

Effect of Teaching Program about Fetal Movement Counting on Primigravida's Prenatal Attachment

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Abstract

Background: Fetal movement counting may be associated with improvement in maternal fetal attachment. **Aim of the study:** To evaluate effect of teaching program about fetal movement counting on primigravida's prenatal attachment. **Setting:** The study was conducted at outpatient clinic of obstetrics and gynecology in Benha university hospital. **Methods:** A purposive sample included 60 primigravida. **Tools:** Of data collection three tools were utilized (1) A structured interviewing questionnaire included three parts general characteristics of the studied pregnant women, Obstetrics history of the woman and assessment of woman's knowledge about fetal movement counting. (2) Women's self-reported practices regarding fetal movement counting. (3) Cranley's Maternal Fetal Attachment Scale. **Results:** Less than one third of the studied pregnant women had adequate knowledge teaching pre teaching program while, the majority had adequate knowledge post teaching program and most of them after one month of implementation of teaching program ($P \leq 0.001$). Less than one quarter of studied pregnant women had satisfactory self-reported practices regarding fetal movement counting preprogram, the most of them had satisfactory self-reported practices post program and after one month of implementation of teaching program ($P \leq 0.001$). One tenth of the studied pregnant women had high attachment pre teaching program while, majority had high attachment post program and after one month of implementation of teaching program ($P \leq 0.001$). **Conclusion:** The application of the teaching program about fetal movement counting had a positive effect on improving primigravida's knowledge, self-reported practices and prenatal attachment. **Recommendations:** Designing of health education program to improve pregnant women's awareness and self-care practices regarding fetal movement counting and maternal attachment.

Keywords: Fetal Movement Counting, Prenatal Attachment, Primigravida, Teaching Program.

Introduction:

Pregnancy is a critical or a stressful period in pregnant woman life because the time of significant physical, mental, and social changes. Although pregnancy is a physiological process, some conditions may endanger maternal or fetal health and put a pregnant woman or fetus in a significantly increased risk for morbidity and mortality (Murray et al., 2020).

Maternal perception of fetal kicks is an important screening method for fetal well-being, as decreased fetal kicks is associated with a wide range of poor pregnancy outcomes. The understanding of factors that may affect maternal perception could help clinicians to determine the importance of maternal reports of decreased fetal kicks, such factors include amniotic fluid volume,

placental location, fetal presentation, and fetal gender also, maternal factors that could influence fetal movements involve maternal smoking, primipara and obesity (**Foord et al., 2021**).

Also, maternal counting of fetal movements is considered an easy and valuable screening tool for fetal well-being that increases maternal-fetal bonding. Prenatal attachment has been defined as "The emotional tie or bond which normally develops between the mother and unborn fetus" (**Henrichs et al., 2020**).

Quality of attachment directly affects maternal and fetal health. Higher prenatal maternal fetal attachment (MFA) has been associated with positive health practices such as obtaining regular prenatal care, maintaining a nutritionally sound diet, obtaining adequate rest and sleep; engaging in regular exercise, abstaining from illegal substances, and learning about pregnancy and childbirth, which contributes to positive pregnancy outcome. Conversely, women with lower MFA are less likely to engage in positive health practices during pregnancy (**Widen and Siega, 2020**).

Therefore, an improved understanding of fetal movement patterns and quality, as perceived by pregnant women, is crucial and can be achieved through providing adequate information about normal fetal movement patterns that help pregnant women to identify and report any deviations that may occur early (**Flenady et al., 2021**).

Nurses have important roles and responsibilities in recognizing the factors affecting attachment during the prenatal period, preparing pregnant women for motherhood, initiating and maintaining the bond of love between mother and fetus, using attachment-supporting practices, and improving perinatal and neonatal health outcomes. Also, ensuring secure attachment in

the prenatal period is also important for the ongoing attachment behavior in the postnatal period (**Sujatha, 2020**).

Fetal movements refer to motion of a fetus caused by the muscle activity. Locomotor activity starts during the late embryological stage and changes in nature throughout development. Muscles begin to move as soon as being innervated. These first movements are not reflexive but arise from self-generated nerve impulses originating in the spinal cord. As the nervous system matures, muscles can move in response to stimuli (**Huang et al., 2021**).

Primigravida feel the first fetal movements are called quickening. One function of the movements to alert the pregnant woman that the fetus growing in the uterus. At around 20 weeks of gestation, the trained healthcare provider can feel fetal movement externally through the abdomen. This is considered a positive sign of pregnancy (**Thistle et al., 2020**).

Attachment is an affect emotional, warm, close and dynamic relationship between the pregnant woman and the fetus. The pregnant women should have high attachment to the fetus; feel more sensitive toward providing the needs of the fetus (**Fern et al., 2020**).

Significance of the study

Worldwide, the maternal mortality rate was 157 deaths /100,000 live births and the newborn mortality rate was 27/1000 live births in 2021(Roosa and Lauren, 2021). In Egypt, the maternal mortality rate was 37 death / 100,000 live births in 2021 and newborn mortality rate was 13.654 deaths per 1000 live births in 2021(**El Refaeey et al, 2021**).

Fetal movement counting is a simple, valuable, effective and reliable method of fetal well-being during pregnancy. Fetal movement counting includes kicks, turns, twists, swishes, rolls, and jabs but not hiccups. Also, fetal movement counting helps pregnant women to

Effect of Teaching Program about Fetal Movement Counting on Primigravida's Prenatal Attachment

identify any change of fetal movement (Mangesi et al, 2021).

Designing teaching program is an important to improve knowledge, practices of pregnant women regarding fetal movement counting which significantly effect on prenatal attachment of primigravida that in turn result in positive pregnancy outcomes. so, this study was conducted to evaluate effect of teaching program about fetal movement counting on primigravida's prenatal attachment.

Aim of the study: The study aimed to evaluate effect of teaching program about fetal movement counting on primigravida's prenatal attachment. This was achieved through:

-Assessing primigravida's knowledge and self-reported practice about fetal movement counting and prenatal attachment.

-Designing and implementing teaching program regarding fetal movement counting and prenatal attachment.

-Evaluating effect of teaching program on knowledge and self-reported practices of primigravida regarding fetal movement counting and prenatal attachment.

Research Hypotheses:

H1: Primigravida woman who received teaching program regarding fetal movement counting would expected to have improved knowledge and self-reported practices than before.

H2: Primigravida woman who received teaching program about fetal movement counting would expected to have better prenatal attachment than before.

Subjects and Method

Research design

A quasi-experimental study design (time series design) was utilized to achieve the aim of the current study the research design in the a dependent variable is measured at many different points in time in one group before and after a treatment that is manipulated by

the researcher is administered (Thomas, 2022).

Setting of the research:

The study was conducted at outpatient clinic of obstetrics and gynecology in Benha university hospital. This particular setting was selected because it is the main official hospital at Benha city providing care for Qalyubia governorate and neighboring governorates. This clinic provides services of obstetrics and gynecological care, family-planning counseling and outpatient procedures.

Sampling:

A purposive sample was used in the current study. A 60-primigravidae woman was included in the current study and represented 10% of the total admission of pregnant woman (600) during last year 2020 and selected according to the following inclusion criteria: Age 20 - 35 year, free from any medical and obstetric problems, gestational age > 20 weeks , can read and write and Agree to participate in the current study.

Exclusion criteria: Woman who had any psychological or stressful event during the study. Woman who not recorded fetal movement for one week.

Tools of data collection: Three tools were used.

Tool (I): A structured interviewing questionnaire:

This questionnaire was designed by the researcher after reviewing related literature (Prabavathy, 2021; Rincy and Nalini, 2020; Raynes-Greenow, 2020) and was written in an Arabic language in the form of closed and open-ended questions and included three parts:

Part 1: general characteristics of the studied pregnant women it included (age, educational level, occupation, residence, monthly income and duration of marriage).

Part 2: Obstetrics history of the woman, it consisted of (gestational age, antenatal follow-up and the frequency of follow-up)

Part 3: Assessment of pregnant women's knowledge about fetal movement counting, it included 14 items.

Scoring system:

Each item was given a score (2) when the answer was correct answer and a score (1) when the answer was incorrect / don't know. The total score of knowledge of each pregnant women was calculated by the addition of total score of all items and ranged from 14 -28. The total knowledge score was converted into percentage and graded as the following: Adequate knowledge $\geq 60\%$ ($17 \leq 28$), inadequate knowledge $< 60\%$ ($14 < 17$).

Tool II: Woman's self-report practices regarding fetal movement counting:

It was designed by the researcher after reviewing related literatures (Singh et al., 2021; Delaram et al., 2020; Douglas, 2020), to assess self-reported practices of pregnant women regarding fetal movement counting and consisted of 14 items.

Scoring system:

Each item was given a score (2) for done and a score (1) for not done. The total score of women's self-reported practices was calculated by the addition of the score of each item that ranged from 14-28 then the total score was converted into percentage as follow: Satisfactory practice $\geq 60\%$ ($17 \leq 28$), unsatisfactory practice $< 60\%$ ($14 < 17$).

Tool III: Cranley's Maternal Fetal Attachment Scale (MFAS)

This tool was adopted from Cranley, (1981) to measure prenatal maternal fetal attachment. It will include 24 items concerned with thoughts indicative of maternal fetal attachment, that divided into five subscales is differentiation from fetus (4 items), interaction with the fetus (5 items), assigning characteristics of the fetus(6 items), giving of self to the fetus (5 items),playing a role (4 items).

Scoring system:

Each item of Cranley's maternal fetal attachment scale was assigned a score based on a 3-point of likert scale range from (1– 3), a score (3) for yes , (2) for uncertain and (1) for No .The total score of the scale ranged from 24 – 72 and higher score indicated high level of attachment as well as classified as the following: High attachment $75\% \leq 100\%$ ($54 \leq 72$), moderate attachment $60\% < 75\%$ ($44 < 54$). low attachment $< 60\%$ ($24 < 44$).

Tools validity and reliability:

Tools of data collection were reviewed by three-panel expertise of professor Obstetrics and Gynecological Medical and Nursing staff to test content validity, relevance, accuracy and comprehensiveness of the tool.

Modifications were done in the light of jury's valuable comments such as modify some words to give the most appropriate meaning for the phrase which were not clear and the sequence of items. Reliability was done by cronbach's alpha coefficient test, which revealed that the internal consistency of knowledge questionnaires was 0.946 women's self- reported questionnaires was 0.826 and Cranley's maternal fetal attachment scale was 0.826

Ethical considerations:

Ethical aspects were considered before starting the study as the following: The research approval was obtained from the scientific research ethical committee at Faculty of Nursing, Benha University before starting the study. Oral consent was obtained from each studied pregnant woman to participate in the study. Each pregnant woman was informed about the purpose and benefits of the study. The research did not cause any physical, social or psychological risk for participants. The researcher-maintained confidentiality, self-esteem and dignity of studied women. The pregnant women had

Effect of Teaching Program about Fetal Movement Counting on Primigravida's Prenatal Attachment

freedom to withdraw from participation in the study at any time.

Pilot study:

The pilot study was carried out on ten percent of total sample (6 pregnant women) to test the clarity and applicability of the study tools as well as estimate of the time needed to fill in the questionnaire. According to the results of the pilot study, no modifications were done. So, women involved in the pilot study were included in the main study sample.

Fieldwork:

The study was carried out from the beginning of January 2022 to the end of July 2022 covering seven months. The researcher visited the previously mentioned study setting three days/weeks (Sunday, Tuesday and Thursday) from 9.00 Am to 12.00pm. To achieve the aim of the present study, the following phases were adopted, interviewing and assessment, planning, implementation and evaluation phases.

Interviewing and assessment phase:

This phase encompassed interviewing the pregnant women to collect baseline data. At the beginning of interview, the researcher introduced herself, greeted each pregnant women, explained the aim of the study.

At first, the researcher used the structured interviewing questionnaire (tool I) to assess the general characteristics pregnant women, obstetrics history and pregnant women's knowledge regarding fetal movement counting. Then, the researcher asked women about self-reported practices regarding fetal movement counting (tool II). The researcher filled in the Canley's maternal fetal attachment scale (tool III)

The average time required for completion of the questionnaire was around 30-35 minutes depending on the response of the pregnant woman. Each pregnant women was assessed individually and the number of interviewed women per week was 3-4 pregnant women.

Planning phase:

Based on the results obtained from pretest assessment of pregnant women's knowledge, self-reported practices regarding fetal movement counting and prenatal maternal fetal attachment among primigravidae, the researcher designed the teaching booklet in an Arabic language supported with colored illustrated pictures and included two parts, theoretical (definition of fetal movement, stages of fetal development, factors affecting of the fetal movement and factors affecting prenatal attachment practical parts (daily fetal movement count chart, method to calculate the fetal movements). Also, the researcher used different teaching methods as lecture, group discussion and demonstration with the assistance of in structural media as video on laptop and pictures about fetal movement counting chart and teaching booklet.

Implementation phase:

Implementation of the teaching program was carried out at the waiting area of the pre mentioned setting. The pregnant women was divided into 10 groups and each group included 6 women. Each group was received three sessions; the duration of each session was 30-45 minutes including periods of discussion according to pregnant women's response.

The First session: At the beginning the researcher gave the pregnant women the teaching booklet and introduced an orientation about the program including the general objectives.

The researcher provided the pregnant women general knowledge about meaning of fetal movement, factors that increase fetal movement, the time of first sensation of fetal monitoring for primigravid's, the number of fetal movements felt during hour, the most appropriate position to count fetal movement, time of consulting obstetrician regarding fetal movement, the best time to measure fetal

movement during the day, factors that preventing sensation of fetal movement, the pathological causes of absent sensation of fetal movement, the investigations of the fetal wellbeing, the actions that the pregnant women should do in case of decreasing fetal movement, the instructions that the pregnant women should know about fetal movement and the actions that the pregnant women should do when feeling the increase of fetal movement and the foods that increase the movement of the fetus.

The second session: implied on the implementation of the practical part of the educational program and involved training the pregnant women's on counting the fetal movements using Cardiff method and record the fetal movement on fetal movement counting chart. The researcher used different teaching methods as demonstration and re demonstration.

The pregnant woman should choose the time when the fetus is active and relax to feel the movements of the fetus, the pregnant woman should be lie on the left side, with the head comfortably supported by a pillow and that help to feel the movement more strongly. Placing the hand on the abdomen to feel the movement of the fetus while counting the movements, and the fetus is more active after eating meals or drinking a drink containing sugar, or after exercising. The pregnant woman should get a notebook or set up a schedule to start by writing the number of movements starting with the first movement and writing the time when the movement started. Upon reaching the ten movement, the time must be written and compared with the time of the first movement, and that helps the pregnant woman to know the time it took for the fetus to reach 10 movements. Before start calculating the movement of the fetus, write down the week of pregnancy as well as the time when the kicks began. Note how long it

took the pregnant woman to reach ten movements. The fetus should move at least ten times in an hour (David, 2021; Winje, 2020).

The third session: Each pregnant women was trained about prenatal attachment including differentiation from fetus, interaction with the fetus, attribution of characteristics of the fetus, give of self to the fetus such as maintaining a nutritional, adequate rest and sleep, regular exercise and regular prenatal car, fetal parts palpation, speaking to the fetus.

Evaluation phase:

Immediately and after one month of implementation of teaching program, pregnant women's knowledge, self-reported practices and maternal- fetal attachment were assessed by the same format of pretest to evaluate the effect of teaching program.

Statistical analysis:

Data was verified prior to computerized entry. The statistical package for social sciences (SPSS version 25) was used followed by data analysis and tabulation. Descriptive statistics were applied (e.g., mean, standard deviation, frequency and percentages). Also tests of significance (Chi-square test, fisher exact test and repeated measure ANOVA test) were applied to test the study hypotheses. Pearson correlation coefficients were used to investigate the relationship the studied variables. A significant level value was considered when $p \leq 0.05$, and a highly significant level value was considered when $p \leq 0.001$.

Limitation of the study:

Sometime the session were protracted due to noise and other individual's interruption.

Results

Table (1): Shows that 45.0% of the studied pregnant women aged from $20 < 25$ years old with mean 25.13 ± 2.94 years old. As regard Level of education, 55.0% of them had secondary education and about 66.7% of them

Effect of Teaching Program about Fetal Movement Counting on Primigravida's Prenatal Attachment

were housewives. In addition, 63.3% of the studied pregnant women were from rural area and about 73.3% of them didn't have enough monthly income. As well, 56.7% of them were married since less than one year.

Figure (1): Display 28.3% of the studied pregnant women had adequate knowledge preprogram while 95% had adequate knowledge post program and 85.0% after one month of implementation of teaching program ($P \leq 0.001$).

Figure(2): Reveals 21.7% of studied pregnant women had satisfactory self-reported practices regarding fetal movement counting preprogram while, 91.7% of them had satisfactory self-reported practices post program and 86.7% after one month of implementation of teaching program ($P \leq 0.001$).

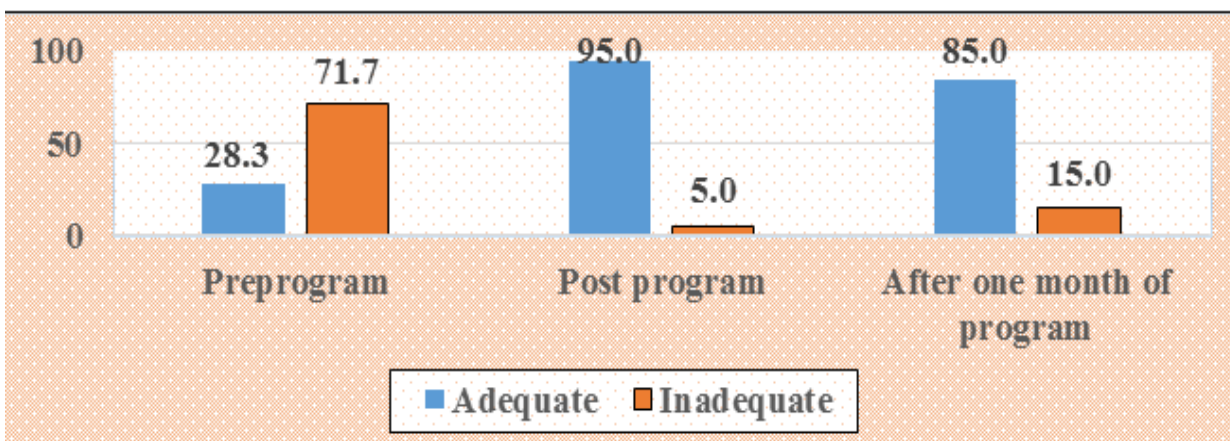
Figure(3): Illustrates that More than 10% of the studied pregnant women had high attachment preprogram while, 93.3% of them had high attachment post program and 90% after one month of implementing of teaching program ($P \leq 0.001$).

Table (2): Shows that there was a highly significant increase in the mean score of total scale and subscales namely differentiation of self, interacting with the fetus, attribution of characteristics and intent, giving of self and role play post teaching program, which decline slightly after one month of implementation of teaching program, with a highly statistically significant difference ($P \leq 0.001$).

Table (3): Represents that, there was highly significant positive correlation between the studied pregnant women's total knowledge and total self-reported practice at pre teaching program and post teaching program ($P \leq 0.05$) while, there was a highly statistical significant positive correlation between the studied pregnant women's total knowledge and total self-reported practice after one month of implementation of teaching program ($P \leq 0.001$). Moreover, there was a highly significant positive correlation between total knowledge score and total maternal fetal attachment score at pre, post and after one month of implementation of teaching program ($P \leq 0.001$).

Table (1): Distribution of the studied pregnant women according to general characteristics (n=60)

General characteristics	n=60	
	No	%
Age (years)		
20 < 25	27	45.0
25 < 30	23	38.3
30 ≥ 35	10	16.7
Mean ± SD	25.13 ± 2.94	
Educational level		
Primary education	2	3.3
Secondary education	33	55.0
University education	25	41.7
Occupation		
Housewife	40	66.7
Working	20	33.3
Residence		
Rural	38	63.3
Urban	22	36.7
Duration of marriage (years)		
< 1	34	56.7
1 ≥ 3	26	43.3

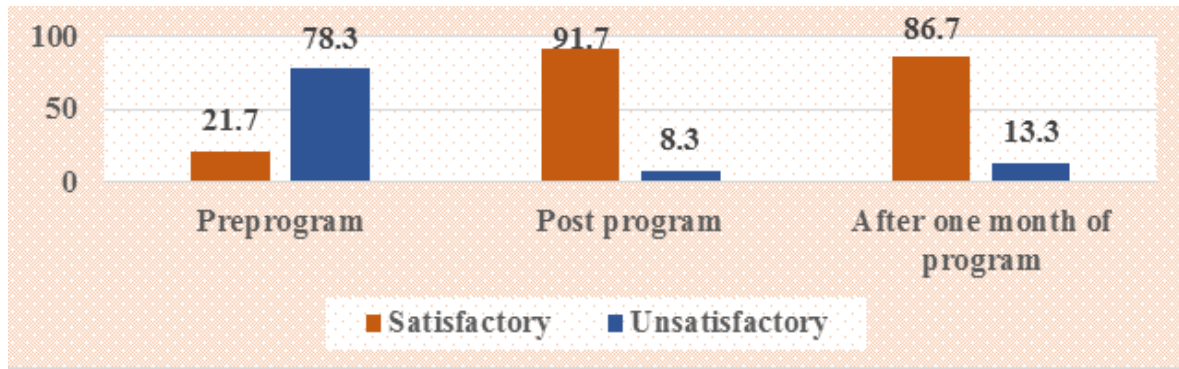


FET=45.147 & P-value=0.000

Figure (1): Distribution of the studied pregnant women according to level of total knowledge about fetal movement counting through program phases (n=60)

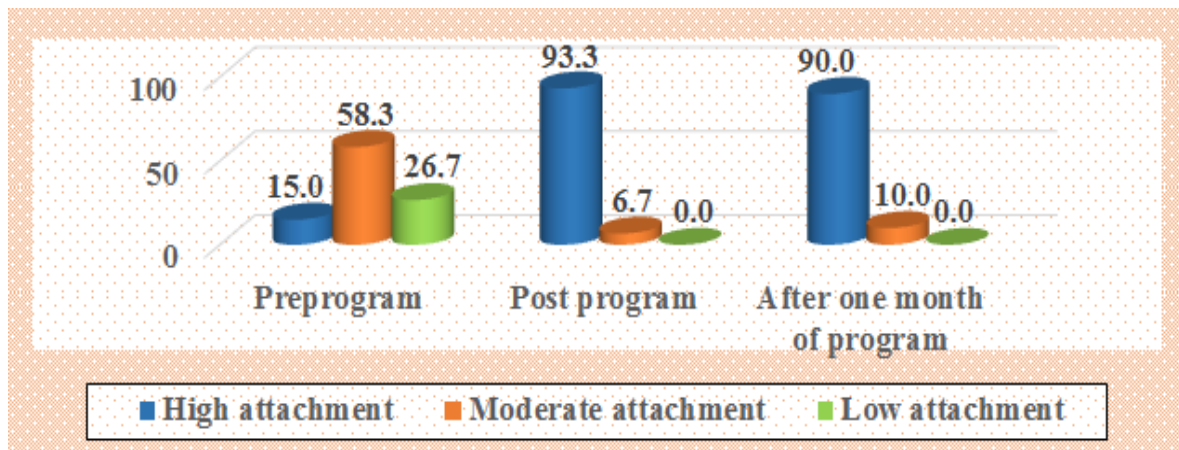
Effect of Teaching Program about Fetal Movement Counting on Primigravida's Prenatal

Attachment



$\chi^2=56.721$ & $P\text{-value}=0.000$

Figure (2): Distribution of the studied pregnant women according to level of total self-reported practice regarding fetal movement counting through program phases (n=60)



$FET=72.974$ & $P\text{-value}=0.000$

Figure (3): Distribution of the studied pregnant women according to level of total maternal-fetal attachment subscales through program phases (n=60)

Table (2): Comparison between mean score of maternal-fetal attachment among the studied pregnant women through teaching program phases (n=60)

Phases / Subscale	Preprogram n= 60	Post program n= 60	After one month program n= 60	F test	P - value
	Mean ± SD	Mean ± SD	Mean ± SD		
Differentiation of self	11.37 ± 0.84	11.68 ± 0.51	11.81 ± 0.40	9.156	0.001**
Interacting with the fetus	7.36 ± 1.60	12.63 ± 1.49	12.13 ± 1.45	224.894	0.000**
Attribution of characteristics and intent	9.32 ± 2.09	13.67 ± 1.64	12.93 ± 1.58	108.718	0.000**
Giving of self	11.23 ± 1.79	13.45 ± 0.86	12.85 ± 1.18	52.263	0.000**
Total	48.97 ± 5.33	62.43 ± 2.85	60.32 ± 2.41	247.476	0.000**

F: Repeated Measure ANOVA

** A highly statistically significant difference ($P \leq 0.001$)

Table (3) Correlation coefficient between total knowledge, total self-reported practice and total maternal-fetal attachment scores of the studied pregnant women through program phases (n=60)

Variables \ Phases	Total knowledge score					
	Preprogram n= 60		Post program n= 60		After one month of prog n= 60	
	r	p	r	p	r	p
Total self-reported practice score	0.361	0.005*	0.385	0.002*	0.498	0.000**
Total maternal-fetal attachment score	0.563	0.000*	0.613	0.000*	0.685	0.000**

** A highly statistically significant difference (P ≤ 0.001) *A statistically significant difference (P ≤ 0.05)

Discussion

This study aimed to evaluate the effect of teaching program about fetal movement counting on primigravida's prenatal attachment. This was achieved through: assessing primigravida's knowledge and practice about fetal movement counting and prenatal attachment. designing and implementing teaching program regarding fetal movement counting, evaluating the effect of teaching program on knowledge and self-reported practice of primigravida about fetal movement counting and prenatal attachment.

Regarding general characteristics of the studied pregnant women, the current study revealed that less than half of the studied pregnant women aged from 20 < 25 years old with mean 25.13 ± 2.94 years old. This finding is matched with **Kopra et al., (2020)** who conducted study about " The Effect of Education of Fetal Movement Counting on Maternal-Fetal Attachment in the Pregnant Women: a Randomized Controlled Clinical Trial" and indicated that half of the studied pregnant women aged from 20 to less than 25 years old with mean 25.33±3.48 years old. This result may be due to this age is age of fertility and the age of married usually begins at this age especially in rural areas.

As regards the studied pregnant women's level of education, the current study showed that more than half of the studied pregnant women had secondary education. This finding is matched with a study conducted by **El-Sayed et al., (2021)** who conducted study about "Effect of Women Self-Monitoring of Fetal Kicks on Enhancing Their General Health Status" and reported that two thirds of the studied pregnant women had secondary education. One other hand, this result is incongruent with **Shereehan et al., (2020)** who showed that less than half of studied pregnant women were read and write.

Concerning Occupation of the studied pregnant women, the current study showed that two thirds of the studied pregnant woman were housewives, this result is in harmony with **Jahan et al., (2022)** who found that more than three quarters of the studied pregnant women were housewives.

Regarding residence, the result of current study illustrated that less than two thirds of the studied women were from rural areas, this result is in same line with study conducted by **El-Refaey et al., (2020)** who showed that more than two thirds of studied pregnant women were from rural areas. This result may be due to that Benha university hospital is the main hospital in Qalyubia

Effect of Teaching Program about Fetal Movement Counting on Primigravida's Prenatal Attachment

governorate that serves a large number of patients especially from rural areas.

As regards to knowledge of the studied pregnant women about fetal movement, the current study clarified that there was a marked improvement in knowledge regarding fetal movement with a highly statistically significant difference between phases of the teaching program as regard all knowledge items as less than one third of the studied pregnant women had adequate level of knowledge pre teaching program that improved to the majority of them had adequate knowledge post program and after one month of implementation of teaching program this finding was supported the study hypothesis which stated "Primigravida women who received teaching program regarding fetal movement counting would expected to have improved knowledge and self-reported practice than before" .

This result in same line with **Ugwu, (2020)** who conducted study about "Effect of counseling intervention on women's knowledge, practices and lifestyle of fetal well-being among Primigravidae" and revealed that the level of a woman's knowledge increased after application of the intervention as compared with before teaching program.

This finding may be due to lack of health literacy among the studied sample as most of women had only heard about fetal movement counting, but women did not have enough and accurate knowledge about it.

Moreover, this result is in accordance with **Ahmed et al., (2021)** who conducted study entitled "Interactive Training Session Regarding Fetal Movements Counting and its Effect on Maternal Outcomes among High-Risk Pregnant Women" and reported that pre-intervention, all of both the intervention and the control groups had poor level of knowledge while, post-intervention most of

the intervention group had a high level of knowledge as compared to entire of the control group had a poor level of knowledge.

In addition, this finding is consistent with **Khalil and Shahin, (2020)** who studied "Effect of Nursing Clinical Pathway on Self-Assessment of Fetal Well-being among high-risk pregnant women" and showed that pre-intervention, majority of the sample had wrong knowledge, while post-intervention, majority of them had good knowledge and the difference was highly statistically significant. This result demonstrated the positive effect of the teaching program and the teaching material administered to the studied pregnant women.

Also, **Samutri and Endriyani, (2021)** who studied " Education of fetal movement counting: an effort to increase knowledge and compliance of pregnant women to do self-assessment of fetal wellbeing" reported that the highest improvement was found in the knowledge of fetal movement counting from half of the studied sample to most of them immediately after education and about all of sample after 3 weeks of intervention.

On other hand, this finding disagrees with **Bowen, (2020)** who carried out a study about "Pregnant Women's Knowledge about Fetal Movement Count" and revealed that most of the studied sample had correct knowledge about fetal movement counting.

Concerning the studied pregnant women's self-reported practices regarding fetal movement counting the result of the current study displayed that there was a marked improvement of the studied women's self-reported practices with a highly statistical significant differences pre, post and after one month of implementation of teaching program as less than one quarter of the studied pregnant women had satisfactory self-reported practices pre-program that improved to majority of them post program and slightly

decreased after one month of implementation of teaching program this results was supported the study hypothesis which stated "Primigravida women who received teaching program regarding fetal movement counting would expected to have improved knowledge and self-reported practice than before".

This result agrees with **Samutri and Endriyani, (2021)** who studied " Education of fetal movement counting: an effort to increase knowledge and compliance of pregnant women to do self-assessment of fetal wellbeing" and revealed that there was improvement of total practice after application of the teaching program.

Also, the result is consistent with **Ashour et al., (2021)** who found that nearly all pregnant women in the study group had adequate practices regarding fetal movement count post intervention compared to the minority of them before the intervention.

These results demonstrates the positive effect and importance of teaching program as well as the convenience of calculating fetal movement counting at home without having to transfer to a health care service.

Also, the current study declared that there was a highly statistically significant difference between phases of the program as regard mean scores of maternal-fetal attachment subscales among the studied pregnant women. As evidence, the mean score of Attribution of characteristics and intent is was low pre-program, while increased post program and slightly decreased to after one month of implementation of teaching program. Also, the mean score of total maternal-fetal attachment subscales was low pre teaching program, while increased post program and slightly decreased to after one month of implementation of teaching program.

Also, the mean score of Differentiation of self is was low pre-program, while

increased post program and slightly increased to after one month of implementation of teaching program. Also, the mean score of Interacting with the fetus was low pre-program, while increased post program and slightly decreased to after one month of implementation of teaching program.

Also, distribution of the studied pregnant women according to level of total maternal-fetal attachment subscales through teaching program phases was low pre-program, while increased post program and slightly decrease to after one month of implementation of teaching program these results were supported the study hypothesis which stated " Primigravida women who received teaching program about fetal movement counting would expected to have better prenatal attachment than before".

Also, the mean score of total maternal-fetal attachment subscales was low pre-program, while increased post program and slightly decreased to after one month of implementation of teaching program.

Concerning that there was a highly significant increase in the mean score of total and subscale namely differentiation of self, interacting with the fetus, attribution of characteristics and intent, giving of self and Role play post teaching program, which decline slightly after one month of implementation of teaching program, with a highly statistically significant difference.

Concerning differentiation of self-subscale related to maternal fetal attachment through program phases, the result of current study clarified that there was a statistically significant difference between phases of the program as regard " looking forward to see what the fetus will looks like", while there was no statistically significant differences between phases of the program concerning other items of differentiation of self-subscale.

Effect of Teaching Program about Fetal Movement Counting on Primigravida's Prenatal Attachment

This finding is in line with study done by **Jangjoo et al., (2021)** entitled "Effect of counselling on maternal-fetal attachment in unwanted pregnancy" and revealed that the mean maternal-fetal attachment score for differentiation of self-subscale of the intervention group was increased before the intervention to slightly increased after the intervention with statistically significant difference between pre and post the program.

Regarding interacting with the fetus subscale related to maternal fetal attachment through teaching program phases, the result of current study portrayed that there was a highly statistically significant difference as regard all items of interaction with the fetus subscale preprogram, post program and after one month of implementation of teaching program except for the item "trying to hold the fetus by the foot so that can feel his movement" there was a statistically significant difference between all phases of teaching program.

This finding is in same line with **Guney and Ucar, (2020)** who studied "Effect of the fetal movement count on maternal-fetal attachment" and showed that that there was a highly statistically significant difference between phases of the program as regard all items of interaction with the fetus at experimental group of studied pregnant.

Regarding attribution of characteristics and intent related to maternal fetal attachment, the result of current study showed that there was a highly statistically significant difference as regard all items of attribution of characteristics and intent, subscale at preprogram, post program and after one month of program except for the item "Wonder if the fetus thinks and feels inside me" showed a statistical significant difference between all phases of teaching program.

This finding agrees with **Abasi et al., (2021)** who conducted study about

"Evaluating the effect of prenatal interventions on maternal-fetal attachment" and concluded that there was a highly statistical significant difference between all items of attribution of characteristics and intent pre and post intervention.

Regarding Giving of self-subscale related to maternal fetal attachment, the present study reflected that there was a highly statistically significant difference between phases of teaching program as regard all items of Giving of self except the item "feeling satisfied with body as a result of pregnancy" showed statistically significant difference between phases of teaching program. This result agrees with **Yuen et al., (2022)** who conducted study about "The effectiveness of psychoeducation interventions on prenatal attachment" and concluded that there was a highly statistically significant difference between phases of the program as regard all items about Giving of self at maternal fetal attachment.

Regarding role-play subscale related to maternal fetal attachment through teaching program phases, the result of present study demonstrated that there was a highly statistically significant difference between phases of teaching program as regard "trying to imagine what the fetus will look like". Also, there was statistically significant difference between phases of teaching program as regard "can imagine self-feeding fetus" and "can imagine self-taking care of fetus".

This result is congruent with Turk **Dudukcu and Tas Arslan, (2022)** who studied "Effects of health promotion program on maternal attachment, parenting self-efficacy, infant development" and found that there was statistically significant difference between phases of teaching program as regard "I can imagine myself taking care of fetus".

Regarding relation between level of

total knowledge score and general characteristics of the studied pregnant women through teaching program phases, the current study clarified that there was statistical significant relation between total self-reported practices of the studied pregnant women and their age and duration of marriage at preprogram, post program and after one month of implementation of teaching program. Also, there was a highly statistically significant relations between pregnant women's self-reported practices and educational level.

This result is in same line with **Ali et al., (2020)** who conducted study about "Increasing Awareness of Primigravidas About Fetal Movements During Pregnancy" and found that there was a significant relationship between mothers' age and educational level and knowledge about fetal movements.

As regards to relation between level of total self-reported practices score and general characteristics of the studied pregnant women through teaching program phases, the current study clarified that there was statistically significant relation between total self-reported practices of the studied pregnant women and their age and duration of marriage at preprogram, post program and after one month of implementation of teaching program. Also, there was a highly statistically significant relations between pregnant women's self-reported practices and educational level.

This result is in harmony with study by **Alamri and Smith, (2022)** who conducted study about "The effect of formal fetal movement counting on maternal psychological outcomes" and showed that there was a statistically significant relation between pregnant women's level of total self-reported practice at pre teaching program and

age, educational level and duration of marriage.

Regarding relation between level of total maternal-fetal attachment score and general characteristics of the studied pregnant women, the current study clarified that there was statistically significant relation between total maternal-fetal attachment score of the studied pregnant women and age and duration of marriage at preprogram, post program and after one month of implementation of teaching program. In addition, there was statistically significant relation between total maternal fetal attachment score of the pregnant women and educational level at pre teaching program and post teaching program.

Conversely, this finding disagreed with study by **Şanlı & Akbağ, (2022)** who studied "Effects of stress in pregnancy on prenatal attachment and contributing factors" and represented that there was no statistically significant relation between pregnant women's level of total maternal-fetal attachment and general characteristics.

Regarding correlation between total knowledge, self-reported practice and maternal-fetal attachment scores of the studied pregnant women through program phases, the current result revealed that there was statistical significant positive correlation between the studied pregnant women's total knowledge and total self-reported practice at preprogram and post program while, there was a highly statistical significant positive correlation between the studied pregnant women's total knowledge and total self-reported practice after one month of program. Moreover, there was a highly statistical significant positive correlation between total knowledge score and total maternal fetal attachment score at pre, post and after one month of implementation of teaching program.

Effect of Teaching Program about Fetal Movement Counting on Primigravida's Prenatal Attachment

There results illustrated that the improvement of pregnant women's knowledge through the teaching program was reflected on the self-reported practices regarding daily fetal movement counting and maternal fetal attachment.

Regarding correlation between total self-reported practices and maternal-fetal attachment scores of the studied pregnant women through teaching program phases, the current study illustrated that, there was a highly significant statistical positive correlation between the studied pregnant women's total self-reported practices and total maternal-fetal attachment at pre, post and after one month of implementation of teaching program.

Conclusion

The application of the teaching program about fetal movement counting had a positive effect on improving primigravida's knowledge, self-reported practices and prenatal attachment as evidenced by less than one third of the studied pregnant women had adequate knowledge pre teaching program while, the majority of them had adequate knowledge post program and after one month of implementation of teaching program. Also, less than one quarter of studied pregnant women had satisfactory self-reported practices regarding fetal movement counting preprogram while, the majority of them had satisfactory self-reported practices post program and after one month of implementation of teaching program. Additionally, less than one fifth of the studied pregnant women had high attachment preprogram while, most of them had high attachment post program and after one month of implementation of teaching program. Hence, the present study findings supported the research hypotheses and achieved the study aim.

Recommendations

- Implementing appropriate strategies for enhancing maternal -fetal attachment.
- Designing health education program to improve pregnant women's awareness and self-care practices regarding fetal movement counting and maternal attachment.
- Dissemination of the teaching booklet regarding fetal movement counting at all obstetrics and gynecological department in Benha city.

Further study need to be performed:

- Concluding an educational program regarding pregnant woman's adaptation to pregnancy to improve health and prenatal attachment.
- Conduct study to explore the factors associated the prenatal attachment.
- Contact study effect of fetal movement counting on maternal fetal attachment

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تأثير البرنامج التعليمي عن مراقبة حركة الجنين على الارتباط ما قبل الولادة للبكرات

هالة عزت عبد الجواد بدار-سعاد عبد السلام رمضان- هند عبدالله السيد عفيفي- زينب ربيع عبدالمرضي

يعتبر الحمل فترة إنتقالية الى الأمومة والتأقلم في حياة السيدات الحوامل ويشمل الإرتباط بين الأم والجنين على السلوكيات ومشاعر الرعاية والحماية والاندماج مع الجنين، والتي تزيد لدى السيدة الحامل ويمكن التعبير عن علاقة الإلتزام والتفاعل مع الجنين من خلال المودة والعواطف والتصورات والمخاوف والتوقعات. تشير صحة الجنين إلى أن نمو الجنين مناسب لفترة الحمل والتكوين الطبيعي للجنين وتعتمد صحة الجنين على صحة الأم الجيدة طوال فترة الحمل ويعد حساب حركة الجنين طريقة تقوم بها السيدة الحامل بالمراقبة الذاتية لحركة الجنين لتقييم حالة الجنين. لذلك هدفت هذه الدراسة إلى تقييم تأثير البرنامج التعليمي عن مراقبة حركة الجنين على الإرتباط ما قبل الولادة للبكرات. وأجريت هذه الدراسة في العيادة الخارجية لقسم النساء والتوليد بمستشفى جامعة بنها. وقد تم اخذ عينة غرضية مكونة من 60 سيدة حامل. أوضحت الدراسة أن هناك إرتباط إيجابي ذات دلالة إحصائية بين مجموع المعلومات الكلى للسيدات الحوامل وممارساتهن الذاتية قبل وبعد البرنامج التعليمي بينما كان هناك إرتباط إيجابي ذات دلالة إحصائية عالية بين مجموع المعلومات الكلى للسيدات الحوامل وممارساتهن الذاتية بعد شهر واحد من تنفيذ البرنامج التعليمي. يمكن الاستنتاج أن تطبيق البرنامج التعليمي عن مراقبة حركة الجنين كان له تأثير إيجابي على تحسين معلومات وممارسات الرعاية الذاتية والإرتباط لدى السيدات البكرات. لذلك تم دعم فرضية الدراسة وتم تحقيق الهدف من الدراسة. وأوصت الدراسة بتنفيذ الاستراتيجيات المناسبة لتعزيز إرتباط الأم بالجنين وتصميم برنامج التثقيف الصحي لتحسين وعي السيدات الحوامل فيما يتعلق بممارسات الرعاية الذاتية لحساب حركة الجنين وإرتباط الأم بالجنين وتوزيع الكتيب التعليمي الخاص بحساب حركة الجنين في جميع أقسام التوليد وأمراض النساء بمدينة بنها .