Effect of Papaya Juice on Constipation in Pregnant Women: Quasi-Experimental Study

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ABSTRACT

Constipation is a condition often found in pregnant women that has an impact on physical, psychological, and social disorders such as discomfort, hemorrhoids, disturbed body image, and decreased quality of life. Papaya is highly recommended for pregnant women as a non-pharmacological therapy to treat constipation. The aim of the research was to determine the effect of papaya juice on constipation in pregnant women. Method: This type of quantitative research is a pretest-posttest quasi-experimental design. In the intervention group, 35 pregnant women received papaya juice therapy, while 35 pregnant women in the control group received therapy by drinking warm water. Bivariate analysis with an independent T test and a paired T test The results showed that there was a significant difference in the mean posttest constipation score between the intervention group and the control group (p = 0.001), the average pretest and posttest constipation score in the intervention group (p<0.001), and the average pretest and posttest constipation score in the control group (p<0.001). The decrease in the average constipation score of pregnant women in the intervention group after being given papaya juice was 0.2 (5.71%) lower than the average constipation score of pregnant women in the control group after being given warm water, which was 0.62 (17.14%). Conclusion: Papaya juice is efficacious in reducing symptoms of constipation in pregnant women. Midwives are expected to provide health education on how to prevent constipation by consuming more fruit and vegetables and doing enough activity during pregnancy

Keywords: *constipation; papaya; pregnant woman*

INTRODUCTION

Constipation is a common gastrointestinal problem experienced by pregnant women. Constipation refers to difficulty and decreased frequency of bowel movements which can be characterized by discomfort, excessive straining, hard or lumpy stools, and a sensation of incomplete bowel movements (Shin, et al, 2015). The prevalence of constipation in Indonesia is 12.9% lower compared to China and South Korea (15.2% and 16.7% respectively). In

addition, the prevalence of constipation in Indonesia in women is higher (15.1%) compared to men (10.7%). The results of studies in several countries, the prevalence of constipation is not related to geographical location and culture (Wald et.al, 2010). It is estimated that 11-38% of pregnant women have experienced constipation (Trottier M, Erebara A, 2012). Pregnant women in the first two trimesters are prone to constipation, with the prevalence ranging between 35% and 39%, 21% in pregnant women in the second trimester and 17% in pregnant women in the third trimester (Meti Patimah, 2020) The prevalence rate of functional constipation in pregnant women is significantly higher than the general population (Shi et al., 2015).

During pregnancy, there are changes in hormone levels such as progesterone which is responsible for reducing the peristaltic movements of smooth muscles. In addition, increased circulating estrogen and progesterone levels during pregnancy initiate activation of the renin-angiotensin system and result in more water absorption. Reduced water levels in the stool result in hardened stools and cause constipation. Constipation in all trimesters of pregnancy part big marked with consistency feces hard and straining strong on more from one time in four times defecation during four week (Retno et al., 2022).

Constipation in pregnancy has an impact on physical, psychological and social health, including discomfort, negative body image perception, psychological disorders such as frustration and bad mood, decreased quality of life, and even increased risk of hemorrhoids (Johnson, P., Mount, K. and Graziano, 2014). In addition, pregnant women with constipation have a higher risk of undergoing cesarean section, delayed first bowel movement after delivery, and postpartum hemorrhoids compared to those who do not experience constipation (Shin et al, 2014).

C. papaya L. belongs to the family Caricaceae and is commonly known as papaya , pawpaw, and kates. It is a perennial horticultural shrub native to Central Mesoamerica, Central America, and southern Mexico (Nandini et al., 2021; Yap et al., 2020) and is mainly cultivated in tropical and subtropical regions of Brazil, Australia, Malaysia, China, India, Thailand, Myanmar, Philippines, and adjacent others (Husin et al., 2019) . Papaya is not only cultivated for its ripe sweet fruits, even other parts of the plant such as seeds, leaves, roots, flowers, bark, and latex have been traditionally used worldwide for the preparation of various medicinal formulations (Vij & Prashar, 2015; Singh et al., 2020).

Non-pharmacological methods that can be used to relieve constipation include increasing fluid intake, consuming high-fiber foods such as papaya, exercising regularly, defecating, and stopping the consumption of drugs that cause constipation. Pharmacologically, constipation can be treated with laxatives and prokinetic agents. While secondary constipation must treat the underlying cause that causes constipation. In some cases of severe chronic constipation, where the methods described above do not help, surgery is performed.

Research at the Rumbai Pesisir Health Center, Pekanbaru, found an influence between pretest and posttest on constipation in pregnant women with papaya consumption (Ardhiyanti, 2017) . Likewise, there is a significant difference between before and after consuming baby food regarding the occurrence of constipation in the RT.002 RW.006 Parigi Lama Pondok Aren-South Tangerang area (Dewi Anggraini, 2020).

Papaya is highly recommended for constipation sufferers because of its high dietary fiber content. Papaya juice can be consumed as much as 250ml per day because consuming papaya is very good for health (Sulihandari, 2013). Papaya juice is one of the best non-pharmacological therapies for treating constipation in pregnant women. Most previous studies have addressed constipation in pregnant

women in general and the factors that cause it. However, this study highlights the consumption of papaya juice as a non-pharmacological therapy to overcome constipation in pregnant women.

OBJECTIVE

The purpose of this study was to determine the effect of consuming papaya juice on constipation in pregnant women.

METHOD

This study used a quasi-experimental Pretest and Posttest Control Group Design. The population of this study were all pregnant women with constipation. population of all pregnant women who came to the Bojonegoro health center with constipation. The sampling technique used was convenience sampling and 35 pregnant women were recruited in the intervention group from health centers in Bojonegara Pulo Ampel, Serang City and 35 pregnant women were recruited in the control group at independent midwife practices. Although the intervention and control locations were different, both health facilities were located within Serang Regency and served pregnant women with similar characteristics. The separation of locations was intended to minimize contamination of the intervention.The inclusion criteria were pregnant women with constipation in the first, second, and third trimesters and the exclusion criteria were pregnant women with hemorrhoids and pregnant women who consumed laxatives. Pregnant women who have a history of allergies to papaya or its derivatives. Initial screening was done through an interview regarding allergy history, and participants were given informed consent explaining the risks. In addition, close observation was done after the first juice administration to ensure participant safety.

Constipation assessment was carried out according to the Rome II criteria including: 1) hard straining more than once in four bowel movements; 2) hard stool consistency more than once in four bowel movements; 3) sensation of incomplete stool excretion more than once in four bowel movements; 4) sensation of blockage or obstruction more than once in four bowel movements; 5) there was manual action more than once in four bowel movements; 6) frequency of bowel movements less than three times a week; and 7) bowel movements without liquid stool and did not meet the criteria for irritable bowel syndrome. If the complaint was felt for four weeks or one month and met two or more criteria, then it could be identified that the person had constipation. The tools and materials used in the intervention group of papaya L carica juice therapy were: 250 grams of papaya fruit and 100 ml of drinking water, food scales, basins, measuring cups, blenders and drinking glasses, pens and paper. In the intervention group, papaya juice therapy was given once in the morning before breakfast for 14 consecutive days. Papaya juice is made all at once and then stored in the refrigerator. Meanwhile, the control group was given warm water in the morning at around 4:30 am, that is, before the subjects consumed any food, for 14 consecutive days. Data collection was conducted from September to November 2022. Make sure all data is filled in, such as participant identity, pretest, posttest, and group scores (intervention or control). Participants who should not be included in the inclusion criteria, such as pregnant women without constipation, pregnant women with hemorrhoids, or those taking laxatives. Make sure that participants who are in the intervention or control group are not confused. Data from participants who did not meet the inclusion criteria (such as not being in the first to third trimester, or not constipated) were removed. Data on participants who included exclusion criteria, such as those who had a history of hemorrhoids or used laxatives, were removed. Use statistical methods (e.g., boxplot) to detect values that are too extreme, such as pretest/posttest scores that don't fit a logical or realistic range. If there is significant data loss, use data imputation

methods such as group mean or median to populate the data. If too much data is missing on a single subject, consider excluding the subject. In the study we got 1) Respondent Characteristics: Group distribution: Intervention group: 35 pregnant women, Control group: 35 pregnant women, Demographic characteristics: Average age, distribution of the third trimester of pregnancy, and other characteristics (e.g., education level or parity). There was no significant difference between the intervention and control groups (homogeneity test).2) Constipation Score: Before the intervention (Pretest): Mean constipation score in the intervention group, Average constipation score in the control group, Statistical tests (e.g., t-test or Mann-Whitney) showed that the two groups had no significant difference in pretest scores, indicating initial homogeneity. After the intervention (Posttest): Average constipation score in the intervention group: Average constipation score in the control group, The decrease in constipation score was greater in the intervention group than in the control group (mean difference test). 3) Change in Constipation Score (Effect of Intervention) Intervention group: Average decrease in constipation score. Papaya juice showed a significant reduction in the level of constipation (paired t-test or Wilcoxon test). Control group: Mean change in constipation score: Insignificant change in constipation severity. Comparison of changes between groups: The decrease in scores in the intervention group was greater than in the control group (independent t or Mann-Whitney test).4). Effectiveness Analysis**:** Papaya juice had a significant effect in reducing the level of constipation in pregnant women compared to the control group (p < value 0.05).

Univariate analysis has also been carried out to test the normality of the data in order to see whether the data in the normally distributed study is normal or not using the Shapiro Wilk test, so that it can determine the next test, namely if the normally distributed data is used the dependent t test and the independent t test, if the distribution is abnormally used the Wilcoxon test and the Mann Whitney test.

The stages of bivariate analysis that have been carried out are as follows: 1) Carry out a homogeneity test to see and analyze the differences in the characteristics of subjects in the two groups homogeneous or not so that it is worthy of comparison. The homogeneity test on the characteristics of the respondents in this study used the Levene test. 2) In this study, the researcher obtained several sample data from both groups, namely as follows: a) Pretest the constipation score of the intervention group. b) Posttest of the intervention group's constipation score. c) Pretest the control group's constipation score. d) Posttest of the control group's constipation score. g) Difference between pretest and posttest knowledge of the intervention group. h) The difference between the pretest and posttest constipation scores of the control group. i) The difference in posttest scores of the intervention group and the control group. 3) Bivariate analysis used paired parametric t-test for normal-distributed numerical scale data (p>0.05 value) in the same group (pretest and posttest). In the data were not normally distributed (p0.05 value) in different groups (intervention and control). In the data is not normally distributed (p<0.05 value)

The ethical clearance was approved from the Faculty of Nursing and Midwifery, Binawan University No. 067/PE/FKK-KEPK/XI/2022. After the data was collected, statistical analysis used the independent t-test and Paired T-test

RESULT

Target Population: Pregnant women who experience constipation during pregnancy. Location: Intervention group: Health Center in Bojonegara, Pulo Ampel, Serang City. Control group: Independent midwife practice. Sample Size Total number: 70 pregnant women, divided into: Intervention Group: 35 pregnant women who received papaya juice as an

intervention. Control Group: 35 pregnant women who drank warm water. Sampling Method Technique: Convenience Sampling. Respondents were recruited based on the availability and ease of access at the research site. Pros: Makes it easy to recruit in a limited time. Disadvantages: Potentially under-representative of the wider population because it does not use random sampling techniques. Rationale for Study Population: Pregnant women were selected because constipation is a common complaint during pregnancy due to hormonal and physiological changes. This study targets this population to evaluate the effectiveness of papaya juice as a potential, safe, and easily accessible natural solution for pregnant women experiencing constipation.

The characteristics of respondents are described in Table1. As can be seen, in the intervention group who consumed papaya juice where the majority of 45.7% of respondents were aged 20-35 years, 68.6% of whom were multiparous, and 45.7% of whom were in the second trimester of pregnancy. While the characteristics of respondents in the control group consisted of 57.1% of respondents aged 20-35 years, 60% of whom were multiparous, and 45.7% of whom were in the third trimester of pregnancy. Based on the constipation assessment in the intervention group, it consisted of 25.7% with severe constipation, 51.4% with moderate constipation and 22.9% with mild constipation. Meanwhile, in the control group 8.6% of respondents experienced severe constipation, 40% experienced moderate constipation and 51.4% experienced mild constipation.

Based on the comparative analysis of the homogeneity test of the two groups, it can be seen that the variance of the two groups is equivalent or homogeneous, in terms of age, parity, and gestational age with a p value of > 0.005. The two groups of research subjects did not show significant differences so they are worthy of being compared.

Table 2 shows that the average pretest constipation score between the intervention group and the control group (p = 0.359), and the average pretest and posttest constipation scores in the control group (p = 0.001) there is a significant difference because the p value is <0.05. There is a significant difference in the average posttest constipation score between the intervention group and the control group (p = 0.001), it is known that the decrease in the average constipation score of pregnant women in the intervention group after being given papaya juice by 0.2 (5.71%) is lower than the difference in the average constipation score of pregnant women in the control group regarding the provision of warm water of 0.62 (17.14%).

DISCUSSION

Constipation can be caused by internal factors of pregnant women that occur due to increased progesterone which causes intestinal peristalsis to slow down (Verghese, et al., 2015). Another impact of increased progesterone is decreased intestinal opening due to relaxation of smooth muscles and increased absorption from the large intestine. The hormone progesterone works by relaxing smooth muscles so that the uterus is in a calm condition and premature uterine contractions can be prevented. Increased progesterone hormone affects the function of the anal sphincter and reduces gastric and intestinal motility so that gastric emptying time becomes longer. In addition, the compressive effect of the uterus expanding with fetal growth causes mechanical intestinal obstruction (Wald et al., 2015). Preventive measures that can be taken are to consume high-fiber foods such as papaya and drink lots of water, especially when the stomach is full. Consuming papaya when the stomach feels full can stimulate intestinal peristalsis. no constipation (Shin et al, 2015).

We conclude from these results, that papaya preparation (Caricol) contributes to the maintenance of gastrointestinal physiology. It improves various functional disorders, such as IBS symptoms. The

mechanisms of this support of gastrointestinal physiology are discussed (Muss et al., 2013)

The results of the study showed that there was a significant effect of papaya juice therapy in reducing constipation symptoms in the intervention group. The results of this study are similar to the study conducted by (Dharmayanti, 2019) which showed that papaya fruit was proven to be able to overcome constipation significantly. Likewise, a study conducted by (Muss et al., 2013) showed that papaya carica L contributed to maintaining the physiology of the digestive tract so that it could overcome constipation problems. Papaya juice therapy has been carried out by midwifery care for normal pregnancies in the third trimester in Karang Anyar Village, Langsa Baro District, Langsa City to reduce constipation symptoms .

Meanwhile, the results of the study in the control group showed that there was a significant difference in the constipation assessment scores before and after drinking warm water. These results are supported by research conducted by Soputri et al., (2021) where drinking 500 ml of warm water (450C) in the morning before breakfast can significantly overcome constipation problems. The number of pregnant women with constipation who were given warm water therapy successfully defecated and increased from the first, second and third days. Additional warm water intake can be used as an alternative therapy in overcoming constipation, especially when consumed regularly (Trottier and Erebara, 2012). Likewise, consuming warm water before consuming any food in the morning when you just wake up is very useful for facilitating the digestive system including treating constipation (Johnson et al., 2014). Several natural methods can be used to overcome constipation, including increasing fiber consumption and drinking water (Shi et al., 2015). Fruit intake may have potential symptom relief in FC because evidence suggests that they can affect stool consistency, stool frequency, and gut microbiota. (Huo et al., 2022). In addition to papaya fruit, F. carica fruit paste may have beneficial effects on subjects suffering from constipation (Baek et al., 2016).

CONCLUSION

The study showed that papaya juice has an effect on reducing constipation symptoms in pregnant women lower than the average constipation difference than drinking warm water. Constipation often occurs in pregnant women, therefore pregnant women should consume papaya juice intake and drink warm water regularly. The limitations of this study were due to the minimum sample with a non-probability sampling method. Future studies can be conducted with larger samples and randomized control trial methods in order to generalize.

The strength of this study is that papaya juice is a natural and safe alternative to drugs for pregnant women, so that it is in accordance with the needs of the population. The effectiveness of papaya juice can be measured through changes in bowel frequency, comfort level, or other parameters, resulting in objective data.

Weaknesses of this study Variables such as diet, physical activity, fluid intake, and other medical conditions are difficult to control strictly, which can affect the results. The effects of papaya juice may take longer to be seen, so the duration of the study is too short to affect the validity of the results**.**

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Table 1. Distribution of sociodemographic characteristics

No	Characteristic	Group				P value*
		Intervention n = 35		Control n = 35		
		n = 35	%	n = 35	%	
1	Age					
	<20	5	14.3	5	14.3	
	20 -35	16	45.7	20	57.1	1.000
	>35	14	40	10	28.6	
2	Parity					1.000
	Primipara	11	31.4	14	40	
	Multipara	24	68.6	21	60	
3	Gestational Age					0.054
	First trimester	5	14.3	14	40	
	Second trimester	17	45.7	5	14.3	
	Third trimester	11	40.0	16	45.7	
4	Constipated					
	Mild	8	22.9	18	51.4	
	Moderate	18	51.4	14	40	
	Severe	9	25.7	3	8.6	
	Total	**35**	**100.0**	**35**	**100.0**	

Note: *p value* with Levene Test

Table 2. Effect of papaya juice on pretest and postest constipation in both groups

Constipation		Group		
		Intervention (n=35)	Control (n=35)	P value
Pretest	*Mean (SD)*	1.57 (0.65)	2.02 (0.70)	0.359*
	Median	1	2	
	Range	2	2	
Posttest	*Mean (SD)*	1.37 (0.54)	1.4(0.49)	0.001*
	Median	1	1	
	Range	2	1	
Nilai p		.001 **	.001**	
Difference (Reduction)	*Mean(SD)*	0.20(0,53)	0.62(0,531)	0.026**
	Median	0.0	-1,0	
	Range	2	3	
% Reduction		5.71%	17.14%	

Notes :*) unpaired t test, **) paired t test ***)