SCIENTIFIC
Research and Community

Review Article   **Open Access**

Maternal Knowledge on Fetal Movement Counting at Jimma Medical Center, Ethiopia

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ABSTRACT

Background: Antenatal fetal surveillance is a method of monitoring fetal well-being during intrauterine life. Fetal movement counting is a parameter of antenatal fetal surveillance and it plays a vital role in reducing stillbirth and prenatal mortality.

Aim: To assess maternal knowledge of fetal movement monitoring among pregnant women in the Jimma University Medical Center, Jimma, Southwest Ethiopia.

Methods: A health care facility-based cross-sectional study was conducted at Jimma University Medical Center on 405 pregnant women regarding their knowledge status of fetal movement counting from June 1 to July 30, 2022. The data were collected using a systematic sampling technique with face-to-face interviews. A pretested questionnaire was used to measure the study participants' level of knowledge regarding fetal movement counting. Bivariate and multivariate logistic regression analyses were conducted to identify factors linked to knowledge of fetal movement counting. A p-value of less than 0.05 indicated statistically significant.

Results: This study included 405 participants, with a 95.97% response rate. One hundred twenty-two (30.12%) respondents had good knowledge regarding their fetal movement count. Residence [AOR=.29, 95% CI (.16-.56), P value;.000], gestational age [AOR=.42, 95% CI (.24-.76); P-value;.004], high-risk pregnancy [AOR=5.34, 95% CI (2.46-11.60); P-value;.000] and health care provider [AOR=2.61,95% CI (1.49-4.56); P-value;.001) were significant predictors of maternal knowledge.

Conclusion: This study reported that the overall maternal knowledge regarding fetal movement monitoring was low relative to previously conducted studies. Healthcare providers and other concerned bodies should enhance maternal knowledge of fetal movement count during the ANC periods.

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

Introduction

Every year, almost 2 million stillbirths occur worldwide [1]. 84% of these occur in low- and middle-income nations, with Sub-Saharan Africa alone having a 7-fold higher stillbirth rate than high-income countries (21.7 vs. 3.1 per 1000 births). Ethiopia has a stillbirth rate of 24.6 per 1,000 births. A single institutional study conducted in Ethiopia revealed that the proportion of stillbirths accounted for 12.5% [2].

Normally, fetal movement is felt within the gestational age of 16-18 weeks and 18-20 weeks by prim-gravida and multigravida pregnant women respectively [3]. Excessive or reduced fetal movements are linked to intrauterine growth restriction and stillbirth [4]. Women who report inadequate or diminished fetal movements should be monitored further and investigated if necessary. Furthermore, all healthy pregnant women should be educated on the importance of fetal movements in the third trimester and be encouraged to report any decreases in fetal movements to their healthcare provider [5]. Several methods for counting movements have been proposed,

including the perception of at least ten movements during 12 hours of typical maternal activity and at least ten motions during two hours of rest and counting by the mother. According to the American Congress of Obstetricians and Gynecologists (ACOG), the criteria of diminished fetal movement demonstrated less than 10 movements within two hours when the fetus was active [6].

Monitoring fetal movement has a positive significance in the reduction of stillbirth and poor obstetric outcomes and the purpose of fetal movement monitoring is timely presentation to a health care professional, so that there is a potential of intervention in cases of preventable stillbirth [7,8]. However, there is insufficient evidence on maternal knowledge of fetal movement. Studies conducted worldwide including 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. Indeed, adequate knowledge about fetal movement monitoring helps avoid intra uterine fetal complications and determines a timely decision to seek intervention [9-14].

As far as we know, no studies have been conducted in Ethiopia on maternal knowledge of fetal movement. Therefore, this study aimed to investigate maternal knowledge of fetal movement among pregnant mothers in their third trimester.

Methods
Study Area and Design
This was a health facility cross-sectional study done at Jimma University Medical Center from June 1, 2023 to July 30, 2022, among women who had antenatal care (ANC) visits. The study received ethical approval from Jimma University's Institutional Review Board (Ref: No IRB/000665/2022). Written informed consent was obtained from the study participants. Furthermore, the ethical deceleration in the study was carried out in compliance with the declaration of Helsinki.

Inclusion and Exclusion Criteria
This study included pregnant women with a gestational age of 28 weeks or more who attended Jimma University Medical Centre during the data collection period. This study excluded pregnant women in their first trimester, those who refused to participate in the study, and those who were very unwell during data collection.

Sample Size Determination
A single population proportion formula was used to estimate the sample size $\left(\mathbf{n} = \frac{(z\alpha/2)^2 * p(1-p)}{d^2}\right)$. By considering the following assumption p: proportion assumed 50% (0.5) because there is no previous research 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. The study participants were selected using a systematic sampling technique.

Study Instrument & Procedure
The questionnaire was adapted from a similar study and modified after review of other related studies [8,15]. The questionnaire consisted of three components. The first section has 7 items dealing with socio-demographic characteristics, the second section contains 9 items dealing with patient-related aspects, and the third section contains 6 questions dealing with maternal knowledge of fetal movement counting. Each correct response to the questioners' knowledge component received a score of '1', while erroneous answers received a score of '0'. The interpretation was that study participants who scored more than or equal to 50% of the overall score were considered knowledgeable. In contrast, study participants who scored less than 50% were regarded to have inadequate knowledge. Three Bachelor of Science (BSc) midwives and one Master of Science (MSc) persons were hired to handle data collecting and supervision. The supervisor and data collectors received two days of training. Data were collected from study participants through face-to-face interviews.

Data Quality Control
The questionnaire was written in English first, then translated into Amharic and Afan Oromo, and then back to English. 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. The multicollinearity was performed using the Variance Inflation Factor (VIF).

Statistical 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 text, tables, and figures were used to describe the study's findings.

Results
This study included 405 participants, resulting in a response rate of 95.97%. Nearly half of respondents, 189 (46.66%), were aged of 25 to 31. More than 80% of the participants had completed primary and secondary educational ranks. Approximately two-thirds of 282(69.62%) respondents came from urban residences. Regarding marital status, more than three-fourths of the participants 323(79.75%) were engaged (See: Table 1).

Table 1: Socio-Demographic Variables of Pregnant Women Who Visit Jimma Medical Center, Jimma, Ethiopia, 2022

Variables	Category	Frequency	Percent (%)
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

Patient Related Factors

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: Patient-Related Factors of Pregnant Women Who Visit Jimma Medical Center, Jimma, Ethiopia, 2022

Variables	Category	Frequency	Percent
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/m^2)	11	2.71%
	Normal weight(18.5kg/m^2-24.5kg/m^2)	309	76.29%
	Overweight (25 kg/m2-30kg/m^2)	77	19.01%
	Obese(>30kg/m^2)	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

Nearly one-third (30.12%) of the respondents had good knowledge of their fetal movement count, and the remaining had poor knowledge of monitoring of fetal movement count during pregnancy (Figure 1).
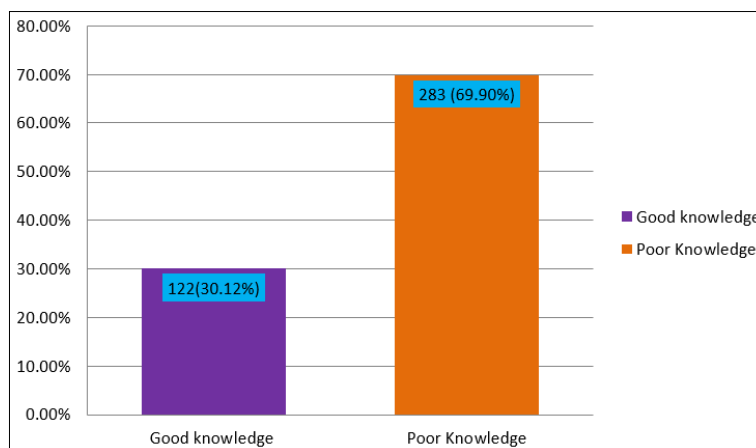
Figure 1: Frequency and percentage distribution of level of knowledge regarding fetal movement counting among women who visit Jimma Medical Center, Jimma, Ethiopia, 2022.

The Associated Factors of Maternal Knowledge
Binary logistic regression demonstrated that education status, Residence, gravidity, gestational age, pregnancy status, healthcare provider, and previous medical status were potential variables for multivariate logistic regression (Table 3).

Table 3: Bivariate 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
Level of Education	Unable to read and write	6	45	#	
	Primary education	48	110	3.27(1.31-8.19)	.013
	Secondary education	40	76	3.95(1.55-10.04)	.021
	College & above	28	52	4.04(1.53-10.63)	.342
Residence	Rural	16	107	#	
	Urban	106	176	.25(.14-.44)	.002
Gravidity	Primi-gravida	26	74	#	
	Multigravida	86	176	.72(.43-1.20)	.242
	Grand multigravida	10	33	1.16(.50-2.67)	.302
Gestational Age	28-32 week	32	154	#	
	32 -36 week	36	78	.45(.26-.78)	.011
	37-40 week	54	51	.19(.11-.34)	.032
Pregnancy Status	Low-risk	112	224	#	
	High-risk	10	59	2.95(1.45-5.98)	.015
Provider of Healthcare Service	Doctor	98	152	#	
	Midwife	24	131	3.52(2.13-5.82)	.004
Previous Medical Illness	No	114	252	#	
	Yes	8	31	1.75(.78-3.93)	.241

Keys: COR: Crude Odd Ratio #Reference category

However, multivariate logistic analysis revealed that only four predictors were significantly associated with the outcome variable: residence (AOR=.29, 95% CI (.16-.56), P value;.001), gestational age (AOR=.42, 95% CI (.24-.76); P-value;.004), pregnancy status (AOR=5.34, 95% CI (2.46-11.60); P-value;.001), and health care provider [AOR=2.61, 95% CI (1.49-4.56); P-value;.001) (Table 4).

Table 4: Multivariate Logistic Regression of Mother Knowledge on Fetal Movement at Jimma Medical Center, Jimma, Ethiopia, 2022

Predictors	Category	Knowledge Status		AOR(95% CI)	P-Value
		Good	Poor		
Residence	Rural	16	107	#	
	Urban	106	176	.29(.16-.56)	.000
Gestational Age	28-32 week	32	154	#	
	32 -36 week	36	78	.42(.24-.76)	.004
	37-40 week	54	51	.19(.11-.36)	.000
Pregnancy Status	Low-risk	112	224	#	
	High-risk	10	59	5.34(2.46-11.60)	.000
Provider of Healthcare	Doctor	98	152	#	
	Midwife	24	131	2.61(1.49-4.56)	.001

Keys: AOR: Adjusted Odd Ratio #Reference category *Significant predictors

Discussion

The findings of this study indicated a low level of maternal knowledge regarding fetal movement counting. It was revealed that, out of 405 total respondents, only one hundred twenty-two (30.12%) of study participants had good knowledge of fetal movement counting. This study was consistent with a study conducted in Nigeria, which found that 31.1% of respondents had good knowledge of decreasing fetal activity [12]. However, the study's findings were lower than those of previous research conducted in Indonesia, Florida (United States), and Canada which showed that 52.9%, 83%, and 47.5% of pregnant women respectively, had good knowledge of fetal movement counting [8,9,16]. The discrepancy was due to variations in quality of health care service, health literacy, study period, study setting, and population. In contrast, the figure of the present study was higher than that of previous studies conducted in Egypt (10.3%), India 17%, Puducherry (India) 13.3%, and New Zealand (25%) [10,15,16]. This discrepancy might be due to variations in the study area, study population, quality of health care services, 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 [8]. However, a study conducted in Norway confirmed that fetal movement doesn't decrease closer to the due date [3]. Most women have a misconception that fetal movement will decrease closer to the due date [15]. This controversy happen due to the lack of trained staff for fetal movement pattern education, and the lack of a standard protocol for fetal movement management [17]. Thus, recognizing the implications of health information, education and communication to assess and manage abnormal fetal movements is necessary [18,19].

This study demonstrated that respondents who come from urban residences have less knowledge than those who come from rural areas. According to this study finding study participants from urban areas were 71% less likely to have poor knowledge of fetal movement than respondents from rural residences. A study conducted at University of Central Florida revealed that participants from high economic class they may have had different access to health care and educational material than women in a lower socioeconomic position [9].

Moreover, study participants with gestational weeks of 32-36 were 58 times less likely to have better knowledge than respondents of 28-32 weeks. The variation might be due to respondents adapting the pattern of fetal movement through pregnancy and not being able to recognize it through time [17].

Pregnant Women at high risk had more knowledge about fetal movement counts than low-risk women. This study found that high-risk pregnant women were five times more knowledgeable than low-risk pregnant women. A Similar study conducted in Norway claimed that low maternal awareness of fetal activity was associated with an increased risk of pregnancy [20]. The health care providers also alert the high-risk pregnant women and give high attention to their fetal movement count through a kick count chart.

This study further demonstrated that pregnant women who were provided health care information by a midwife were twice more likely to have better knowledge of fetal movement than those who received health care from other caregivers. A study conducted in United Kingdom (UK) reported that large variation in the knowledge of associations with decrease fetal movement and management of women presenting with decrease fetal movement have been existed [21]. Indeed, those who receive health care information regarding fetal movement from a health care provider are more able to describe normal healthy fetal movement patterns and would be more inclined to seek aid promptly if fetal movements decreased [8].

Study Limitations

First, due to the nature of the cross-sectional design, the current study did not demonstrate a causal effect. Second, the study was limited to a single-center healthcare facility; therefore, the findings may not be generalizable.

Conclusion

This study pointed out that the majority of study participants had poor knowledge about fetal movement patterns. Respondents' residence, pregnancy status, gestational age, and healthcare providers were significantly associated predictors with maternal knowledge of fetal movement patterns. Healthcare providers and healthcare policymakers have to give priority to enhancing maternal knowledge of fetal movement counting.

Declaration
Ethics Approval and Informed Consent
Jimma University's Institutional Review Board provided ethical clearance (Reference: No IRB/000665/2022). The Jimma University Medical Center provided a permission letter to perform the study. All study participants provided written informed consent. To protect anonymity, respondents' names were not written on the surveys.

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