



F-KICO (FETAL-KICK COUNT) INNOVATION NEEDS ANALYSIS FOR MONITORING FETAL WELL-BEING AND MATERNAL-FETAL ATTACHMENT

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ABSTRACT

Fetal movement is an indicator of fetal well-being that can be monitored independently by pregnant women. Counting fetal movements affects the attention and maternal-fetal attachment which has an impact on health practices and the health of the baby. The problem is that pregnant women don't care about the importance of counting fetal movements and in practice counting they often forget or fall asleep before getting ten counts. Objective: to analyze the experiences and needs of independent fetal well-being monitoring devices by pregnant women that can stimulate maternal-fetal attachment. Methods: In-depth interviews were conducted on ten primigravidas at 24-36 weeks' gestation, the instrument was a researcher using an interview guide. Data analysis uses data compaction techniques, data presentation and conclusion/verification. Result: based on coding analysis of keywords, ten categories and four themes were found, namely the perception of the benefits of counting fetal movements; previous experience and behavior; obstacles to the implementation of fetal motion counts; expectations about the method/tool for calculating fetal motion. Conclusion: the findings of the theme underlie the need for the development of a fetal kick count that can be used in monitoring fetal well-being independently by pregnant women and stimulating maternal-fetal attachment.

Keywords: Fetal kick count, fetal well-being, pregnant women

INTRODUCTION

Perinatal mortality is a problem for developing countries including Indonesia. WHO data for 2020 shows that the infant mortality rate (IMR) in the world is still high, namely 27.4/1000 live births, the highest rate is due to premature and low birth weight births (WHO, 2019). In Indonesia, IMR is 19.5 per 1000 live births, with the 2020-2024 RPJMN target of 16/1000 live births (RPJMN, 2020). Global policies in overcoming maternal and infant problems are mentioned in the third target of SDGs, good health and well-being with one of the targets to reduce IMR by 2030 to at least 12/1000 live births. Efforts to reduce IMR have been carried out by the government, among others, with antenatal care services at least 4 visits, childbirth and postpartum, improving the referral system and mother class program.(Permenkes, 2019). Until now these efforts have not been able to meet the expected targets, so efforts are needed to improve services since pregnancy.

Pregnancy is an important situation in a mother's life that requires physiological and psychological adaptation. Pregnancy adaptation is an important basis for the mother to build a relationship with the fetus during pregnancy (AlAmri & Smith, 2022; Berthelot et al., 2020). Maternal-Fetal Attachment (MFA) is a bond of attachment between mother and baby with love and affection, plays an important role in the health of the mother and fetus and influences the mother's decision to behave healthily during pregnancy, this was revealed in

research(Wahyuntari & Puspitasari, 2021;Purwati et al., 2023). The maternal-fetal attachment relationship contributes to the protection provided by the mother to the fetus, reflected in the behavior of attention, love, affection, touch, communication, monitoring of fetal movements and fetal care activities (Baltacı & Başer, 2018;Khalili et al., 2020).

Studies prove that a strong mother-fetus bond has an impact on the health practices of mothers during pregnancy and preparing for birth (Shin & Kim, 2011;Doaltabadi & Farahani, 2021). Bad MFA can affect mood, fetal well-being and worsen pregnancy outcomes, babies can be born prematurely, low birth weight, fetal distress to fetal death (Nakamura et al., 2022; Røhder et al., 2020). Studies that show good MFA quality have a significant impact on fetal well-being and the growth and development of infants after birth to 3 months of age (Hassan & Hassan, 2017).

Fetal well-being is the condition of the fetus in a healthy state measured by heart rate and fetal movement. Fetal movements can be felt by the mother as a result of pressure behind the abdominal wall by the movement of the fetal limbs. These movements can be felt from the 20th week of gestation, getting clearer and stronger with advancing gestation (Güney & Uçar, 2019; AlAmri & Smith, 2022). Fetal movement was measured using the Cardiff Count of Ten technique, namely the fetus is said to be healthy and prosperous showing 10 series of movements in less than 12 hours. If less than 10 sets of movements last more than 12 hours, there is a risk to fetal well-being(AlAmri & Smith, 2022; Paiss et al., 2023). Decreased fetal movement as a sign of fetal health problems, initiated by a lack of placental perfusion originating from oxygenation of the mother, causing hypoxia. Prolonged hypoxia is at risk of acidosis, decreased fetal pH, which disrupts metabolism, fetal growth, cell death, tissue damage, organ failure to fetal death (Paiss et al., 2023).

Monitoring fetal movement is an action that can be performed by pregnant women independently to determine the well-being and signs of danger to the fetus. Besides that, counting fetal movements can trigger caring behavior, the mother's attention to the fetus (Mohapatra et al., 2021; Lai et al., 2016). The movement of the fetus that is felt gives the mother confidence that the fetus exists and is alive, will instinctively stimulate the mother to move, stroke, talk so that the fetus responds with further movements. This maternal-fetal emotional connection has a positive impact on the uteroplacental circulation so that the fetus is maintained healthy (Delaram et al., 2018; AlAmri & Smith, 2022). The results of a study were also reported which stated that counting fetal movements affects the attitudes and actions of mothers who pay more attention to the fetus which has an impact on the development of the fetus to the baby (Yani et al., 2021).

The problem found is that the mother has felt fetal movements generally started for 20 weeks of gestation, but does not understand the importance of counting fetal movements at a certain time period. Pregnant women who have been taught the technique of counting fetal movements have not been able to carry them out due to busy household activities, work activities, and often fall asleep or forget before getting 10 sets of fetal movements. The purpose of this study was to examine and analyze the need for independent fetal movement monitoring by pregnant women.

METHODS

Study design

Research with a qualitative design exploratory descriptive approach, namely research to find out the phenomenon of the object of research and the conclusions drawn are phenomena

that occur in the object of research (Creswell, 2018). The research method uses in-depth interviews with pregnant women.

Sample

The population of this study were pregnant women in 27 working areas of basic health services in Bantul, Yogyakarta, Indonesia. The sample technique uses purposive sampling (Verma & Verma, 2020). The inclusion criteria were pregnant women in the working area of the Health Center in Bantul Regency, Yogyakarta Indonesia, single pregnancy, normal pregnancy and willing to become participants. Exclusion criteria were able to communicate fluently and had no history of psychiatric disorders. The number of samples is 10 pregnant women participants.

Table 1. Characteristics of In-depth Interview Participants

In-depth Interview Participant	Age	Gestational age	Education	Gravida Status
P1	30	36	Senior high school	Secondigravida
P2	35	30	Bachelor degree	Multigravida
P3	36	36	Senior high school	Multigravida
P4	23	32	Senior high school	Primigravida
P5	25	28	Senior high school	Primigravida
P6	23	30	Junior high school	Primigravida
Q7	29	32	Senior high school	Primigravida
Q8	23	28	Senior high school	Secondigravida
Q9	24	36	Senior high school	Primigravida
P10	24	27	Senior high school	Primigravida

Most of the in-depth interview participants were aged 20-30 years, namely 6 (60%) participants, 8 (80%) third trimester, 8 (80%) had high school/vocational school education and 6 (60%) were primigravidas.

Method of data gathering

In-depth interviews were conducted on 10 pregnant women, while the researchers as interview instruments were guided by interview guidelines. In-depth interview in a mutually agreed and conducive place. The implementation of the in-depth interview was recorded, documented with photos and stored in mp3 and mp4 formats and made verbatim in a Microsoft Word document. The interview guideline has been tested by expert judgment and produced notes on revised sentence structure and CVI score: 0.91, meaning that the interview guideline instrument is valid. Prior to use, revisions were made based on input from experts. The interview guide included questions about the importance of counting fetal movements, educational experiences and practice of counting fetal movements and expectations in the practice of counting fetal movements.

Methods of data analysis

The data analysis stage of the in-depth interview results refers to the opinions expressed by Miles and Huberman. Three stages in analyzing qualitative research data: (1) data condensation, (2) data presentation, and (3) drawing conclusions/verification. Researchers use the validity of the data to confirm the truth of the research. The validity criteria consist of credibility, transferability, dependability, and confirmability (Joukl et al., 2022). Data

compression includes condensing the meaning expressed by the participants into a shorter formulation and concise, in an effort to capture diversity participant perspective and synthesize data to maintain diversity communicated experiences (Taneichi & Rokkaku, 2020). Presentation of data is done by coding analysis, categorizing and defining. Coding is done by formulating the transcript into words with the same meaning and is used to make the code. A double check is performed that all code has condensed properly. The similarity of the code obtained is then formulated according to the appropriate category, then grouped into themes. The results of the analysis are presented in tables/diagrams consisting of codes, categories and themes. During data analysis, an iterative process was carried out in checking and adjusting transcripts, coding, categories, concluding themes.

Ethical considerations

The study was conducted after obtaining approval from the ethics committee of Universitas Aisyiyah Yogyakarta Indonesia number: 3095/KEP-UNISA/VII/2023 and a research permit from the Bantul District Health Office, Yogyakarta Indonesia, number: B/000.9.2/00179. In carrying out the research, participants were given information about the research objectives, sample, focus, in-depth interview method. Participants were informed about the documentation of in-depth interviews by recording and picture documentation. Participants data is made anonymous, verbatim, protocol and all documentation were archived for research purposes only. Participant consent was shown by signing an informed consent.

RESULTS AND DISCUSSION

1. Results

The results of indeph interview qualitative data analysis produced four themes, namely:

1.1. Perceived benefit of counting fetal movements

This theme was built from the findings of 2 categories based on the keywords expressed by the participants, namely the perception of the importance of calculating fetal movement and perceived benefits.

First category: **the perception of the importance of calculating fetal movement, generated from the keywords expressed by the participants**, as follows: "*It is important to know whether the fetus is healthy or not, whether it is active or not*" (P1); "*If the fetus doesn't move, you need to watch out for fetal movement which determines whether the fetus is healthy or not*" (P2).

second category, **perceived benefits**, resulting from the following expression: "*It can also be interaction between the mother and the fetus if it is said that interaction with the fetus is important so that it stimulates the development of the fetal brain*" (P2); "*I'm not worried, if there's a lot of movement, it's healthy, so if it's not enough, the mother is scared*" (P3); "*To find out if the baby is active or not, usually if I'm usually there should be movement for two hours, if you're not afraid, what's wrong or is it sleeping, is something not going well or what*" (P8).

1.2. Previous experience and behavior

Themes are generated from 4 categories:

The first category: **the experience of feeling the movement of the fetus**, is obtained based on the following expression: *"If you lie to your left, the kick is quite hard"* (P8); *"Mostly the lower right but the left also often moves. Yesterday he said it was still not established, the head on the ultrasound was already below but when the check-up was moved to the top again"* (P7).

Second category: **experience of getting education on counting fetal movements**, obtained from the keywords expressed as follows: *"never been, just saw it from the tiktok sis but it's not very clear yet"* (P6)

Third category: **previous fetal movement count experience**, obtained from the keywords expressed as follows: *"If you feel that it's finished once, it's counted once, when it's finished, if there's a pause, it's only two seconds later, move again, then enter again, then enter the second count."* (P5); *"If you are lying down or resting like that, then it seems like you made about three movements or when you were washing the dishes you suddenly felt it too"* (P10)

Fourth category: **used fetal movement counter**, generated from the respondent's expression: *"nothing, just use a watch"* (P1); *"use paper ticks like a table"* (P5); *"use timer"* (6); *"Use a cell phone to remember how many movements you made"* (P9).

1.3. Barriers to carrying out fetal movement counts

There are three categories that underlie the findings of this theme, namely:

First category: **lack of time**, generated from the keywords expressed by the participants as follows: *"During activities, for example when I'm on a laptop or when I'm out, I don't need to be patient anymore"* (P10).

Second category: **disturbed concentration**, the underlying keywords are: *"we don't know if it is a correct and normal movement or not because we are ordinary people"* (P2); *"Don't use any tools, don't use anything, just remember. How many movements are there, sometimes I forget, fall asleep"* (P5); *"The obstacle is forgetting if you don't write it down"* (P9).

Third category: **lack of knowledge**, based on participant expressions: *"difficult to remember, confused if the movement of the fetus is different from the heartbeat, it's not easy to understand"* (P3); *"I don't know, it's just stomach cramps, oh, just move like that"* (P6).

1.4. Expectations about methods/tools for calculating fetal motion

Found one category to get this theme, namely: **Fetal movement counting device**. The expressions conveyed by the participants were: *"every health center has equipment, it can be owned by pregnant women themselves if it is cheap and affordable"* (P3); *"There are tools such as digital or tools that we understand and can use when on the move"* (P4); *"a tool that is easy to carry anywhere, simple and easy to use, there is a timer"* (P5); *"easy to use and practical"* (P6).

The theme derivation image as follows:

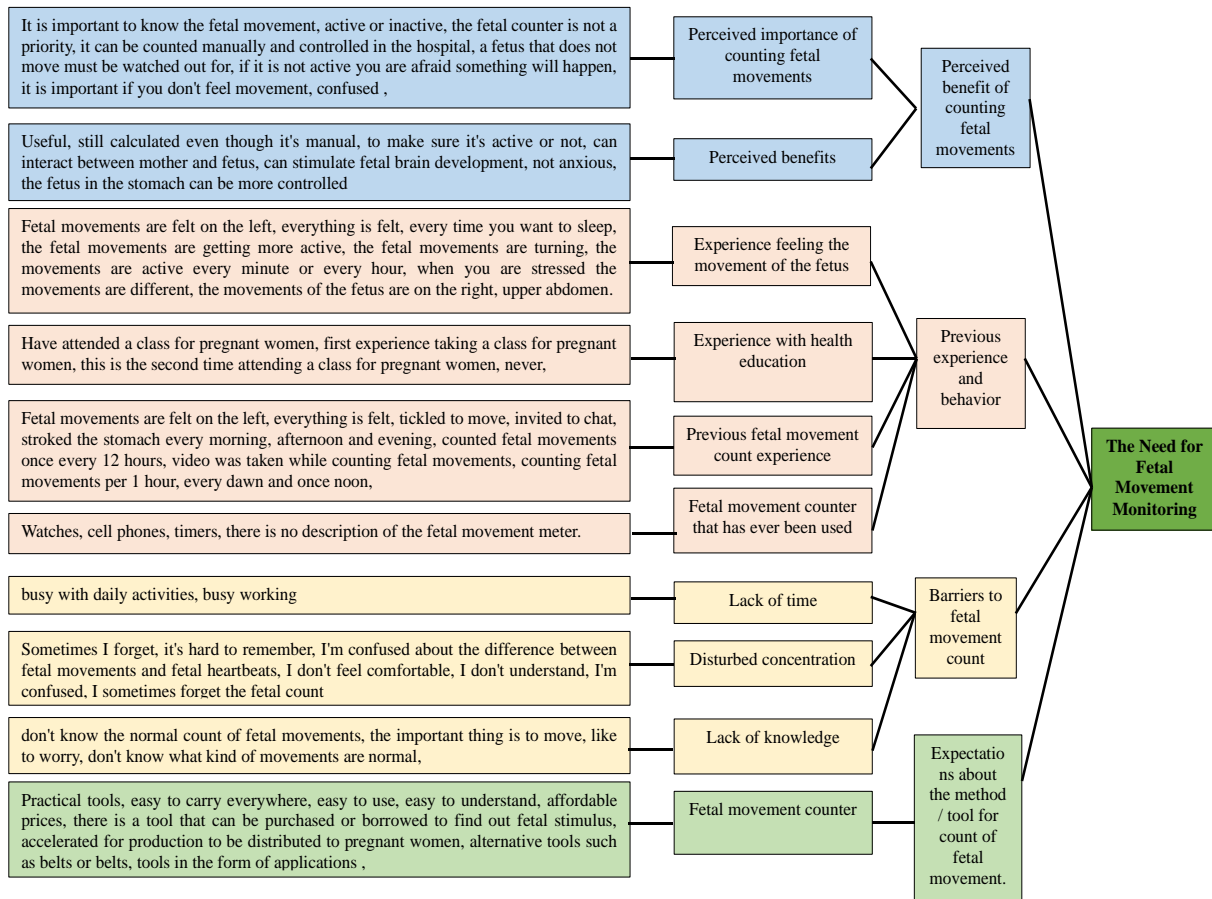


Figure 1. Results of Fetal Movement Monitoring Needs Analysis (Pregnant women informant)

2. Discussion

The results of this study indicate themes in answering the research objectives, namely to assess and analyze the need for independent fetal movement monitoring by pregnant women.

2.1. Perceived benefit of counting fetal movements

The findings of this theme reinforce pregnant women's understanding of the importance of counting fetal movements. It was revealed that the benefits of calculating fetal movements are important in knowing the well-being of pregnancy. Pregnant women need to know early warnings that can be identified from a decrease in the number of fetal movements. Studies say that the benefit of monitoring fetal movement is to assess the health of the fetus. Calculation of fetal movements every day can improve the mother's ability to recognize warning signs more quickly and the condition of the fetus in danger. Monitoring fetal movement normally gets at least ten movements in a span of 12 hours each day. Decreased fetal movement can pose a risk of complications such as fetal growth restriction and stillbirth (Mangesi et al., 2015). When the mother knows the benefits of counting fetal movements, the mother can understand and report if there is a decrease in fetal movement to the health worker, so that immediate action can be

taken to prevent infant morbidity and mortality. The findings stated that 99.9% of pregnant women said feeling the baby move every day was important (Yudianti et al., 2022).

Besides that, pregnant women understand that counting fetal movements can increase interaction between mother and fetus, increasing the bond between mother and fetus. The results of a normal count, fetal movements that are felt increase the mother's response to continue to interact by stroking and inviting communication with the fetus (Güney & Uçar, 2019b). This can provide comfort, calm, and oxygenation as well as blood circulation which brings nutrients to the fetus more adequately which has an impact on the well-being of the fetus. The results of the study support that there is a lack of knowledge about monitoring fetal well-being and affecting the low psychological condition of the mother, poor MFA actions and poor fetal well-being. Another study stated that from 100 first-time pregnant women, 52 pregnant women did not practice counting fetal movements, had never specifically counted fetal movements, were less concerned about the care and health of their fetus and did not understand the importance of doing MFA stimulation to improve guard behavior, love and care. her pregnancy (Mariani et al., 2020).

2.2. Previous experience and behavior

Participants' expressions in counting fetal movements provide important information about daily activities in calculating fetal movements. At the gestational age of 28 weeks and above, the mother can feel the activity of the fetus every day such as the abdomen where the baby's kicks are more often felt, whenever the fetus is actively kicking or moving. The theory states that at the age of 28 weeks, fetal movements can be felt clearly by the mother. The fetus can move approximately 30 per hour from gentle movements to movements that can be seen prominently in the mother's abdomen. The fetus moves more at night, but during the day movement will be identified more frequently after eating (Renzo et al., 2020). Movement felt by pregnant women and the theory that underlies it is an important part that can be used to determine the development of a fetal kick count device.

The understanding and experience of pregnant women in calculating fetal movements is greatly influenced by the information obtained. The education obtained provides understanding and stimulates behavior to carry out fetal movement counting activities with the right technique. Previous studies showed that pregnant women who received education using the health belief model approach for 3 months produced better health behaviors, pretest 45 ± 9.2 , posttest after 3 months 77 ± 9.7 , p value $<0/001$ (Bahabadi et al., 2020). Other research that health promotion has a significant relationship with lifestyle and health care behavior in pregnancy ($P<0.05$) (Zinsser et al., 2020). The results of this study provide reinforcement that education and training can provide understanding to pregnant women that can change health behavior for the better.

Attempts to make it easier to calculate fetal movements, often require equipment or instruments. This tool that has been used can be used for evaluation, function and effectiveness in helping to get easy and precise calculations. The results of the study on 1057 health workers proved that 73.8% of subjects stated that the use of tools that assist examinations is beneficial to obtain better examination results (Akselsson, 2020).

2.3.Barriers to calculating further fetal movements

The category obtained from participants' expressions about counting fetal movements due to lack of time, impaired concentration and lack of knowledge. Obstacles to the actions taken are important to know, as an effort to take action to minimize obstacles. Obstacles that can be overcome will give better work results. Obstacles found when counting fetal movements, such as lack of time due to busyness, can be overcome by setting the time to count fetal movements at rest. Disturbed concentration due to daily activities, can be overcome by counting fetal movements which can be done while relaxed and using practical and effective tools. Knowledge is lacking so that pregnant women are not interested or are not precise in calculating fetal movements, so training is needed to be able to calculate fetal movements accurately. Studies that support that the identified barriers must be strengthened with a good support system so as to support better behavior change (Neven et al., 2022; Degerli & Yildirim, 2022).

2.4.Expectations about the method / tool for calculating fetal movement

This theme is derived from the categories generated from the keywords: it is important that there is a tool used to calculate fetal movements in the basic service unit or that it can be owned by pregnant women themselves. Pregnant women expect a tool that is economical and affordable, can be used effectively and flexibly even with activities, a tool that can read the results of the fetal kick count automatically, can be used when on the move, has an accurate and practical count timer. Expectations of pregnant women and the results of the literature study are the main keys needed in developing a fetal kick count. The development of technology is getting faster and faster, the development of technology is getting more advanced (Di Renzo et al., 2020). This is corroborated by the findings that educational media for calculating fetal movements based on android affects the level of knowledge and behavior of pregnant women in calculating fetal movements better, with a p value of $0.000 < 0.05$ (Yani et al., 2021).

The basis used is the ten kick movement method, that is, if the fetus has reached ten movements in the count and 12 hours is sufficient, then it can be said that the fetus is in good health.(Mangesi et al., 2015). This method requires special time and concentration for a certain time, so a special tool is needed that can be used to calculate fetal kicks. The existence of a tool to calculate fetal movements can be applied while maintaining the interaction of the mother's affection for the fetus. The mother can still feel the movement of the fetus, stroke the fetus and communicate with the fetus. The calculation results obtained will increase the mother's happiness and further increase the interaction of mother-fetal affection thereby stimulating an increase in MFA. This bond will affect the well-being and health of the fetus until it is born.

LIMITATION OF THE STUDY

In the implementation of indeph interviews it was difficult to find all participants with primigravida status, so that there were participants with multigravida status. The time agreed for the implementation of the indeph interview varied, so that rescheduling was carried out repeatedly and there were participants who canceled the interview due to busyness, so they had to look for other participants.

CONCLUSIONS AND SUGGESTIONS

The results of a qualitative study of indeph interviews with ten pregnant women aimed at identifying four themes were obtained. Theme 1) perceived benefits of counting fetal movements; theme 2) previous experience and behavior; theme 3) obstacles to the implementation of fetal motion counting; and theme 4) expectations regarding methods/tools for calculating fetal motion. The findings of this theme form the basis for innovating practical, effective and efficient fetal movement counters to be applied independently by pregnant women and stimulating an increase in MFA. These findings can also be used as a basis for addressing previous limitations and weaknesses regarding the development of existing fetal counting devices, both manual and technological based.

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ETHICAL CONSIDERATIONS

This research has received ethical approval from the ethical commission of Universitas Aisyiyah Yogyakarta Indonesia.

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Conflict of Interest Statements

In this study, the author does not have a conflict of interest and the author is responsible for the entire series of research and writing of this article.

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