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Amira Abdallah
Werabe University
Belay Susu
susubelay19@gmail.com
Woldia University
Hussein Awol
Werabe University
Moges Sisay
Debre Berhan University
Abdurahman Mohammed
Debre Berhan University
Jemal Derbew
Bati primary hospital
Bogale Molla
Woldia University
Sada Ahmed
Woldia University
Alemu Basazin
Debre Berhan University
Adem Yesuf
Woldia University

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Knowledge Attitudes and Associated Factors Related to Antenatal Exercise Counselling Among Obstetric Care Providers in Public Hospitals in Addis Ababa Ethiopia.

Amira Abdallah[1], Belay Susu[5] , Hussein Awol[1], Moges Sisay[2], Abdurahman Mohammed[3], Jemal Derbew[4], Bogale Molla[5], Sada Ahmed,[6]Alemu Basazin[7], Adem Yesuf [5]

Affiliation

[1]Department of Nursing and Midwifery, College of Medicine and Health Science, Werabe University, Werabe, Central Ethiopia.

[2]Department of Midwifery, College of Medicine and Health Sciences, Debre Berhan University, Debre Berhan, Ethiopia.

[3] Department of Public health, College of Medicine and Health Sciences, Debre Berhan University, Debre Berhan, Ethiopia.

[4] Bati primary hospital, Bati, Ethiopia.

[5] Department of Nursing and Midwifery, College of Health Sciences, Woldia University, Woldia, Ethiopia.

[6]Department of Information Tecnology, Institute of technology, Woldia University,Woldia ,Ethiopia.

[7]Department of Nursing, College of Medicine and Health Sciences, Debre Berhan University, Debre Berhan, Ethiopia

Authors' email:

*Corresponding Author: Belay Susu:susubelay19@gmail.com Woldia University, Woldia, Ethiopia.

Amira Abdallah: ehyauami@gmail.com_ , Belay Susu:susubelay19@gmail.com

Alemu Basazin: aalexppx0809b@gmail.com Jemal Derbew: jemsman944@gmail.com

Moges Sisay: ssisaymoges07@gmail.com Hussein Awol: hhussenawol647@gmail.com

Abdurahman Mohammed: der1286@gmail.com Adem Yesuf: ademyesuf333@gmail.com

Bogale Molla: bog.molla9927@gmail.com Sada Ahmed: Sadifradi@gmail.com

Abstract

Background: Antenatal exercise is an important component of maternal health care that promotes healthy pregnancy outcomes, yet counseling practices remain suboptimal in many low-resource settings. Obstetric care providers play a central role in promoting antenatal exercise; however, gaps in knowledge and attitude may hinder effective counseling. This study assessed knowledge and attitudes toward antenatal exercise counseling and associated factors among obstetric care providers in public hospitals in Addis Ababa.

Methods: A facility-based cross-sectional study supplemented by qualitative methods was conducted from April 30 to May 30, 2023. A total of 287 obstetric care providers were selected using simple random sampling for the quantitative component, and seven key informants were purposively selected for in-depth interviews. Quantitative data were analyzed using binary and multivariable logistic regression, while qualitative data were analyzed thematically.

Results: Overall, 52.6% (95% CI: 46.7–58.2) of participants had a favorable attitude toward antenatal exercise counseling, while 32.4% (95% CI: 27.2–37.6) demonstrated good knowledge. Reading guidelines (AOR = 2.58, 95% CI: 1.34–4.97) and receiving training (AOR = 3.16, 95% CI: 1.60–7.25) were significantly associated with good knowledge. Good knowledge (AOR = 1.94, 95% CI: 1.09–3.43) and higher educational attainment (third degree) (AOR = 1.23, 95% CI: 1.10–3.24) were associated with favorable attitudes. Qualitative findings revealed barriers including inadequate knowledge, limited resources, low motivation, and personal disinterest in physical exercise among obstetric care providers.

Conclusion: Although attitudes toward antenatal exercise counseling were generally favorable, knowledge levels among obstetric care providers were low. Strengthening training, improving access to guidelines, and enhancing professional education are recommended to improve Antenatal exercise counseling.

Keywords: Antenatal exercise, Obstetric care providers, Knowledge, Attitude, Pregnancy, Ethiopia

Introduction

Pregnancy, provide an opportunity to make positive changes in behavior and embrace a healthy lifestyle. This is because motivation is higher and medical care is more readily available (1).

Exercise during pregnancy can help a woman stay healthy both physically and psychologically (2). It improves blood flow to the mother and fetus's organs, reduces the risk of pre-eclampsia, gestational diabetes mellitus and delivery complications, and increases the likelihood of a normal delivery. Additionally, it enhances sleep, reduces exhaustion and tension, alleviates lower back discomfort, and improves overall well-being (3-10). These advantages are most likely to be obvious when pregnant women follow acceptable physical exercise requirements, according to research in the general population (11).

On other side pregnancy is correlated with significant physiological and psychological changes that may promote sedentary behavior in women, which makes physical inactivity worse (12).

World Health Organization (WHO) ranked physical inactivity as the fourth leading risk factor for global mortality in the general population (13).As the study proved, physical exercise is extremely important in reducing maternal complications during pregnancy (14). According to a study conducted in Eastern Ethiopia, hypertensive disorders of pregnancy account for 16.3% of maternal deaths during pregnancy (15). Another study on the level and intensity of physical activity in Ethiopia urban areas found that pregnant mothers obtained 1.46 MET (Metabolic Equivalent), which is considered physically inactive and low when compared to women from low-income nations (16).

The exact causes of physical inactivity in Ethiopia are not well documented, but various studies have suggested that they may be related to one of the following: most of pregnant women did not receive advice for exercise during antenatal care, and or they believed that exercising while pregnant posed risks to the fetus (17-19).

According to a study conducted in Addis Ababa, more than half of pregnant women were unaware of antenatal exercise, which could be attributed to a lack of obstetric care providers counseling during their ANC contact (20).

Studies indicated that, there is a rising interest in physical exercise counseling as a form of preventive health and treatment (19). Physical exercise counseling is arguably a crucial part of antenatal care in maternal and clinical settings because scientific evidence has sufficiently proved the benefits of antenatal exercise participation for the mother and child (21-23)

However, the value of exercises has been overlooked due to insufficient education in exercise physiology (24). According to literature, some obstetric care providers felt that they lacked the necessary training and experience to counsel on antenatal exercise (25).This study determined the level of knowledge of obstetric care providers on antenatal exercise counselling.

Unfortunately, many myths and stereotypes still exist around exercising during pregnancy, such as the belief that it can cause miscarriage (26). To shed more light on this topic, a researcher sought to determine the attitude of obstetric care providers towards antenatal exercise counselling.

Although antenatal exercise is widely recommended during pregnancy, evidence on obstetric care providers' knowledge and attitudes toward antenatal exercise counselling in Ethiopia remains limited. Using a mixed-methods design, this study was conducted to assess obstetric care providers' knowledge and attitudes toward antenatal exercise counselling, explore perceived barriers, and identify factors associated with these outcomes in public hospitals in Addis Ababa, Ethiopia.

Methods

Study design, setting and period

A facility based cross sectional study supported by qualitative study was conducted from April 30– May 30, 2023 in Addis Ababa public hospitals. Addis Ababa is the capital city of Ethiopia. It has 12 state run and more than 40 private hospitals. The study was conducted on six public hospitals found in Addis Ababa, Ethiopia. These facilities provide top-notch obstetric and gynecological services, including comprehensive antenatal care. These were Torhayloch Armed Forces Hospital, St'Paulos Hospital, Alert hospital, Ras desta General Hospital, Abebech Gobena MCH Hospital, Minilik II Hospital.

Population

Source of population were all obstetric care providers who were working at MCH unit of public hospitals in Addis Ababa, Ethiopia in 2023 and all randomly selected obstetrics care providers working at MCH unit in selected public Hospitals, Addis Ababa, Ethiopia, 2023 were study population.

Sample size determination technique and sampling

For quantitative data from a total of twelve public hospitals six public hospitals were selected randomly using lottery method then the number of obstetric providers to be included in the study from each selected hospital were proportionally allocated finally obstetric care providers were selected using simple random sampling technique by computer generated random numbers.

For qualitative data, experienced obstetric care providers were carefully selected to participate in the data collection process. These professionals were from prestigious hospitals such as St' Paulos Hospital, Alert Hospital, Abebech Gobena MCH Hospital, and Ras Desta General Hospital. The selection process was done using a purposive sampling technique, and data collection continued until information saturation level was reached.

Eligibility criteria

Obstetric care providers who were working in public hospitals during the study period were included and obstetric care providers who were absent or on maternity leave and annual leave during the period of study were excluded.

Operational definitions

Obstetric care providers: health care providers who are working in MCH unit (obstetrician and gynecologist, GP, nurses and midwives).

Good knowledge: Participants who answer correctly to seven knowledge questions, score greater than and equal to the mean value.

Poor knowledge: Participants who answer correctly to seven knowledge questions and score less than the mean value.

Favorable attitude: it refers those who answered to eleven attitude question correctly and scored greater than and equal to the mean value.

Unfavorable attitude: Those who answered to eleven attitude question correctly and scored less than the mean value.

Lack of motivation: a participant who answered no to motivation question.

Lack of information: a participant who answered no to information question.

Data collection method and quality assurance

A structured questionnaire was used for this study, which was adapted from the study conducted in Kenya, South Africa Saudi Arabia (4, 27, 28). Pre-tested, self-administered questionnaires were used to collect the data. The questionnaire had three sub parts namely socio demographic characteristics, knowledge related, and attitude related questions. The questioner was written in English, then translated into Amharic, and finally translated back into English. The data collection was facilitated by 6 BSc nurses and one MSc nurse supervisor.

For qualitative type of data it was collected by unstructured interviewer guide adapted from a study conducted in South Africa (4). It was written in English and converted to Amharic. The interview guide included questions that helps to find out obstetric care providers thought, desire/demand to know about ANE counseling, its training and its detailed guide line. Key informant interview were done among obstetric care providers working at ANC during data collection time based on their experience level. Data obtained from KII was used in order to triangulate responses obtained by the structured questionnaire.

Pre-test was done on 16 obstetric care providers to check clarity and consistency of the questionnaire and some modification was made. Additionally, Cronbach alpha was performed and its result was different. Specifically, the questionnaires on sociodemographic characteristics have an alpha value of 0.67, while those related to knowledge and attitude have alpha values of 0.88 and 0.72, respectively. A two days training were given for data collectors and a supervisor concerning the overall issue of data collection format like, objectives, method and duration for gathering the needed information. At the end of each day the supervisor checked for the completeness of the questionnaires, and for any missing or other problem found, immediate correction was given.

During qualitative data collection, field notes, audio recording, spot check (the quality of the recording) or every day, every recorded audio file was checked for its appropriateness in terms of proper coding and writing transcript.

Data process and analysis

For quantitative

Before data entry the data was checked for completeness. Data was entered by using epi data (version 4.6). Then the data was exported to SPSS version 25 for analysis. Description of means, simple frequencies, proportions, and Standard Deviation of the given data on each variable was calculated. Binary logistic regression was assessed to determine the relationship and association between dependent and independent variables.

Hosmer-Lemeshow goodness of fit test was used to determine model adequacy and $p = 0.127$ for knowledge and $p= 0.202$ for attitude questions. Multicollinearity between independent variables

were checked by using variance inflation factor (VIF). Independent variables having a p value less than 0.25 in the bi-variable analysis was taken to the multivariable analysis. Adjusted odds ratios from multivariable logistic regression was calculated for potential confounding factors between the variables. A p-value of less than 0.05 was considered statistically significant and adjusted odds ratios with 95% confidence interval (CI) was calculated to determine strength of association.

For qualitative

Verbatim transcription in Amharic language was made to convert the audio file into text file. Then the transcribed text was translated in to English language for the purpose of analysis. All of the transcripts were read by the researcher and coded for data analysis. Then the translated text file was coded, categorized and theme was created by using thematic analysis method.

Result

Socio demographic characteristics of respondents

A total of 287 participants, were recruited in this study making an overall response rate of 94.7 %.From those 156(54.4) were males. Mean age of the respondents was 28.76(SD± 3.12) years with a minimum and maximum age of 24 and 39 respectively and 53.7% were married. Most of respondents (68.6%) were degree holder and mean age of work experience was 2.27(SD± 0.79) years (Table 1).

Table 1: Socio demographic characteristics of obstetric care providers working in Addis Ababa public hospitals, 2023(n=287).

Variables	Category	Frequency	Percent
Sex	Male	156	54.4
	Female	131	45.6
Age	<30	217	75.6
	>30	70	24.4
Marital status	Single	133	46.3
	Married	154	53.7
Educational qualification	1st degree	197	68.6
	2nd degree	71	24.8
	3rd degree	19	6.6
Work experience	<1 year	41	14.3
	1-3 years	148	51.6
	3-5 years	77	26.8
	>5 years	21	7.3

For key informant interview, there were 7 participants and their age was range from 26-37 years. Three of them were females. Regarding their educational qualification 5 were degree holders and 2 were masters.

Knowledge and attitude of obstetric care providers on antenatal exercise counselling

The mean score for the knowledge of obstetric care providers on antenatal exercise counselling was 69.3%. One third (32.4%) (95% CI: 27.2-37.6) were found to have good knowledge. Regarding their attitude, the mean attitude score of the respondents was found to be 47.4%. More than half (52.6%) (95% CI: 46.7-58.2) of the obstetric care providers had a favorable attitude while the remaining had an unfavorable attitude towards antenatal exercise (shown in Figure 1).

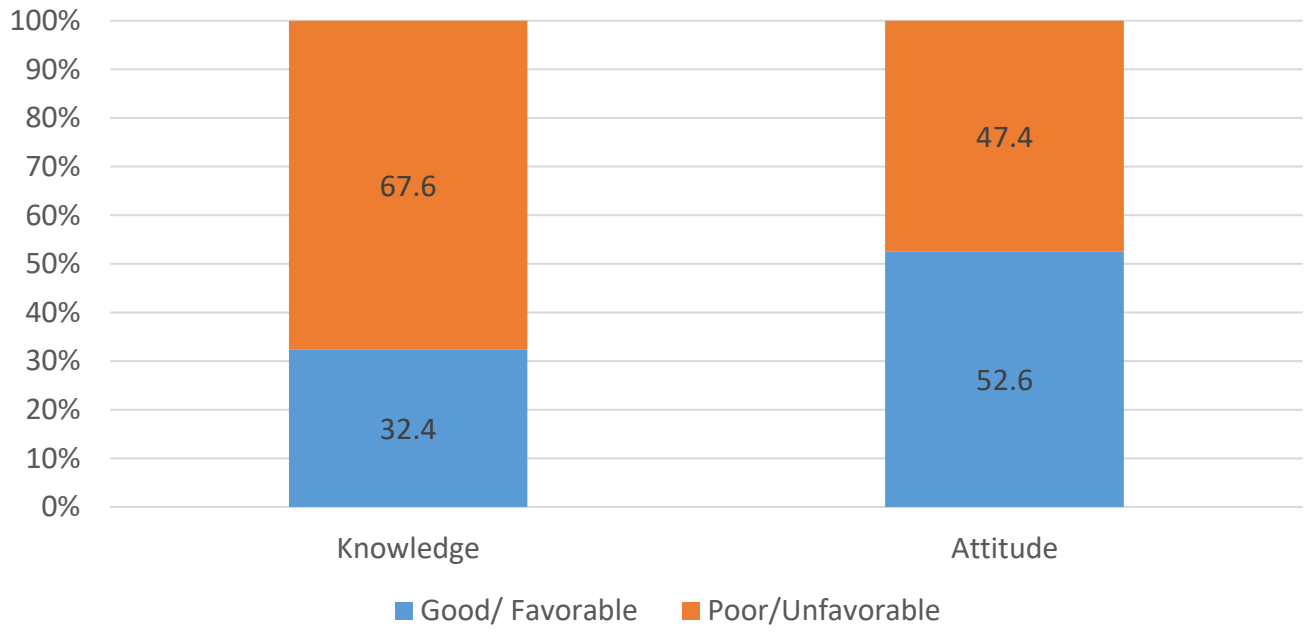


Figure 1: Magnitude of obstetric care providers' knowledge and attitude on antenatal exercise counselling.

The following table presents the percentage of correct responses provided by obstetric care providers concerning their knowledge on antenatal exercise counseling. (Table 2).

Table 2: Knowledge of antenatal exercise counselling among obstetric care providers working in Addis Ababa public hospitals, 2023 (n=287).

Knowledge about antenatal exercise	**Rate of obstetric care providers' knowledge** **Correct** **N (%)**
Meaning of antenatal exercise	48(16.7)
Times per week of doing antenatal exercise	74(25.8)
Types of antenatal exercise	
Breathing exercise	185(15.4)
Abdominal exercise	122(10.2)
Ankle-toe exercise	155(12.9)
Aerobics	195(16.2)
Yoga	212(17.7)
Cycling	186(15.5)
Pelvic floor strengthening exercises	145(12.1)
Benefits of antenatal exercise	
Reduces risk of back pain during pregnancy	181(10.1)
Prevents excessive weight gain in pregnancy	211(11.7)
Strengthens pelvic floor muscle in pregnancy	215(12.0)
Reduces the risk of gestational diabetes mellitus	198(11.0)
Increases energy and stamina during pregnancy	204(11.4)
Better ability to cope with labor and delivery	173(9.6)

More rapid post-natal recovery	212(11.8)
Decrease cesarean birth	211(11.7)
Prevent of depressive disorders of women in the postpartum period	192(10.7)
Effects of antenatal exercise on the fetus	
Improve neuro development	91(40.1)
Lower percentage of body fat	136(59.9)
Precaution	53(18.5)
Contraindications	
Preeclampsia	167(17.4)
Ruptured membranes	130(13.5)
Incompetent cervix	154(16.0)
Bleeding in the second or third trimester	136(14.1)
Placenta previa	185(19.2)
Severe anemia	190(19.8)

The table below showed that the percentage distribution of obstetric care provider's attitude to 5 point Likert scale items (Table 3).

Table 3: Attitude of antenatal exercise counselling among obstetric care providers working in Addis Ababa public hospitals, 2023(n=287).

Items	SD (%)	D (%)	N (%)	A (%)	SA (%)
Counselling antenatal exercise is necessary	6.1	2.3	7.3	23.7	60.6
Antenatal exercise is risky to the fetus	53.7	3.8	28.2	4.5	9.8
Antenatal exercise suit with our culture	2.1	13.2	22.0	6.3	56.4
Counselling antenatal exercise training to be important	0.3	1.0	10.1	14.3	74.2
Any amount of exercise is beneficial to health	34.5	32.8	15.7	7.7	9.4
Only vigorous/strenuous exercise is beneficial to health	33.8	40.8	16.0	6.6	2.8
A sedentary woman, with an uncomplicated pregnancy, should not begin an exercise programme during pregnancy	42.5	28.9	21.3	3.1	4.2
Advising patients on exercise during pregnancy is not a major component of prenatal care	38.3	33.4	16.0	6.3	5.9
Discussing the benefits of exercise with pregnant mothers is part of the my role	7.0	2.4	18.8	35.5	36.2
I can be effective in persuading mothers to increase antenatal exercise	2.4	7.7	14.6	46.0	29.3
Obstetric care providers should be active toact as a role model for the pregnant mothers	1.0	7.0	15.7	39.0	37.3

Reference: SD: strongly disagree; D: disagree; N: neutral; A: agree; A: strongly agree.

Quantitative findings were supported by qualitative findings. After coding, categorizing and creating of themes, two themes were identified: obstetric care provider's attitude towards antenatal exercise counselling, and challenges to antenatal exercise counselling.

The above finding was supported by:

Theme 1 Obstetric care providers' attitude towards antenatal exercise counselling

Obstetric care providers most of them believe that exercising during pregnancy is a beneficial and should be recommended to expecting mothers (Table 2). However, there are some who believe that antenatal exercise counselling is not necessary and could even be harmful to the fetus. Meanwhile, there are others who feel that antenatal exercise is an area that is often overlooked. These differing opinions led to the emergence of three sub-themes.

Sub theme 1.1 Antenatal exercise counselling is beneficial

In my view antenatal exercise has a great benefit for the mother as well as for the neuro development of the fetus, so we should give emphasis and counsel them well(31 years old, female GP).

There is no doubt that counselling antenatal exercise beneficial (37 years old, female midwife).

Well, unless counselling on vigorous exercises, moderate exercises during pregnancy is beneficial for the mother as well as the fetus (30 years old, male GP).

Sub theme 1.2 Perception of expository

Since our mothers do not receive appropriate nutrition, I believe that prenatal exercise counseling is not essential in our society. Doing so might put the fetus at danger of having a low birth weight baby (29 years old, male midwife).

Even though, I do not read about antenatal exercise, I do not think counselling antenatal exercise is important as it may cause miscarriage (37 years old male nurse).

Sub theme 1.3 Lack of attention on antenatal exercise counselling

I can't recall any pregnant woman asking me about her exercise, and I've never discussed antenatal exercise, it is almost neglected area. If an emphasis was given to eat we would have more information about it (32 years old, male midwife).

Hmmm! As you see there is high case flow in our set up so let alone what counselling antenatal exercise, sometimes we don't counsel obstetric danger signs and others, we simply say if you have a complain come at any time (29 years old, male midwife).

Theme 2-Challenges to antenatal exercise counselling

Sub theme 2.1 Lack of knowledge

Counselling on lifestyle modification to pregnant women is the key roles of obstetric care providers working in antenatal health facilities. However, obstetric care providers identify constraints to antenatal exercise counselling.

We frequently counsel pregnant women about obstetric danger signs, birth preparedness and complication readiness, nutrition, to refrain from smoking, alcohol, and caffeine, but not exercising. If it was so, I don't know what type of exercise I should counsel to how extent she have to do generally I have no idea on it (26 years old, female midwife).

We often counsel pregnant women on to eat what she get, to reduce or if she can to stop smoking, alcohol, caffeine, to rest and walk specially on third trimester, to avoid lifting heavy objects, about obstetric danger signs, birth preparedness and complication readiness but I do not have detailed information on exercises done during pregnancy (30 years old, male GP).

Factors associated with knowledge of obstetric care providers

Adjusted for other variables, educational qualification, experience, reading guideline about antenatal exercise and training about antenatal exercise were significantly associated with obstetric care providers' knowledge regarding antenatal exercise at p-value of < 0.05. Providers with 3rd degree were about 3.42[AOR = 3.42, 95% CI (1.22, 8.75)] times and 2nd degree holders were 3.18[AOR =3.18, 95% CI (1.08, 4.64)] times more likely to have good knowledge in comparison to 1st degree holders. Providers who had three up to five years' work experience were 3.21 [AOR = 3.21, 95% CI(1.15,7.63)] and those with one up to three years' work experience were 3.01 [AOR = 3.01, 95% CI(1.17,6.0)] times more likely to have good knowledge as compared with that of less than one year work experience.

Obstetric care providers who read guidelines about antenatal exercise [AOR = 2.58, 95% CI (1.34, 4.97)] and respondents who take training [AOR = 3.16, 95% CI (1.6, 7.25)] were also associated with good knowledge (Table 4).

Table 4: Bivariate and multivariable analysis of factors associated with knowledge of obstetric care providers working in Addis Ababa public hospitals, 2023, (n=287).

Variables	Category	Knowledge		COR(95%CI)	AOR(95%CI)	P-value
		Good, n%	**Poor, n%**			
Age	<30 years	59(63.4)	158 (81.4)	1	1	
	>30 years	34 (36.6)	36 (18.6)	2.53(1.45,4.41)	2.1(0.88,4.4)	0.061
Marital status	Single	32 (34.4)	101(52.1)	1	1	
	Married	61 (65.6)	93(47.9)	2.07(1.24, 3.46)	1.18(0.6,2.37)	0.634
Educational qualification	1st degree	47 (48.0)	150(79.4)	1	1	
	2nd degree	39 (39.8)	32(16.9)	3.28(1.86, 5.8)	**3.18(1.08,4.64)****	**0.000**
	3rd degree	12 (12.2)	7(3.7)	3.55(1.36, 9.24)	**3.42(1.22,8.75)***	**0.018**
Experience	<1 year	6 (6.5)	35(18.0)	1	1	
	1-3 years	51 (54.8)	97(50.0)	3.07(1.21, 7.77)	**3.01(1.17,6.0)***	**0.023**
	3-5 years	28 (30.1)	49(25.3)	3.33(1.25, 8.91)	**3.21(1.15,7.63)***	**0.016**
	>5 years	8 (8.6)	13(6.7)	3.59(1.04, 12.35)	2.07(0.46,9.31)	0.340
Information about ANE	Yes	61 (65.6)	84(43.3)	2.5(1.49,4.17)	1.73(0.93,3.21)	0.082
	No	32 (34.4)	111(56.7)	1	1	
Guideline about ANE	Yes	60 (64.5)	79(40.7)	2.65(1.59, 4.42)	**2.58(1.34,4.97)***	**0.005**
	No	33 (35.5)	115(59.3)	1	1	
Motivation about ANE	Yes	64 (68.8)	86(44.3)	2.77(1.64, 4.67)	1.12(0.53,2.33)	0.770
	No	29 (31.2)	108(55.7)	1	1	

Training about ANE	Yes	42 (45.2)	29(14.9)	4.69(2.67, 8.27)	**3.16(1.6,7.25)***	**0.001**
	No	51 (54.8)	165(85.1)	1	1	

Reference; * significant in the multivariable analysis at $p < 0.05$; **$p < 0.001$.

Abbreviations': COR; crude odds ratio, AOR; adjusted odds ratio, CI; confidence interval

These was supported by qualitative result:-

Sub theme 2.2 Lack of resources

I believe that our nation needs comprehensive antenatal exercise guideline since the absence of such guidelines may affect our understanding of the topic as well as the priority we give for it. More over this lack of training affect the knowledge and attitude of us (26 years old, female midwife).The other findings obtained from qualitative part in sub theme lack of resource were shortage of staff and busy schedule.In my opinion shortage of staff and busy schedule may be to blame to lack of awareness on antenatal exercise counselling (37 years old, female midwife).

Factors associated with attitude of obstetric care providers

Adjusted for other variables, educational qualification, and knowledge of antenatal exercise were found to have a significant association with the attitude of obstetric care providers towards antenatal exercise at a p-value of <0.05. Providers with 3rd degree holders were 1.23 [AOR = 1.23, CI (1.10, 3.24)] times more likely to have favorable attitude than 1st degree holders. Those obstetric care providers' with good knowledge regarding antenatal exercise were 1.94 [AOR = 1.94, CI (1.09, 3.43)] times more likely to have a favorable attitude as compared to those who had poor knowledge (Table 5).

Table 5 Bivariate and multivariable analysis of factors associated with attitude of obstetric care providers working in Addis Ababa public hospitals, 2023(n=287).

Variables	Category	Attitude		COR(95%CI)	AOR(95%CI)	p-value
		Favorable, n%	**Unfavorable, n%**			
Educational qualification	1st degree	97(64.2)	100(73.5)	1	1	
	2nd degree	43(28.5)	28(20.6)	1.58(0.91,2.75)	1.61(0.83,3.1)	0.131
	3rd degree	11(7.3)	8(5.9)	1.41(1.26,3.5)	**1.23(1.10,3.24)***	**0.007**
Information about antenatal exercise	Yes	85(56.3)	60(44.1)	0.61(0.38,0.98)	1.3(0.77,2.2)	0.323
	No	66(43.7)	76(55.9)	1	1	
Training about antenatal exercise	Yes	42(27.8)	29(21.3)	1.42(0.83,2.45)	0.88(0.47,1.68)	0.822
	No	109(72.2)	107(78.7)	1	1	
Knowledge about antenatal exercise	Good	61(40.4)	32(23.5)	2.2(1.32,3.68)	**1.94(1.09,3.43)***	**0.002**
	Poor	90(59.6)	104(76.5)	1	1	

Reference; * significant in the multivariate analysis at $p < 0.05$; **$p < 0.001$.

Abbreviations': COR; crude odds ratio, AOR; adjusted odds ratio, CI; confidence interval

The other challenge for antenatal exercise counselling mentioned was lack of motivation and dislike exercise.

Sub theme 2.3 Lack of motivation

If we are motivated enough it is easy to counsel on antenatal exercise but we lack motivation I believe that lack of motivation is the only thing that make us not to counsel (31 years old, female GP).

Sub theme 2.4 Dislike exercise

If someone does not find exercise enjoyable, they are less likely to have an interest in studying antenatal exercise and probably won't advise customers on it (29 years old, male midwife).

Discussion

In this study, 32.4% (95% CI: 27.2–37.6) of obstetric care providers demonstrated good knowledge regarding antenatal exercise counselling. This finding is lower than a study conducted in Kenya (27) and Sudan (28). The observed difference may be attributed to variations in professional training opportunities, continuing education programs, and the availability of institutional support for antenatal exercise counselling. Furthermore, healthcare facilities in some settings may provide structured antenatal exercise programs that enhance providers' awareness and knowledge.

Consistent with the present findings, a review conducted in South Africa reported inadequate knowledge of physical activity and exercise recommendations during pregnancy among healthcare providers (23). Similar findings have been reported in previous studies conducted in other country, which have shown that healthcare providers lack adequate knowledge about the guidelines for physical activity and exercise (29-32). Maternal physical exercise would be compromised if the obstetric care providers who work directly with pregnant women were unaware of the antenatal exercise recommendations because women would not be motivated to begin, engage in, and maintain physical exercise as a long-term health activity (23).

This study revealed that educational qualification had significant association with knowledge of obstetric care providers. Providers with 3rd degree were about 3.42[AOR = 3.42, 95% CI (1.22, 8.75)] times and 2nd degree holders were 3.18[AOR =3.18, 95% CI (1.08, 4.64)] times more likely to have good knowledge in comparison to 1st degree holders. The potential reasoning behind the significance of educational qualifications could be that as an individual's level of education increases, they are likely to gain a more comprehensive understanding of the professional issues related to their field. By acquiring knowledge and skills through education, individuals can enhance their critical thinking abilities, broaden their perspectives, and develop a deeper understanding of the world around them (33).

Work experience was one of the factor associated with knowledge of obstetric care providers on antenatal exercise counseling. Participants who had three up to five years' work experience were 3.21 [AOR = 3.21, 95% CI(1.15,7.63)] and those with one up to three years' work experience were 3.01 [AOR = 3.01, 95% CI(1.17,6.0)] times more likely to have good knowledge as compared with that of less than one year work experience.

The possible reason behind may be Participants with one to five years of work experience were more likely to have good knowledge compared with those having less than one year of experience. This finding may be explained by increased clinical exposure, accumulated professional experience, and greater opportunities to encounter and apply evidence related to antenatal exercise counselling during routine maternal healthcare practice (34).

Providers who read guideline [AOR = 2.58, 95% CI (1.34, 4.97)], and had training [AOR = 3.16, 95% CI (1.6, 7.25)], were significantly associated with obstetric care providers' knowledge regarding antenatal exercise. Which was supported by qualitative finding revealed that lack of resources (staff, detailed guide line, training, busy schedule) were a challenge of obstetric care providers towards antenatal exercise counselling.

In consistent with this study, studies in South Africa (29), Saudi Arabia (30), and the UK (31, 32) have demonstrated a lack of knowledge among healthcare practitioners regarding antenatal exercise guideline. And similar to this finding a study done in South Africa revealed that lack of resources were a bottle neck problem for antenatal exercise counselling (4). In addition to this a study done in England revealed a lack of training, time, and resources as a challenge. Several studies, both recent and older, have identified that the main obstacles that prevent health care professionals from antenatal exercise counselling are the shortage of time, resources, and proper education (30, 31, 35). This similarity might be due to lack of emphasis given to antenatal exercise.

In this study lack of motivation and dislike exercise identified as a challenge on antenatal exercise counselling. Similar to this study, dislike exercise is among a common challenge on ANE counselling (28). Another study done in Swedish revealed lack of motivation as one of those challenges (36). This similarity may be due to the same study design was employed.

The finding of this study suggests that more than half (52.6%) (95% CI: 46.7-58.2) of the respondents had a favorable attitude. It is lower than a study conducted in Kenya (27). The possible disparity may be due to difference in their knowledge regarding the topic and the difference in operational definition used.

Adjusted for other variables, educational qualification were found to have a significant association with the attitude of obstetric care providers towards antenatal exercise. Providers with 3rd degree were 1.23 [AOR = 1.23, CI (1.10, 3.24)] times more likely to have favorable attitude than 1st degree holders.

Similarly a study in Kenya showed that the Masters group were associated with the numerically highest mean of attitude towards antenatal physical exercises (M=15.92 SD=1.23 CI=11.9-20.4) and Nurses degree group was associated with the numerically smallest mean of attitude towards prenatal exercises (M=12.1 SD= 5.18 CI=10.3-13.7) (27). It's possible that the reason for this similarity lies in the fact that data collection tool, and data collection method are quite similar.

Those obstetric care providers' with good knowledge regarding antenatal exercise were 1.94 [AOR = 1.94, CI (1.09, 3.43)] times more likely to have a favorable attitude as compared to those who had poor knowledge. The possible reason for knowledge significantly associated with favorable attitude might be the acquisition of knowledge can lead to a more favorable attitude towards a particular subject or issue. By learning more about a topic, individuals can gain a deeper understanding of its complexities, and implications. This can lead to a greater appreciation for the subject matter, as well as a more positive outlook on its potential outcomes (37).

Strength and limitation of the study

One of the major strengths of this study is its novel approach towards unfamiliar topics and mixed-methods design, which provided both quantitative evidence and qualitative insights into obstetric care providers' knowledge and attitudes toward antenatal exercise counselling. The qualitative findings helped explain and validate the quantitative results. However, the study has some limitations. The cross-sectional design limits causal inference, and interviewer bias may have influenced participants' responses during data collection.

Conclusion

In conclusion, although obstetric care providers demonstrated a generally favorable attitude toward antenatal exercise counselling, their level of knowledge was inadequate. Educational qualification, work experience, access to guidelines, and training were significant predictors of knowledge. Qualitative findings highlighted limited resources, lack of motivation, and personal dislike of exercise as important barriers to counselling. Furthermore, higher educational qualification and good knowledge were significantly associated with favorable attitudes toward antenatal exercise counselling. Strengthening provider training, improving access to evidence-based guidelines, and integrating antenatal exercise counselling into routine maternal healthcare services may enhance counselling practices and maternal health outcomes.

Abbreviations

ANC: Antenatal Care; ANE: Antenatal Exercise; AOR: Adjusted Odd Ratio; BMI: Body Mass Index; COR: Crude Odd Ratio; FMOH: Federal Ministry of Health; GP: General Practitioner: MCH: Maternal and Child Health; PA: Physical Activity; WHO: World Health Organization

Declaration

Ethical approval

Ethical approval was granted by the Institutional Review Board (IRB) of Debre Berhan University, Asrat Woldeyes Health Sciences Campus, Ethiopia (Reference No. IRB01/58/2015). The study was conducted in accordance with the ethical guidelines and requirements of the IRB.

Consent to Participate

An official letter of cooperation was obtained from the Department of Nursing and submitted to the relevant authorities. Before data collection, participants were informed about the purpose of the study, their right to refuse or withdraw at any time without penalty, and how their information would be kept confidential. Written informed consent was obtained from all participants before they took part in the study. To protect their privacy, no identifying information, including participants' names, was recorded on the questionnaires

Consent for publication

Not applicable

Availability of data and materials

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no financial and non-financial competing of interest.

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Authors' contribution(s)

Conceptualization: Amira Abdallah, Alemu Basazin, Abdurahman Mohammed, Moges Sisay.

Methodology: Amira Abdallah, Alemu Basazin, Belay Susu, Abdurahman Mohammed, Moges Sisay, Adem Yesuf, Jemal Derbew, Hussein Awol, Bogale Molla.

Validation: Abdurahman Mohammed, Moges Sisay.

Formal analysis: Amira Abdallah, Sada Ahmed, Abdurahman Mohammed, Moges Sisay.

Investigation: Amira Abdallah, Adem Yesuf

Data curation: Amira Abdallah, Sada Ahmed

Writing – original draft: Amira Abdallah, Sada Ahmed.

Writing – review & editing: Amira Abdallah, Belay Susu, Alemu Basazin, Abdurahman Mohammed, Moges Sisay, Adem Yesuf, Jemal Derbew, Hussein Awol, Bogale Molla.

Visualization: Amira Abdallah, Sada Ahmed, Belay Susu

Supervision: Amira Abdallah, Belay Susu, Adem Yesuf, Jemal Derbew, Hussein Awol, Bogale Molla.

Project administration: Amira Abdallah.

All authors read and approved the final manuscript

References

1. Physical Activity and Exercise During Pregnancy and the Postpartum Period: ACOG Committee Opinion, Number 804. Obstetrics & Gynecology. 2020;135(4):e178-e88.
2. Khatri A, Sirohi S, Dixit S, Rai S, Pandey D. Effect of antenatal exercise on outcome of labor. National Journal of Community Medicine. 2014;5(03):342-5.
3. Marshall JE, Raynor MD. Myles' Textbook for Midwives E-Book: Elsevier Health Sciences; 2014.
4. Okafor U, Goon D. Providing physical activity education and counselling during pregnancy: A qualitative study of midwives' perspectives. Nig J Clin Pract. 2021;24:718-28.
5. da Silva SG, Ricardo LI, Evenson KR, Hallal PC. Leisure-time physical activity in pregnancy and maternal-child health: a systematic review and meta-analysis of randomized controlled trials and cohort studies. Sports medicine. 2017;47:295-317.
6. Harrison AL, Shields N, Taylor NF, Frawley HC. Exercise improves glycaemic control in women diagnosed with gestational diabetes mellitus: a systematic review. Journal of physiotherapy. 2016;62(4):188-96.
7. Russo LM, Nobles C, Ertel KA, Chasan-Taber L, Whitcomb BW. Physical activity interventions in pregnancy and risk of gestational diabetes mellitus: a systematic review and meta-analysis. Obstetrics & Gynecology. 2015;125(3):576-82.
8. Davenport MH, Ruchat S-M, Poitras VJ, Garcia AJ, Gray CE, Barrowman N, et al. Prenatal exercise for the prevention of gestational diabetes mellitus and hypertensive disorders of pregnancy: a systematic review and meta-analysis. British journal of sports medicine. 2018;52(21):1367-75.
9. Baker JH, Rothenberger SD, Kline CE, Okun ML. Exercise during early pregnancy is associated with greater sleep continuity. Behavioral sleep medicine. 2018;16(5):482-93.
10. Poyatos-León R, García-Hermoso A, Sanabria-Martínez G, Álvarez-Bueno C, Sánchez-López M, Martínez-Vizcaíno V. Effects of exercise during pregnancy on mode of delivery: a meta-analysis. Acta obstetricia et gynecologica Scandinavica. 2015;94(10):1039-47.
11. Currie S, Gray C, Shepherd A, McInnes RJ. Antenatal physical activity: a qualitative study exploring women's experiences and the acceptability of antenatal walking groups. BMC pregnancy and Childbirth. 2016;16(1):1-10.

12. Katz M. Physical activity during pregnancy-Past and present. Journal of Mother and Child. 2018;22(1):9-13.
13. Bayisa D, Waltengus F, Lake S, Wakuma B, Bayisa L, Chala M, et al. Pregnant women's knowledge, attitudes, and associated factors toward physical exercise during pregnancy among those attending antenatal care at Bahir Dar city, Northwest Ethiopia. SAGE Open Medicine. 2022;10:20503121221115252.
14. Sanabria-Martinez G, Poyatos-Leon R, Notario-Pacheco B, Alvarez-Bueno C, Cavero-Redondo I, Martinez-Vizcaino V. Effects of physical exercise during pregnancy on mothers' and neonates' health: a protocol for an umbrella review of systematic reviews and meta-analysis of randomised controlled trials. BMJ open. 2019;9(9).
15. Tesfaye G, Loxton D, Chojenta C, Assefa N, Smith R. Magnitude, trends and causes of maternal mortality among reproductive aged women in Kersa health and demographic surveillance system, eastern Ethiopia. BMC women's health. 2018;18(1):1-10.
16. Addis A, Alemnew W, Kassie A, Handebo S. Physical exercise and its associated factors among Ethiopian pregnant women: a cross-sectional study based on the theory of planned behavior. BMC psychology. 2022;10(1):1-9.
17. Garland M. Physical activity during pregnancy: a prescription for improved perinatal outcomes. The Journal for Nurse Practitioners. 2017;13(1):54-8.
18. Santo EC, Forbes PW, Oken E, Belfort MB. Determinants of physical activity frequency and provider advice during pregnancy. BMC pregnancy and childbirth. 2017;17:1-11.
19. Sooknarine-Rajpatty J, B. Auyeung A, Doyle F. A systematic review protocol of the barriers to both physical activity and obesity counselling in the secondary care setting as reported by healthcare providers. International Journal of Environmental Research and Public Health. 2020;17(4):1195.
20. <excersise.pdf>.
21. Barakat R, Pelaez M, Cordero Y, Perales M, Lopez C, Coteron J, et al. Exercise during pregnancy protects against hypertension and macrosomia: randomized clinical trial. American journal of obstetrics and gynecology. 2016;214(5):649. e1-. e8.
22. Moyer C, Reoyo OR, May L. The influence of prenatal exercise on offspring health: a review. Clinical Medicine Insights: Women's Health. 2016;9:CMWH. S34670.

23. Okafor UB, Goon DT, editors. Physical activity advice and counselling by healthcare providers: a scoping review. Healthcare; 2021: MDPI.
24. Roos GM. Exercise prescription: knowledge, practice and attitude among South African doctor: University of the Free State; 2014.
25. Persson G, Brorsson A, Ekvall Hansson E, Troein M, Strandberg EL. Physical activity on prescription (PAP) from the general practitioner's perspective–a qualitative study. BMC family practice. 2013;14:1-8.
26. Moses M, Donkoh S, Umar M, Falola K. Physical activity and exercise participation duration of antenatal mothers. American International Journal of Contemporary Scientific Research. 2015;2(8):68-74.
27. Vurigwa E. KNOWLEDGE, ATTITUDE AND PRACTICESOF NURSES IN PROMOTING ANTENATALPHYSICALEXERCISES IN KAKAMEGA COUNTY, KENYA: MMUST; 2020.
28. Abdalla AAA. Nurses'& Nurses Midwives' Knowledge regarding Antenatal Exercises at Kassala Alsaudi Obstetrics & Gynecology Teaching Hospital, Kassala State, Sudan (2020): University of Gezira; 2021.
29. Watson ED, Oddie B, Constantinou D. Exercise during pregnancy: knowledge and beliefs of medical practitioners in South Africa: a survey study. BMC pregnancy and childbirth. 2015;15(1):1-7.
30. Alahmed Z, Lobelo F. Correlates of physical activity counseling provided by physicians: A cross-sectional study in Eastern Province, Saudi Arabia. PloS one. 2019;14(7):e0220396.
31. Kime N, Pringle A, Zwolinsky S, Vishnubala D. How prepared are healthcare professionals for delivering physical activity guidance to those with diabetes? A formative evaluation. BMC health services research. 2020;20(1):1-12.
32. Din NU, Moore GF, Murphy S, Wilkinson C, Williams NH. Health professionals' perspectives on exercise referral and physical activity promotion in primary care: findings from a process evaluation of the National Exercise Referral Scheme in Wales. Health Education Journal. 2015;74(6):743-57.
33. <The-Influence-of-the-Levels-of-Education-and-Knowledge.pdf>.

34. Maduro O, Maduro O. 13Does Experience Shape Our Knowledge? In: Mendieta E, Mendieta E, editors. Maps for a Fiesta: A Latina/o Perspective on Knowledge and the Global Crisis: Fordham University Press; 2015. p. 0.
35. Lindqvist M, Mogren I, Eurenius E, Edvardsson K, Persson M. "An on-going individual adjustment": a qualitative study of midwives' experiences counselling pregnant women on physical activity in Sweden. BMC pregnancy and childbirth. 2014;14(1):1-10.
36. Börjesson M. Promotion of physical activity in the hospital setting. Dtsch Z Sportmed. 2013;64:162-5.
37. <knowledge on attitude.pdf>.