A new strategy to improve maternal-fetal attachment in primigravida women with prenatal spiritual-based stimulation

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Abstract

Primigravida has impacts related to preparedness for the transition into motherhood. Thus, its can disrupt the attachment between the mother and the fetus. This study aimed to determine the effects of prenatal spiritual-based stimulation on maternal-fetal attachment. This study employed a quasi-experimental design with a control group and was conducted among primigravida women in Indonesia. The study included 66 respondents selected through purposive sampling. They were divided into the intervention and control groups, each comprising 33 participants. The intervention group received prenatal spiritual-based stimulations, which involved auditory, kinesthetic, light, and temperature stimulations and were administered over a 12-week period. Data on maternal-fetal attachment were collected using the Prenatal Attachment Inventory (PAI), which had been tested for validity and reliability. Approval to use the instrument was obtained from its original author. Data analysis was performed using the Wilcoxon and Mann Whitney tests. The results showed that the Wilcoxon test yielded a p-value of 0.000 or significant differences were observed before and after intervention for the intervention group and 0.059 no significant differences were observed before and after the intervention for the control group. The Mann Whitney test revealed a p-value of 0.000, there were differences in the maternal-fetal attachment before and after the intervention. Therefore, spiritual-based prenatal stimulation is effective in enhancing maternal-fetal attachment. These results can provide a basis for pregnant women to apply spiritual-based prenatal stimulation interventions to enhance maternal-fetal attachment and health status.

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Introduction

The first pregnancy is a new experience for women, resulting in various consequences in their lives as they prepare for their new role as mothers.[1] The immature psychological and social conditions of mothers are highly susceptible to being influenced by the changes during pregnancy, which can affect the attachment between the mother and her fetus.[2,3] Maternal-fetal attachment is important period, as this is the sensitive period of growth.[4] Since all of the mother's behavior, actions, and thoughts during pregnancy could have more permanent effects on the fetus than any other period of the child's life and pregnancy is considered as a critical period in the development, therefore it is necessary to increase maternal-fetal attachment.[5] Although pregnancy is a source of joy for families, the increasing number of roles and responsibilities can act as stressors that disrupt emotional states and moods.[6]

Emotional disturbances act as stressors for primigravida,[7] affecting their ability to focus.[8] As a result, these mothers often become self-centered, frequently neglecting the pregnancy, fetal development, and the needs of the fetus.[9] Women may experience difficulties in establishing a connection with the fetus and in integrating behaviors to care for their own well-being during the pregnancy period, ultimately impacting the fetus's welfare.[10] This emphasizes that physical and psychological unpreparedness during primigravida pregnancies affects their adaptive capabilities and the attachment between the mother and her fetus. Anxiety that cannot be overcome will result in stress and depression.[11] Therefore, there is a need for social support from family, friends, colleagues, and healthcare providers to assist pregnant women.[12]

The mother's unpreparedness in adapting to her pregnancy was also evident in a previous study in Sleman Regency, Yogyakarta, reporting that only 25.8% of primiparous mothers could achieve their roles with a "good" rating, while the remaining 67.7%

achieved at "satisfactory" or "insufficient" levels. This result shows that the mother's readiness to adapt is not optimal, which reflects that only a small percentage of mothers really care about feeling close to the baby, feelings of anxiety about the state of the mother, and the state of the baby. Furthermore, a study highlighted unpreparedness in the achievement of roles, especially regarding the attachment of mothers to their fetuses (maternal-fetal attachment).[13] The results of research on low maternal-fetal attachment were also reflected in another study in 2018, which highlighted that primigravida mothers had low maternal attachment scores to the fetus.[9,10] Innovations are needed in providing prenatal stimulation interventions by integrating them with spiritual theories. Spirituality is very important in maternal-fetal attachment, as demonstrated in a study conducted in 2020 on spiritual health and maternal-fetal attachment behavior, showing that the higher the spiritual health, the greater the maternal-fetal attachment behavior.[16] Spirituality is the culmination of an individual's spiritual experience with the purpose and meaning of life, thus, when experiencing problems in pregnancy, primigravida women who have good spirituality can interpret this as a life event from a different perspective, so that they have a stronger sense of self-control, which can improve maternal-fetal attachment.[17] Primigravida mothers become more motivated to embrace their pregnancies, grow closer to, and cherish their unborn babies, leading to fetal well-being and a reduction in neonatal mortality. Achieving this goal aligns with the fulfillment of the third Sustainable Development Goal (SDG), which ensures a healthy and prosperous life, with targets that encompass the prevention of neonatal and infant mortality.[18] Thus, by providing prenatal-based stimulation interventions, primigravida mothers become more motivated to welcome the pregnancy, become closer, and love the unborn baby. Accordingly, this study was conducted to examine the effects of spiritually-based prenatal stimulation on enhancing maternal-fetal attachment.

Materials and Methods

Study design

This study employed a quasi-experimental design with a control group. The study was conducted in Semarang, Central Java, Indonesia.

Participants

This study focused on a population of first-time pregnant mothers (primigravida). The samples consisted of 66 individuals who were recruited using purposive sampling and were divided into two groups: the intervention group and the control group. The inclusion criteria were as follows: i) Primigravida women; ii) Gestational age 12-30 weeks; iii) Husband is still alive. The exclusion criteria were as follows: i) Husband does not live in the same house; ii) Has a history of mental disorders.

Instrument

Data collection was conducted using the prenatal attachment invertory questionnaire is a questionnaire from Jonnason in 2004,[19] and Permission to use the questionnaire was obtained from the original author. The questionnaire consisted of 21 questions that reflected five indicators: i) identifying the future baby; ii) touching the prospective baby; iii) joining the movement of the future baby; iv) knowing the habits of the future baby; v) feeling love for the future baby. The questionnaire underwent validity and reliability tests, yielding correlation values ranging from 0.362 to 0.922 and a Cronbach's alpha coefficient of 0.866. The variables were ordinal, with indicators falling into the ranges of 76-100% (good), 55-75% (enough), and lower than 55%.[20]

Intervention

Spiritual-based stimulation intervention is the interventions providing education for the mother and father to the fetus by integrating spiritual values such as reciting prayers for the fetus, listening to the reading of the Qur'an or holy verses for the fetus, listening to religious songs for the fetus, touching and stroking the fetus, giving the fetus a pat or kinesthetic, introducing dark and light-dark stimulations, and introducing hot and cold or temperatur stimulations. Additionally, it involved the incorporation of spiritual practices into the daily activities of the mothers. The intervention was implemented for 12 weeks and actively engaged the mothers, fathers, and the unborn babies.

The overall intervention implementation activities were carried out for 12 weeks based on research conducted by.[21] Which stated that the implementation of assistance to pregnant women was carried out for a minimum of eight weeks. Assistance is carried out using various methods, such as gathering pregnant women in a room to be given treatment in pregnant women's classes, discussions via WhatsApp groups, and home visits. The details of the intervention are as in Table 1.

Data analysis

Descriptive analysis in this study took the form of frequencies, percentages aimed at data on age, education, employment, and mean, standard deviation (SD) of gestational age. Inferential analysis was carried out to determine the differences between the pre and posttest because the results of the Levene test for the control group showed that the distribution of data was not normal for the Fetal Attachment variable, a difference test was carried out using Wilcoxon. The delta value difference test between the treatment and control groups was carried out using the Mann-Whitney test because all data was not normally distributed. Interpretation of the Wilcoxon test and Mann Whitney test with a significance level of 5% (α=0.05) and it is said that there is a difference or there is an influence with the result of a $p<0.05$.[22]

Ethical clearance

This research has passed the ethical clearance test by faculty of nursing Sultan Agung university Health Research Ethics Committee on 19 July 2022 under No. 307/ KEPK-A.1-S1/FIK/VII/2022 and has obtained the respondents' consent through Informed Consent, thus respondents first received an explanation from researchers about the research carried out in full, an explanation carried out orally and in writing; after the patient understands the research being conducted, the researcher is given informed consent in writing, and then the respondents who agrees to be a respondent can sign the informed consent sheet, which is in accordance with the ethical principles of research, namely informed consent, anonymity, confidentiality, fidelity, and autonomy.

Results

Data regarding the characteristics of primigravida mothers in Semarang City during the third phase of the study can be observed in Table 2. Tables 2 and 3 show that the characteristics of primigravida in both the intervention and control groups are quite similar. These characteristics include age, education, occupation, and gestational age. The majority of them fall within the early adult-

hood range (20-35 years), accounting for 87.9% in the intervention group and 81.8% in the control group. Most respondents obtained secondary education, comprising junior high and senior high/vocational school, with 75.8% in the intervention group and 72.7% in the control group. Furthermore, most primigravida were unemployed, with 87.9% in the intervention group and 75.8% in the control group. The mean gestational age for the intervention group is 26.12 weeks, while it is 26.33 weeks for the control group.

Table 4 reveals that fetal attachment increased in both the intervention and control groups from the pre-test to the post-test.

Table 1. Details of prenatal spiritual-based stimulation intervention activities.

Time (Weeks)	Activity	Frequency	Duration
1	Pretest, then the activity continues with providing education to pregnant women and husbands about prenatal stimulation	1 Times	100 Minutes
2	Assistance to pregnant women by nurses by providing further education about 1. Spiritual aspects that underlie prenatal parenting towards readiness to become mothers; 2. Spiritually based prenatal stimulation and practice and role play by each pregnant mother and her partner about prenatal stimulation. a. Auditory stimulation involved engaging in conversations with the fetus, introducing the concept of God, familiarizing the fetus with both mother and father, and participating in joint prayers for 20 minutes. b. Kinesthetic stimulation was performed using by tapping on the baby's buttocks for 5 minutes, c. Temperature stimulation alternated between warm and cold baths for 10 minutes. d. Light-dark stimulations was administered using a flashlight for 10 minutes.	1 Times	100 Minutes
3-11	Independent interventions by the mother who continue to receive assistance and monitoring	8 Times	60-90 Minutes
3-4	Assistance to pregnant women by nurses, with peer group couples, strengthening husbands' support in prenatal stimulation carried out at agreed times by conducting home visits.	5 Times	60-90 Minutes
5-7	Assistance to pregnant women by nurses by sharing experiences of applying spiritual-based prenatal stimulation to pregnant women in groups carried out online via the Whatsapp group.	Every day (21 days)	60-90 Minutes
8-11	Assistance to pregnant women by nurses, with overall monitoring and evaluation of the implementation of spiritual-based prenatal care for pregnant women in groups carried out at agreed times through home visits	4 Times	60-90 Minutes
12	Posttest was performed when pregnant women were taken to the antenatal care class.	1 Times	30 Minutes

Table 2. Characteristics of primigravida mothers in 2023 (n=33).

Characteristics	Intervention		Control		Levene test p
	f	%	f	%	
Age					1.000
Adolescence (< 20 years)	2	6.1	3	9.1	
Early adulthood (20-35 years)	29	87.9	27	81.8	
Late adulthood (>35 years)	2	6.1	3	9.1	
Education					0.944
Elementary	4	12.1	5	15.2	
Junior high school	12	36.4	11	33.3	
Senior high school	13	39.4	13	39.4	
Higher education	4	12.1	4	12.1	
Employment					0.061
Civil servant	2	6.1	1	3.0	
Private sector employee	1	3.0	7	21.2	
Self-employed	1	3.0	0	0	
Unemployed	29	87.9	25	75.8	
Total	33	100	33	100	

Table 3. Gestational age of primigravida in 2023 (n=66).

Characteristics	Intervention		Control		p
	Mean	SD	Mean	SD	
Gestational age	26.12	2.99	26.33	2.78	0.861

Table 4. Effects of prenatal spiritual-based stimulation on maternal-fetal attachment in primigravida in 2023 (n=33).

Variable	Intervention				Control				Mann-whitney
	Mean±SD		Δ Mean	p	Mean± SD		Δ Mean	p	
	Pre	Post			Pre	Post			
Maternal-fetal attachment	44.09±3.09	75.58±5.13	31.49	0.000[a]	43.97±3.22	44.18±3.01	0.21	0.059[a]	0.000[b]

Notes: [a]Wilcoxon test; [b]Mann -Whitney test.

However, the intervention group exhibited a greater increase compared to the control group. The Wilcoxon test results for the intervention group displayed a p-value of 0.00, signifying a significant difference in fetal attachment before and after receiving prenatal stimulation. Conversely, the control group demonstrated an average increase in fetal attachment, but the Wilcoxon test yielded a p-value higher than 0.05, indicating no significant difference. The Mann Whitney test produced a p-value of 0.000 ($p<0.005$), indicating a mean difference between the intervention and control groups. This outcome underscores that spirituality-based prenatal stimulation had a significant impact on fetal attachment in primigravida.

Discussion

The results of the present study indicate that spirituality-based prenatal stimulation significantly influences fetal attachment in primigravida women in Semarang. This spirituality-based prenatal stimulation included educational, auditory, and kinesthetic stimulations. This finding is consistent with a prior study, which emphasized the significant relationship between providing education in prenatal classes and maternal-fetal attachment.[23]

This research shows that prenatal stimulation, one of which consists of educational stimulation, can increase maternal-fetal attachment. The research results are in line with results in the same direction as this research, namely a study conducted in 2023, which shows the same results as couples who, after being given education or training, can encourage maternal-fetal attachment.[24] A similar study discovered ini 2020 a significant increase in maternal-fetal attachment scores before and after the provision of education.[25] After being stimulated by training or health education, it can increase maternal motivation and facilitate maternal health behavior, which can increase maternal - fetal attachment.[26] Offering education to pregnant mothers through various media can enhance their mental well-being and strengthen the bond between mothers and their fetuses. Providing stimulations through collaborative education can offer maximum support to pregnant women, not only from healthcare professionals but also from fellow pregnant women within the group. Incorporating spiritual content into each educational material further reinforces the belief that the pregnancy process can be successfully navigated. This fosters an awareness of considering the fetus as a sacred trust that must be nurtured with love by providing the best possible care.

Auditory stimulation, which was also one of the stimulations in this study, was proven to increase maternal-fetal attachment. This result is in line with research in 2019, which also showed that auditory stimulation with music was able to increase maternal-fetal attachment.[27] The provision of spirituality-based prenatal stimulation, such as auditory stimulation, aligns with a study which reporting that providing stimulation through communication and music can alter fetal behavior and bring them closer to their mothers.[28] Auditory stimulation, such as Quran recitation (murotal), provides auditory stimulation received by the midbrain that prompts the midbrain to release Gamma-Amino Butyric Acid, enkephalin, and beta-endorphin, which act as electrical conduction inhibitors, have analgesic effects, and induce relaxation.[29] Providing stimulation through sound or communicating with the fetus helps form specific memory traces, influencing the neonate's nervous system.[30] A relaxed condition is the best state for instilling religious values, fostering feelings of love and care, including self-love and care for the fetus in the womb. The fetus will be able to perceive the positive values instilled by their parents and develop a greater love and affection towards them. Kinesthetic stimulation is one of the stimulations that also plays a role in this research because it can increase maternal-fetal attachment. This result is in line with research that also shows that kinesthetic stimulation in the 2018 study using gentle tactile stimulation is able to increase maternal-fetal attachment.[31] Kinesthetic intervention involving rubbing and tapping has been found to enhance the bond between mothers and their fetuses, routine gentle stimulation of the fetus can shape fetal behavior or fetal movement, fetal heart rate, anthropometry, and biophysics until birth and strengthen the bond between the mother and the baby.[32] Similarly, a study showed that tactile stimulation can maintain psychological responses and improve social interaction. Rubbing or tapping is another form of communication between the mother and the fetus. Tapping on the fetus essentially invites the fetus to play, stimulating them to interact with others. When the mother engages in this kind of play, the fetus experiences a close interaction with the mother even while inside the womb.[33]

Interventions involving temperature stimulation, where the fetus is exposed to warm and cold temperatures, have been shown to enhance the bond between the mother and the fetus. Temperature stimulation can improve blood circulation, relaxation, and comfort.[34] Additionally, the relaxation effect of hydrotherapy does not negatively impact the fetus and, in fact, stimulates fetal movement. When applying temperature stimulation, such as warm water baths, it is recommended to use a gentle pouring method and limit the duration to a maximum of 15 minutes to ensure proper circulation. Similarly, light stimulation can enhance fetal responses.[35] Fetuses exposed to light stimulation exhibited movement responses.[36] The movements felt by the mother elicit feelings of love and affection for the fetus. The movements made by the fetus after receiving stimulation are a form of communication, conveying messages and signaling to the mother. Love grows, and attachment intensifies as interactions become more intense.[37]

Spiritual-based stimulation provided by parents during the prenatal period is a parenting pattern in which parents interact with the fetus in the womb. It aims to prepare for the psychological bond between parents and the fetus and its biological development effects. Parenting activities are essentially a form of communication and interaction between the mother, father, and the fetus that enhance attachment to the fetus. In addition to strengthening the bond between mother and fetus, spirituality-based stimulation during prenatal care can introduce and stimulate early understanding in the fetus about God, instill values and morals, and teach positive behaviors.

Reflections on the results of this research show how important spiritual-based prenatal stimulation interventions are in increasing maternal-fetal attachment, so primigravida mothers can apply sound, kinesthetic, light, and temperature stimulation independently together with their husbands, so that maternal-fetal attachment increases and can also improve. Parents interact with the fetus in the womb, then the psychological bond between parents and fetus and the impact of its biological development and introduce and stimulate an early understanding of the fetus about God, instill values, and morals, so that the mother's psychological condition improves and the readiness to welcome the birth babies and the welfare of mothers and babies increases.

This research can also have an impact on health services because in the health service sector, especially maternity nurses, obstetricians, and midwives, this research can be used as a reference for providing educational stimulation to mothers, teaching various spiritual-based stimuli ranging from sound, kinesthetic, to light stimulation, and temperature so that the mother has the ability

to do it independently with her partner at home, so that stimulation for the fetus increases, and maternal-fetal health and maternal-fetal attachment increase.

Conclusions

The attachment of the fetus in both the intervention and control groups increased; however, the attachment scores of the intervention group were higher than those of the control group. Spiritual-based prenatal stimulation is effective in enhancing the attachment between mothers and fetuses in primigravida. The provision of light stimulation is recommended using a flashlight rather than a smartphone's flash to minimize radiation exposure to the fetus. Future research could explore a similar topic by evaluating fetal-maternal attachment scores after the baby's birth.

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