-health education interventions on systolic and diastolic blood pressure, with a p value of 0.000.

The researcher assumed that conducting health promotion through infographic-based booklet media could increase pregnant women's knowledge about pregnancy hypertension, including risk factors, complications, and how to prevent it. This health promotion can help pregnant women who have hypertension control their blood pressure by giving them anti-hypertensive drugs regularly, avoiding foods and drinks that are not recommended, exercising lightly, and Thus, this study can indirectly encourage respondents to behave healthily, which can help control the blood pressure of pregnant women.

4. CONCLUSION

Infographic-based booklet media has an effect on increasing maternal knowledge about hypertension in pregnancy with a sig. value of 0.000 <0.05**,** so that infographic-based booklet media can be used as an educational medium in increasing pregnant women's about preventing hypertension in pregnancy.knowledge

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