Jurnal Info Kesehatan
Vol. 20, No. 2, December 2022, pp. 214-221
P-ISSN 0216-504X, E-ISSN 2620-536X
DOI: *10.31965/infokes.Vol20Iss2.874*
Journal homepage:*http://jurnal.poltekeskupang.ac.id/index.php/infokes*

RESEARCH **Open Access**

Utilizing Go-Yoga Smartphone Application to Prevent Preeclampsia in Pregnant Women

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Received: 8 August 2022 Revised: 11 December 2022 Accepted: 23 December 2022

Abstract
After bleeding, hypertension is the second leading cause of maternal death. Hypertension is caused by a combination of factors, including increased stress and a low level of albumin. All of these changes will cause complications and necessitate long-term medication therapy. As a result, complementary therapies such as family roles and yoga are required. Many people are unfamiliar with yoga movements, so this study provides innovation by incorporating yoga into a smartphone application. The objective of the study is to determine the differences in the implementation of the Go-Yoga smartphone application and the role of the family in pregnant women in the III trimester on blood pressure and albumin levels. This type of research is quasi-experimental involving 60 pregnant women in the third trimester. In Group I, 20 pregnant women practiced yoga with books; in Group II, 20 pregnant women exercised yoga with the Go-Yoga app without their families; and in Group III, 20 pregnant women practiced yoga with their families. The study's results revealed significant blood pressure, with the third group having the highest average (p = 0.000 1). Pregnant women who utilize the Go-Yoga app with their families have lower blood pressure than other groups. Furthermore, pregnant women who employ the Go-Yoga app with their families have higher albumin levels than other groups. Therefore, this study suggests employing the Go-Yoga application with the family prevents hypertension in pregnancy.

Keywords: Go-Yoga Application, Supportive Therapies, Hypertension.

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1. INTRODUCTION

Prevalence of hypertension continues to increase from 972 million people with hypertension, 333 million are in developed countries, and the remaining 639 are in developing countries, incorporating Indonesia (Bektas et al., 2020). In Indonesia, hypertension during pregnancy is the second leading cause of maternal death after miscarriage. In Gorontalo Province, after bleeding, hypertension is the second leading cause of maternal mortality after diabetes.

Pregnancy hypertension is caused by physical, psychological, and biochemical changes. The changes that occur determine the growth and development of the fetus. Pregnant women in their third trimester will be at risk of albumin deficiency. Pregnant women with low albumin levels possess a higher risk of developing preeclampsia, seizures, and high blood pressure due to fluid accumulation in the tissues, such as oedema (Fox et al., 2020).

Increased protein intake and drug administration can be employed to increase albumin in pregnant women, but this method necessitates a long time, so a more effective solution is required (Hopkins et al., 2021). To prevent hypertension, supportive therapies such as yoga by also involving family are tremendously needed. Numerous yoga people do not understand the movement; thus, innovation is also necessitated to overcome this problem.

Smartphones are evident to enhance the quality of health services (Burgess et al., 2020). Hence, the solution offered is by developing a smartphone application containing yoga movements to make it easier for pregnant women to perform yoga. This smartphone application also allows pregnant women to perform yoga in pairs with their families. Research on the role of the family has also been conducted, and the results of Skor anxiety in pregnant women giving birth accompanied by a family are lower than in pregnant women giving birth alone. As a result, researchers are interested in developing a smartphone app that incorporates a modification of yoga movements in the form of an android app that allows pregnant women to perform yoga with their families while still paying attention to the objective of each movement supported by timing and information in English, Indonesian, and Gorontalo language (Burton et al., 2020).

This study is to develop practical innovations to enhance the role of families in preventing hypertension in pregnant women by employing smartphone-based applications. Furthermore, the objective of this study is also to identify the characteristics of pregnant women which affect albumin levels and blood pressure, to discover the differences in the implementation of the Go-Yoga application to the albumin levels of pregnant women in the III trimester and to unveil the differences in the implementation of yoga applications to the blood pressure of pregnant women in the III trimester.

2. RESEARCH METHOD

This type of research is quasi-experimental involving 60 pregnant women in the third trimester. This study possessed three groups: I, II and III. Each group comprises of 20 pregnant women. Group I performed yoga by employing books, group II practiced yoga by utilizing the Go-Yoga app without a family, and group III did yoga by employing the Go-Yoga app with the family. Pregnant women administered in the study following the inclusion criteria had given birth once, had a single pregnancy and owned a smartphone and exclusion criteria experienced an emergency. In this study, the free variables were smartphone-based Go-Yoga apps with the role of the family and the variables connected to blood pressure and albumin levels. From February 2021 to November 2021, this study was conducted at the Tapa and South Bulango Health Centers. Before and after utilizing go-yoga application, blood pressure was measured with a sphygmomanometer and albumin levels were evaluated with bromocresol green (BCG).

The sample in this study comprises of several trimester pregnant women who fulfilled the inclusion and exclusion criteria of 60 pregnant women. Respondents 1-20 were performed into group I conducting yoga by administering books, numbers 21-40 were created into group II by employing the Go-Yoga application without a family and numbers 41 to 60 utilizing the Go-Yoga application with a family. Pregnant women practiced the yoga 3 times a week until 1 month.

Smartphone development was conducted by creating yoga movements in the form of an android application to make it more convenient for pregnant women to follow along with timings and information in English, Indonesian, and Gorontalo language. The family's role is a supportive therapy in the context of utilizing applications in pairs with pregnant women. Hypertension was discovered by administering albumin and blood pressure indicators. Albumin is a type of protein discovered in blood. How to measure albumin with bromocresol green (BCG), with results expressed in grams per deciliter (g / dL) and average values in pregnant women in the third trimester ranging from 2.3 to 4.2 g/dL. Meanwhile, a sphygmomanometer with mmHg units and a common value of < 139 mmHg is being administered to measure blood pressure.

The descriptive analysis encompasses the characteristics of respondents by observing the minimum, maximum and mean. The data obtained was first conducted by administering a normality test using the Kolmogorov Smirnov test for blood pressure and albumin levels. One Way Anova was employed to analyze the data. This study has obtained ethical clearance with number LB.01.01/KEPK/66/2021..

3. RESULTS AND DISCUSSION

Table 1. Respondent Characteristics (n=60)

Characteristics	**Frequency Distribution**		**p-value**
	Number	**Percentage**	
Age			0,002
Healthy Reproduction (20-35)	53	88	
High Risk (<20/>35)	7	12	
Body Mass Index			0,001
Not Normal (<18,5 or >22,9)	12	21	
Normal (18,5-22,9)	48	79	

Table 1 demonstrates that the homogeneity test displayed no significant difference in the control and intervention groups (p > 0.05).

Table 2. Albumin Levels (n=60).

Group	**Data Analysis**			
	Min	**Max**	**Mean**	**p-value**
Group 1	2	3	2,14	0,0001
Group 2	2	4	2,65	
Group 3	3	6	4,35	

Table 2 presents that the main findings of this study discovered significant albumin levels, and the third group revealed the highest average (p = 0.000 1).

Table 3. Blood Pressure (n=60).

Blood Pressure	Data Analysis			
	Min	**Max**	**Mean**	**p-value**
Group 1	120	160	139,95	0,0001
Group 2	110	140	130,50	
Group 3	110	120	117,00	

Table 3 demonstrates that the main findings of this study uncovered significant blood pressure, and the third group revealed the highest average (p = 0.0001).

Based on table 1, it is identified that the majority of maternal age in the study possessed a normal category (20 years to 35 years) as much as 88% and another 12% of the pregnant women's generation owned a high-risk category (less than 20 years and more than 35 years).

The prevalence of hypertension occurs 29% at the age of 25-44 years, at the age of 45-64 years by 51%, and at the age of >65 years by 65%. At the age of 60-64 years, compared to the age of 55-59 years, an increased risk of hypertension occurred by 2.18 times, 65-69 years by 2.45 times and age > 70 years by 2.97 times (Itoh & Tanaka, 2022). In addition to being related to maternal age hypertension, it is also associated with albumin levels. Pregnant women over 35 years of age will have lower albumin levels and experience an almost double increased risk of hypertension in primiparous and multipara (Ding et al., 2021). Moreover, young people less than 19 years old can also escalate the risk of low albumin levels (Deng et al., 2021).

Based on table 2, it is discovered that the majority of maternal body mass indexes in the study possessed a normal category (18.5 to 22.9), as much as 79% and another 21% of pregnant women owned an abnormal body mass index category (less 18.5 and more than 22.9). Every one unit of increase in body mass index escalates systolic blood pressure by 0.72 in women. The value between body mass index and blood pressure possesses a positive correlation. Although hypertension is not yet identified with certainty, the factors which frequently cause hypertension encompass heredity, individual characteristics and life habits (Wildman et al., 2022). Life habits generally affect hypertension, one of which is obesity or overeating (Kane et al., 2012). Although the mechanism of how obesity affects hypertension is not yet apparent, it has been evident that weight loss can lower blood pressure (Xiong et al., 2022). A high-calorie diet, fatty, smoking and drinking alcohol are one of the behaviors causing several diseases, encompassing hypertension (Parashar et al., 2022). The factors which cause blood pressure incorporate dietary factors and weight factors (Herrera et al., 2020). People with obesity may possess high blood pressure as arterial or venous blood vessels are most likely filled with fat, causing blood pressure to enhance. Furthermore, nutritional status as health indicator also becomes a factor affecting albumin levels (Roesmono et al., 2017). Pregnant women with low albumin levels were also incorporated in the high-risk group as in pregnant women experiencing eclampsia, laboratory results with low albumin levels were also revealed, hence, pregnant women with lower albumin levels presented a higher prevalence of increasing mortality rates than pregnant women with normal albumin levels (Tumas et al., 2022). Pregnant women with low albumin levels are a significant problem, but if the management is not good, it may possess a direct effect on the occurrence of the fetus.

Based on table 3 above, it can be perceived that there is a difference in the implementation of the Go-Yoga smartphone application against albumin, which demonstrates a p-value more minor than the alpha value (0.0001< 0.05), then H0 is rejected. Utilizing Go-Yoga applications and family roles can produce albumin levels higher than in other groups.

Albumin is a protein present in human blood. The proteins created by this liver organ regulate osmotic pressure in the blood (Thomas et al., 2021). The amount of albumin in the blood has to be balanced so as not to affect the fluid in the blood to spread to other parts of the

body (Rafie et al., 2022). Moreover, albumin also plays a significant role in transporting nutrients in the body and can repair the damage to cell tissue (Sukesi, 2020). Albumin possesses an essential role in maintaining the health and balance of fluids in the body (Yaping et al., 2020). Hence, it is necessary to assure that the body owns sufficient albumin levels. Pregnant women with low albumin levels possess higher risk in developing preeclampsia (Yamada et al., 2018), seizures, high blood pressure, and fluid accumulation in the tissues, aka oedema. If the albumin is low, the nutrients are not able to be perfectly conducted (Wardoyo et al., 2021). Less albumin can also cause damage to nerve cells in the brain. Other conditions such as fatigue, anxiety, and lack of energy until premature ageing are also affected by low intake of albumin (Metri et al., 2021). The paucity of albumin levels in the blood is typical as the supply of amino acids is inadequate, affecting suboptimal protein absorption (Vlachopoylou et al., 2021). The average level of this protein in the blood is as much as 3.4 - 5.4 liters (Cagnacci et al., 2022). Pregnant women should also routinely perform regular health and gynecological check-ups (Chikowore et al., 2021).

Based on table 3 above, it can be revealed that there is a difference in the implementation of the Go-Yoga smartphone application on blood pressure, which illustrates a p-value more minor than the alpha value (0.0001< 0.05), then H0 is rejected. The utilization of the Go-Yoga app and the role of the family affects blood pressure lower than in other groups.

The Go-Yoga application is able to suppress the performance of the sympathetic nervous system, creating impediments to the adrenal medulla stimulus to secrete catecholamines (epinephrine and norepinephrine). Every minute, the decrease in catecholamines causes vasodilation of the blood vessels of the kidneys and nearly the entire visceral organ, lowering blood pressure and facilitating blood distribution (Chakhtoura et al., 2019). The Go-Yoga app can also assist in lowering blood pressure and oxidative stress. Since the movements in the Go-Yoga application are simple, it is secure and simple for pregnant women to use. The Go-Yoga application can increase blood flow, enhance the supply of oxygen and nutrients, and strengthen the respiratory muscles and heart, resulting in a decrease in systole blood pressure. Breathing exercises with the Go-Yoga app can improve lung capacity and strengthen the heart muscle.

Family support is a behavior performed by the family in the form of emotional support, appreciation/judgment, and informational and instrumental (Cox, 2018). The family is a safe and peaceful place to help people fulfilled physical and psychological necessities and provide social support in which they come from the family (Freedman, 2016). Health problems experienced by one of the family members may influence the rest of the family and the entire system. The family is a vital support system in maintaining health. Furthermore, family members who work in the health sector must be able to recognize health issues and make decisions. To overcome health issues, families must modify their environment in order to remain healthy and optimal, and they have to take advantage of the health facilities that are available in their area (Hammadi et al., 2021).

Families who care about their members will pay attention to feeding, invite exercise together, and accompany and remind them to check their blood pressure on a regular basis. The assistance provided demonstrates the family's attention and care in order to increase motivation. Attempts to prevent hypertension in pregnant women by increasing family support and working together to control blood pressure should be implemented. It is because the better the family support, the better the efforts to control blood pressure, hence, hypertension can be prevented. Family support can be the best preventive strategy for assisting family members in maintaining and enhancing their health (Perriman & Davis, 2018). A happy family possesses a positive impact. Emotional support, reward support, information support, and family instrumental support all play a significant role in hypertension control. The presence of family support provides strength and encourage a sense of mutual belonging in meeting needs (Thomas et al.,

2021). Family emotional support influences a person's feelings and motivations. The better the family support, the more preventable hypertension will be. It should also be understood that families possess a power structure that allows them to change health-promoting behaviors. Thus, researchers assume that family support is good, but hypertension cannot be prevented as motivation is still lacking, and family support is not satisfactory, but hypertension can be prevented since the patient is motivated and concerned about his condition.

4. CONCLUSION

Utilizing Go-Yoga applications and family roles can affect albumin levels more than other groups. Moreover, by employing Go-Yoga application with the family can prevent hypertension in pregnancy if completed three times per week for one month. The utilization of the Go-Yoga app and being a part of a family can result in lower blood pressure than in other groups. To prevent hypertension in pregnant women, midwives are expected to be able to implement the Go-Yoga application and increase the role of the family in providing care. Furthermore, for pregnant women, I hope to be able to utilize the Go-Yoga app and apply it at home to make childbirth easier for pregnant women and to manage hospital can be an issue as evidence based practice.

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