Research Article

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Knowledge Towards Fetal Movement Counting at Jimma Medical Center, Ethiopia

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ABSTRACT

Background: Fetal movement counting is a method used by pregnant women to assess fetal well-being, and it is crucial for avoiding bad pregnancy outcomes. Most adverse pregnancy outcomes are associated with the mother's ability to perceive and seek help for abnormal fetal movement counts throughout intrauterine life. Hence, this study aimed to assess the maternal knowledge of Fetal Movement Counts (FMC) among pregnant women in the Jimma University Medical Center, Jimma, Southwest Ethiopia.

Methods: A facility-based cross-sectional study of four hundred five participants was undertaken at Jimma University Medical Center from June 1 to July 30, 2022. A systematic sampling technique was used to gather data from pregnant women who were in the third trimester of pregnancy. A pre-tested questionnaire was employed. Data were collected using an interviewer-administered questionnaire. Bivariate and multivariate logistic regression analyses were conducted to examine the relationship between the dependent variable and predictors. Adjusted Odds ratio, 95% CI, and P-value of less than 0.05 were considered to determine the statistical association.

Results: This study involved 405 participants, with a 95.97% response rate. One hundred twenty-two (30.12%) respondents had good knowledge regarding FMC. Being an urban resident (AOR=.29, 95% CI (.16-.56)), gestational age of 32-36 weeks (AOR=.42, 95% CI (.24-.76)), having a high-risk pregnancy (AOR=5.34, 95% CI (2.46-11.60)) and being seen by a midwife (AOR=2.61, 95% CI (1.49-4.56)) were all statistically significant predictors with good knowledge of FMC.

Conclusion: This study reported that the overall maternal knowledge regarding fetal movement counting was low. Being an urban resident, gestational age of 32- 36 weeks, having a high-risk pregnancy, and getting midwife care were significant factors in this study. Healthcare providers and other concerned bodies should educate pregnant women about fetal movement counts and their benefits during the prenatal period.

Abbreviations
ACOG: American Congress of Obstetricians and Gynecologists
AOR: Adjusted Odd Ratio
CI: Confidence Interval
COR: Crude Odd Ratio
FMC: Fetal Movement Counts
JUMC: Jimma University Medical Center
OPD: Outpatient Department
SD: Standard Deviation

Introduction
Fetal movement counting is a non-invasive method performed by pregnant mothers to track their infants' movements with the goal of reducing adverse obstetrical outcome [1]. Normally, fetal movement is felt with range of 16-20 weeks of gestational age [2]. Several methods for counting movements have been proposed, including the perception of at least ten movements during 12 hours and at least ten motions during two hours of rest. According to the American Congress of Obstetricians and Gynecologists, the criteria of diminished fetal movement demonstrated less than 10 movements within two hours when the fetus was active [3]. Perceived change of the pattern of fetal movements by pregnant mothers implies a worse pregnancy outcome [4,5].

Routine fetal movement counts have a favorable impact on reducing stillbirths and poor obstetric outcomes [6,7]. Awareness of decreased fetal movements might drive pregnant mothers to

make an early decision for seeking help. Every year, around 2 million stillbirths occur worldwide [8]. Low- and middle-income nations account for 84% of all stillbirths. According to the 2019 Ethiopian Demographic Health Survey, the stillbirth rate was 12 per 1000 live births [9]. A single institutional study conducted in Ethiopia also revealed that the proportion of stillbirths accounted for 12.5% [10].

A few research are available, and they reveal that mothers' knowledge of fetal movement counts varies across countries. The previous studies conducted in the United States (Florida), Canada, India, Indonesian, Nigeria and Egypt revealed that 83%,18%, 13%, 52.94%, 10.3%, and 31.1% of participants possessed good knowledge regarding their fetal movement respectively [7, 11-15].

Indeed, it has been shown that fetal movement counting improves pregnancy outcomes [7]. However, there has been no study conducted in Ethiopia to recognized how many mothers understand the method, when, and how to perform FMC during the perinatal period. Therefore, this study aimed to investigate maternal knowledge of fetal movement counts during intrauterine life.

Methods and Materials
Study Area and Period
This study was carried out at Jimma University Medical Centre (JUMC) from June 1, 2022 to July 30, 2022, among women who received ANC. JUMC is located in Jimma town, 355 kilometers to the South-West of Ethiopia's capital city, Addis Ababa. Jimma University Medical Centre is a referral hospital that provides health care services to the people of southwestern Ethiopia. It contains major unit for Emergency, Surgical, Medical, Pediatric, gynecologic and Obstetric Care. Annually, 4,332 pregnant women accessed antenatal care services, and 5,267 women got delivered service at JUMC in 2022. (Source: Health Information Management System of JUMC, https://dhis.moh.gov.et/dhis-web-custom-report/index.html#/report).

Study Design
A facility based cross-sectional study was applied.

Study Participants
All pregnant women who received antenatal care at Jimma University Medical Centre were considered the source population. Pregnant women in their third trimester who had ANC contact at Jimma University Medical Centre throughout the study period were the study population.

Inclusion and Exclusion Criteria
This study included pregnant women who had a gestational age of 28 weeks or more who attended Jimma University Medical Centre during the data collection period. In contrast, pregnant women who had multiple (twin) pregnancy, severely ill and unable to response during data collection were excluded from the study.

Sample size Determination
A single population proportion formula was used to estimate the

sample size $(\mathbf{n} = \frac{(Z\alpha/2)^2 * p(1-p)}{d^2})$. By considering the following

assumption p: proportion assumed 50% (0.5) because there is no previous study conducted in the study area, Z: the standard value or variable at the required level of confidence (95%) and then becomes 1.96, d: margin of error (5%). ni: - the initial sample size

becomes 384; after accounting for the 10% non-response rate, the final sample size was 422.

Sampling Procedure and Technique
The annual ANC visit report for the year 2022 was obtained from Health Information Management System of JUMC, and the two-month report was estimated using this data. The anticipated two-month ANC report (722) was divided by a sample size of 405, yielding the Kth-interval (722/422=1.71~2). Finally, pregnant women who had sought ANC were selected for interviews at every second interval, based on their order of arrival. As a result, the study participants were selected using a systematic sampling method.

Data Collection Tool & Procedure
The questionnaire was adapted from a similar studies and modified after review of other related studies [7,16]. The questionnaire consisted of three parts. The first part, socio-demographic characteristics comprises of 7 items, the second part contains 9 items dealing with obstetrics-related characteristics, and the third part contains 6 questions dealing with maternal knowledge of fetal movement counts. Three Bachelor of Science (BSc) midwives and one Master of Science (MSc) persons were hired to handle data collecting and supervision. Data were collected using interviewer-administered questionnaire.

Operational Definition
Knowledge: In this study context, knowledge means the capacity to feel, understand, and report the reduction, absence, or rapid rise of fetal movements [17].
Good Knowledge: The study participants who scored higher than or equal to 50% on the overall knowledge questions [18].
Poor Knowledge: The study participants who scored less than 50% on the overall knowledge questions.
Fetal Movement Counts: A simple and non-invasive method that pregnant mothers use to track fetal movement [17].

Data Quality Control
The questionnaire was written in English first, then translated into Amharic and Afan Oromo, and then back to English. Two days of training were provided to data collectors and supervisor. In order to ensure quality of data, a pilot study with 22 pregnant women prior to the actual data collection period was conducted in another setting (Agaro general Hospital). Then appropriate corrections were made before using it for main study. The tool's reliability was confirmed using Cronbach alpha (its value was 0.76). Moreover, the face and content validity of the questioners were assessed.

Data Analysis
The collected data was coded and imported into Epidata version 3.1. The data was then exported and analyzed using the Statistical Package for Social Sciences (SPSS) version 25. Bivariate and multivariate logistic regression analyses were used to find relevant predictors. In bivariate logistic regression, variables with a p-value < 0.25 were evaluated for multivariate logistic regression. In multivariate regression, p-values < 0.05 were considered statistically significant. Finally, the study findings were narrated using text, tables, and figures.

Results
This study included 405 participants, with a response rate of 95.97%. Nearly half of the respondents, 189 (46.66%), were aged 25 to 31. More than 80% of the participants had completed the

primary and secondary education levels. Furthermore, more than two-thirds of the 282 respondents (69.62%) came from urban areas. In terms of marital status, more than three-quarters of the participants (323, 79.75%) were engaged (See: Table 1).

Table 1: Socio-demographic characteristics of pregnant women who visit Jimma Medical Center, Jimma, Ethiopia, 2022

Variables	Category	Frequency	Percentage (%)
Age	18-24	137	33.82%
	24-31	189	46.66%
	31-38	63	15.55%
	38+	16	3.95%
	Mean & SD	26.78±5.587	
Religious	Orthodox	119	29.38 %
	Muslim	187	46.17%
	Protestant	73	18.02%
	Catholic	26	5.77%
Marital status	Married	323	79.75%
	Divorced/widowed	63	15.55%
	Single	19	4.69%
Level of education	Unable to read or write	51	12.59%
	Primary education	158	39.01%
	Secondary education	116	28.64%
	College & above	80	19.75%
Residence	Urban	282	69.62%
	Rural	123	30.37%
Ethnicity	Oromo	291	71.85%
	Amhara	61	15.06%
	Tigire	34	8.39%
	Other*	19	4.69%
Occupation	Farmer	41	10.12%
	Housewife	188	46.41%
	Private employee	47	11.60%
	Government employee	32	7.90%
	Merchant	34	8.39%
	Student	45	11.11%
	Daily labor	16	3.95%
	Other**	2	0.49%

Key: * Kaffa, Sheka, Yem ** Unemployed

Obstetrics Characteristics

Nearly two-thirds of 262 (64.7%) respondents had been pregnant more than twice, followed by 100 (24.7%) first-time pregnant women. One hundred eighty-six women were found between 28-32 weeks of gestation. Most respondents 376 (92.8%) had a history of antenatal care visits. Of those who had a history of ANC visits, 168(40.5%) had visited antenatal care 4 times. More than three-fourths of the participants 336(83%) were categorized as having low-risk pregnancies (See: Table 2).

Table 2: Obstetrics-Characteristics of Pregnant Women who Visit Jimma Medical Center, Jimma, Ethiopia, 2022

Variables	Category	Frequency	Percentage (%)
Gravidity	Primi-gravida	100	24.69%
	Multigravida	262	64.69%
	Grand multigravida	43	10.61%
Gestational Age	28-32 week	186	45.92%
	32 -36 week	114	28.14%
	37-40 week	105	25.92%
ANC visit	Yes	376	92.83%
	No	29	7.16%
Number of ANC visit	Once	5	1.23%
	Twice	54	13.33%
	Three	103	25.43%
	Fourth	164	40.49%
	>5	50	12.34%
History of medical illness	Yes	39	9.62%
	No	366	90.37%
Smoking habit	Yes	23	5.67%
	No	382	94.32%
Body Mass Index (BMI)	Underweight(18.5kg/m2)	11	2.71%
	Normal weight(18.5kg/m2-24.5kg/m2)	309	76.29%
	Overweight (25 kg/m2-30kg/m2)	77	19.01%
	Obese(>30kg/m2)	8	1.97%
Pregnancy status	High risk	69	17.03%
	Low risk	336	82.96%
Providing health care service	Doctor	250	61.72%
	Midwife	155	38.27%

Overall, Knowledge Status

In terms of fetal movement counting, this study found that 122 (30.12% with 95% CI (25.62-34.62)) of the participants had good knowledge of fetal movement counting, whereas the remaining 283 (69.90%) respondents had inadequate understanding of fetal movement counts throughout pregnancy (Figure 1).
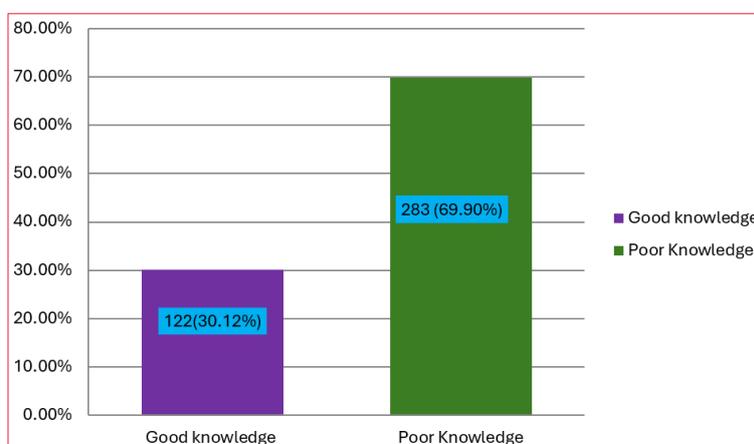

Figure 1: Frequency and Percentage Distribution of Level of Knowledge Regarding Fetal Movement Counting among Women who Attend Jimma Medical Center, Ethiopia, 2022.

The Associated Factors of Maternal Knowledge

In bivariate logistic analysis, six independent variables (education status, residence, gravidity, gestational age, pregnancy status, healthcare provider, and prior medical status) were identified as candidate variables for multivariable logistic regression. However, multivariate logistic analysis indicated that only four predictors were significantly associated with knowledge of FMC. The factors of being an urban resident (AOR=.29, 95% CI (.16-.56), gestational age of 32-36 weeks (AOR=.42, 95% CI (.24-.76), and being

gestational age of 37-40 weeks (AOR=.19, 95% CI (.11-.36) were inversely linked with good knowledge of FMC. Having a high-risk pregnancy (AOR=5.34, 95% CI (2.46-11.60), and being seen by a midwife (AOR=2.61, 95% CI (1.49-4.56) were predictors positively linked with good understanding of FMC (Table 3).

Table 3: Bivariate and Multivariable Logistic Regression of Mother Knowledge on Fetal Movement at Jimma Medical Center, Jimma, Ethiopia, 2022

Predictors	Category	Good knowledge	Poor knowledge	COR(95% CI)	P-value	AOR(95%CI)
Education status	Unable to read and write	6	45	1		1
	Primary education	48	110	3.27(1.31-8.19)	.013	2.18(0.90-7.88)
	Secondary education	40	76	3.95(1.55-10.04)	.021	3.83(0.89-9.36)
	College & above	28	52	4.04(1.53-10.63)	.342	3.71(0.36-7.65)
Residence	Rural	16	107	1		1
	Urban	106	176	.25(.14-.44)	.002	.29(.16-.56)** .000
Gravidity	Primi-gravida	26	74	1		1
	Multigravida	86	176	.72(.43-1.20)	.242	.54(.31-1.07)
	Grand multigravida	10	33	1.16(.50-2.67)	.302	1.12(.32-2.58)
Gestational age	28-32 week	32	154	1		1
	32 -36 week	36	78	.45(.26-.78)	.011	.42(.24-.76)**
	37-40 week	54	51	.19(.11-.34)	.032	.19(.11-.36)**
Pregnancy status	Low-risk	112	224	1		1
	High-risk	10	59	2.95(1.45-5.98)	.015	5.34(2.46-11.60)**
Provider of healthcare service	Doctor	98	152	1		1
	Midwife	24	131	3.52(2.13-5.82)	.004	2.61(1.49-4.56)**
Previous medical illness	No	114	252	1		1
	Yes	8	31	1.75(.78-3.93)	.241	1.63(.76-.2.81)

Keys: COR: Crude Odd Ratio, AOR: Adjusted Odd Ratio, 1Reference category, **p-value < 0.05

Discussion

The study's findings revealed that 30.12% of participants were knowledgeable with fetal movement counts. This conclusion was congruent with research performed in Nigeria, which showed that 31.1% of respondents were aware of diminishing fetal activity [14]. However, the study's findings were lower than those of earlier studies conducted in Indonesia, Florida (United States) and Canada which showed that 52.9%, 83%, and 47.5% of pregnant women, respectively, were knowledgeable with fetal movement counts [7,11,19]. The disparity was caused by differences in the quality of health care services, health literacy, study time, study site, and demographic.

In contrast, the current study's findings were greater than that of previous studies conducted in Egypt (10.3%), India 17%, Puducherry (India) 13.3%, and New Zealand (25%) [12,15,16,19]. This disparity might be attributed to differences in the research location, population, quality of health care services, health literacy, and health care policy.

The present study also claimed that 189 (46.7%) respondents thought that fetal movement decreased closer to the due date. Similarly, a study conducted in Canada revealed that around 37.5% (114/304) of respondents stated that it may be usual for fetal movement to cease around the date of delivery [7]. However, a study conducted in Norway confirmed that fetal movement doesn't decrease closer to the due date [2]. Most women have

a misconception that fetal movement will decrease closer to the due date. This argument arose due to a lack of trained health professional to teach fetal movement patterns, as well as a lack of a clear standard manual for monitoring of fetal movement count [16,20]. Recognizing the value of health information, education, and communication is crucial for recognizing and intervening, as well as having a shared understanding of aberrant fetal movements [21,22].

This study found that respondents from urban areas have lower levels of knowledge than those from rural areas. Pregnant women who reside in urban were 71% less likely had good knowledge of FMC. It might be linked to the Ethiopian government's recent launch of a new Maternal Waiting Homes initiative; it provides a conducive setting for pregnant women from rural regions to remain calm and follow any health advice given by health professionals. It also enhances their understanding of monitoring fetal movement during intrauterine life [23].

Moreover, study participants with gestational weeks of 32-36 were 58 % less likely had good knowledge than respondents of 28-32 weeks. Similarly, participants with gestational weeks of 32-36 were 81 % less likely had good knowledge of FMC than respondents with gestational age of 28-32 weeks. This might be due to the fact that as the gestational age increase, the motions may appear more constrained due to the limited space available, and responders may be unable to detect it accurately [20].

Pregnant mothers at high risk were more knowledgeable about fetal movement counts than those at low risk. This study found that high-risk pregnant women were five times more likely had good knowledge than low-risk pregnant women. A comparable study done in Norway claimed that decreased mother awareness of fetal movement was connected with risk of pregnancy [24]. This was attributed to high-risk pregnant women receiving inpatient care in a health institution, where health care workers paid special attention to them and urged them to perform daily fetal movement kick counts. It might be improves comprehension of fetal movement monitoring using a kick count sheet.

This study also found that pregnant women who were seen by a midwife were twice as likely to have a better understanding of fetal movement as those who got care from other caregivers. A study conducted in the United Kingdom (UK) found that there was a wide range of information about the correlations with decreased fetal movement and how to handle women who present with decreased fetal movement [25]. Indeed, it might be strongly related to the concept of midwifery continuity care; providing healthcare services by the same midwives throughout pregnancy allows women to increase their knowledge and understanding of monitoring fetal movement counts [7].

Implication of Study
These investigations identify abnormal fetal movement early, allowing for prompt intervention, including delivery, and perhaps sparing adverse birth outcomes like as intrauterine fetal death and stillbirth. This study implication to figure out the extent of pregnant women's knowledge of fetal movement counts during the perinatal period. It is also used to provide empirical data for healthcare policymakers and future researchers.

Limitations of this Study
First, due to the cross-sectional design, the current study did not reveal a cause effect relationship. Second, the study was limited to a specific healthcare facility, therefore the findings may not be generalizable.

Conclusion
This study found that mother knowledge of fetal movement counts was limited. Being an urban resident, having a high-risk pregnancy, gestational age between 32 and 36 weeks, and being seen by a midwife were all significant predictors of the outcome variable. Based on the study's findings, the authors urge that pregnant women do fetal movement counts, and that anybody experiencing decrease or excessive fetal movement seek medical assistance at their local health institution. This study also advised that healthcare providers educate pregnant women on fetal movement counts.

Declaration
Ethics Approval and Informed Consent
The study received ethical approval from Jimma University's Institutional Review Board (IRB) (Ref: No IRB/000665/2022). The Jimma University Medical Centre then provided a permission letter to carry out the study. Written informed consent was obtained from the study participants. To protect anonymity, respondents' names were not involved on the surveys. Moreover, the ethical principle of the study was conducted in accordance with the declaration of Helsinki.

Author Contributions
All authors (TB, KC, AY, and BF) contributed to the conception and design, data acquisition and analysis, data interpretation, paper drafting, and critical revision. The authors have reviewed and approved the final manuscript draft that will be published. Furthermore, the authors agreed to accept responsibility and accountability for the contents of the work.

Data Availability Statement
The corresponding author will provide the data if a reasonable request is made.

Conflict of Interest
No conflicts of interest were disclosed by the authors.

Consent to Publication
Not applicable

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