

Proportion of Knowledge, Attitude and Practice of Physical Exercise during Pregnancy among Antenatal Care Attendants at Dessie Town Health Institutions, South Wollo Zone, Amhara Region, Ethiopia. A Multicenter Descriptive Cross Sectional Study

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Abstract

Introduction: Physical exercise consist of planned, repetitive and intentional movements that reduces the risk of pregnancy related complications. Worldwide, there was a high rate of physical inactivity during pregnancy including Ethiopia, which had detrimental effects on both pregnant women and their developing fetus. In this study area, no studies has been conducted on pregnant women's knowledge, attitude and practice towards physical exercise during pregnancy.

Objectives: This study aims to assess proportion of pregnant women's knowledge, attitude and practice towards physical exercise during pregnancy among antenatal care attendants at Dessie town health institutions, south Wollo zone, Amhara region, Ethiopia, 2023.

Method: Institutional based cross-sectional study was conducted among 614 pregnant women receiving antenatal care service from 18th January to 25th February 2023. A systematic random sampling technique was used to select study participants. Data were collected using a pretested, face to face interviewer-administered and semi-structured questionnaire. Then, the data were cleaned, coded and entered into EPIDATA version 4.6 and analyzed using SPSS version 25. Descriptive statistics were done using frequency, percentage and mean of the variables. Finally, the finding presented using text, tables and figures.

Results: The response rate of this study was 98%. The proportion of good knowledge, favorable attitude and currently practiced physical exercise during pregnancy were 56.3%, 51.5% and 32.2% respectively.

Conclusion: The findings of this study indicated that approximately half of the participants had good knowledge and favorable attitude. However, almost one-third of the participants practiced physical exercise during their pregnancy. It is recommended that antenatal care providers offer health education and counseling about the benefits of physical exercise during pregnancy.

Keywords: Knowledge; Attitude; Practice; Physical exercise; Pregnant women; Dessie; Ethiopia

Abbreviations: ACOG: American College of Obstetrics and Gynecology; ACSM: American College of Sports Medicine; ANC: Antenatal Care; AOR: Adjusted Odds Ratio; EDHS: Ethiopia Demographic and Health Survey; I-CVI: Item Content Validity Index; IRERC: Institutional Research Ethical Review Committee; MMR: Maternal Mortality Ratio; NGO: Non-Governmental Organization; PEx: Physical Exercise; SDGs: Sustainable Development Goals; UNFPA: United Nations Population Fund Agency; SSA: Sub-Saharan Africa; WHO: World Health Organization; VIF: Variance Inflation Factor

Introduction

Physical activity encompasses all bodily movements produced by the contraction and relaxation of skeletal muscles throughout life. Physical exercise is a subset of physical activity that characterized by planned, repetitive and intentional movements that provide numerous health benefits for individuals, including pregnant women and their fetuses [1].

One effective health intervention for preventing maternal morbidity and mortality comprehensive antenatal care. This care aim to ensure a positive pregnancy and birth experience by

identifying risks, managing pregnancy-related complications and providing health education and promotion. One of the health promotion and preventive measure for pregnancy-related complications is physical exercise during pregnancy [2]. Physical exercise stands out as reliable, safe and beneficiary throughout pregnancy for both the pregnant women and fetuses, provided there are no obstetric or medical contraindications [3].

Engaging in Physical Exercise (PEx) during pregnancy enhances physical fitness, reduces gestational weight gain, lowers the risk of gestational diabetes, decreases cesarean section rates and mitigates issues such as hypertension, postpartum depression, instrumental deliveries, urinary incontinence, peripartum pain and macrosomia. It also alleviates lower back pain, shortens recovery time and positively impacts maternal mental health and quality of life [4].

Recommended exercises during pregnancy include walking, relaxation/breathing exercises, pelvic floor exercises, back care exercises, ankle and toe exercises, aerobic swimming and labor preparation exercises like squatting and pelvic tilts. According to the American College of Obstetrics and Gynecology (ACOG) committee opinion No. 804 and the American College of Sports Medicine (ACSM), light to moderate physical exercise during pregnancy is generally safe and beneficial for most women, though some modifications may be necessary due to physiological changes and fetal needs. Pregnant women should aim for at least 150 minutes of moderate-intensity exercise per week, spread over at least three days per week, with sessions lasting a minimum of 30 minutes each [5].

Maternal mortality remains a global health challenge. While the Maternal Mortality Ratio (MMR) was 211 per 100,000 live births worldwide in 2017, it was 542 per 100,000 live births in Sub-Saharan Africa (SSA) in 2017 [6]. Ethiopia, one of the countries in this region, reported an MMR of 401 per 100,000 live births in Ethiopia Demographic and Health Survey (EDHS) 2019. Globally, there is a rise in physical inactivity that has serious health repercussions implications including increased non-communicable diseases such as hypertensive disorder during pregnancy and gestational diabetes mellitus which are contributed for these maternal deaths. The United Nations has set a target within its sustainable development goals in 2015 to reduce the MMR to below 70 per 100,000 live births by 2030. To achieve this, the United Nations Population Fund (UNFPA) emphasizes the need for improved health promotion, reproductive health care and preventive services to avoid pregnancy-related complications [7].

Globally, the magnitude of pregnant women's knowledge towards PEx during pregnancy varies from country to country. As evidence indicated that a study conducted in different countries revealed a magnitude of poor knowledge towards PEx during pregnancy ranging from 34% in India to 93% in Iraq. In Zambia, 81%, in Nigeria, 51% and in Ethiopia ranging from 44.6% in Arbaminch to 59.5% in Gonder of the pregnant women's had poor knowledge towards PEx during pregnancy [8]. As study showed in the above-mentioned scholars around the world documented that most of the pregnant women's had poor knowledge towards PEx during pregnancy.

Globally, the magnitude of pregnant women's attitude towards PEx during pregnancy varies from country to country. As evidence indicated that a study conducted in different countries revealed a magnitude of unfavorable attitude towards PEx during pregnancy ranging from 6.2% in Brazil to 64.5% in Sirilanka (Colombo). In Zambia, 7%, in Nigeria, 15.6% and in Ethiopia ranging from 54% in Arbaminch to 72.1% in Addis Ababa had unfavorable attitude towards PEx during pregnancy. As study showed in the above-mentioned scholars around the world documented that most of the pregnant women had unfavorable attitude towards PEx during pregnancy.

According to World Health Organization (WHO) report in 2015, an estimated 3.2 million of the global deaths are caused by physical inactivity [9]. Less than 15% of pregnant women actually achieve the minimum recommended 150 minutes per week of moderate-intensity PEx during their pregnancy. Researchers around the world have documented that the magnitude of practice of PEx during pregnancy in developing countries and to some extent in developed countries was low and does not meet ACOG requirements. A systematic review conducted in Africa found that the magnitude of practice of PEx during pregnancy was low [10]. The magnitude of practice of PEx during pregnancy in pregnant Ethiopian women was found to be low, ranging from 20.7% in Mekelle to 30.9% in Gonder.

Thousands of pregnant women died due to physical inactivity during pregnancy and other preventable pregnancy-related complications around the world. Physical inactivity during pregnancy poses serious short and long-term risks to pregnant women, fetus and newborn. Pregnant women who are physically inactive during pregnancy are at increased risk of excessive gestational weight gain, hypertensive disorder, gestational diabetes mellitus, complications during labor and delivery, instrumental delivery, postpartum weight retention, low back pain, increase the risk of urinary incontinence and antenatal and postnatal depression.

Planned and repetitive PEx offers numerous health benefits including 35% reduction in excessive maternal gestational weight gain, 55% reduction in gestational diabetes mellitus and its complications, 11.2% increase in the likelihood of vaginal delivery and reduced cesarean delivery rate by 66% compared to physically inactive and reduced the risk of macrosomia, the rate of operative deliveries, low back pain, antenatal and postnatal depression and shorten the durations of labor and reduce delivery complications, quick recovery after childbirth and getting back to the pre-pregnancy shape and helps to cope up with labor pain. In addition, participating in PEx like walking reduce the risk of hypertensive disorder during pregnancy by 30%-33%.

Despite the well documented health benefits, little attention has been given to PEx during pregnancy. To the best of the investigator's knowledge, no study was conducted on pregnant women's knowledge, attitude and practice towards PEx during pregnancy among antenatal care attendants in this study area. A limited number of studies have been conducted on pregnant women's knowledge, attitude and practice towards PEx during pregnancy and its associated factors. Previous researches limited only on governmental health institutions. In contrast, both

governmental and private health institutions were included in this study. In spite of the above gap, the following factor such as preparing for labor: Squatting and pelvic tilts has not been studied in the past but was studied in this study. Therefore, this study aims to fill this gap by assessing pregnant women's KAP towards PEx during pregnancy among ANC attendants at Dessie town health institutions, Amhara region, Northeast Ethiopia.

Materials and Methods

Study design, area and period

Institutional based cross-sectional study was conducted in Dessie town, south Wollo zone, northeast Ethiopia, from 20th January to 20th March 2023. Dessie town has 2 governmental hospitals, 8 governmental health centers, 4 private hospitals and 73 private clinics. Among these, 17 health institutions (10 governmental and 7 private) provide maternal and child health related services. In December 2022, 1,223 pregnant women were attended ANC follow-up at these institutions.

Source population

All pregnant women who had attended ANC follow-up at Dessie town health institutions.

Study population

All pregnant women who had attended ANC follow-up at randomly selected five public and four private health institutions in Dessie town during the study period.

Study unit

Selected pregnant women who had attended ANC follow-up at the selected five public and four private health institutions during the study period and met inclusion criteria.

Table 1: Sample size calculation for pregnant women's knowledge, attitude and practice towards PEx during pregnancy at Dessie town health institutions, Northeast Ethiopia, 2023.

No.	Dependent variables	P (%)	D (%)	CI	n
1	Good knowledge	50.4	5	95	384
2	Favorable attitude	46	5	95	381
3	Practice of physical exercise during pregnancy	30.9	5	95	328

Note: P=Proportion; d=Margin of error; CI=Confidence Interval; n=Calculated sample size

The study considered the maximum calculated sample size. Therefore, the proportion of pregnant women having good knowledge towards PEx during pregnancy taken from a study conducted in Addis Ababa, Ethiopia was given the maximum sample size (384). Then, using 1.5 design effect and by considering 10% of non-response rate and the final sample size becomes 614 study participants.

Inclusion criteria

All pregnant women who had attended ANC follow-up at the selected five public and four private health institutions in Dessie town during study period were included.

Exclusion criteria

Those pregnant women who had antepartum hemorrhage, orthopedics limitation and seizure disorder at the time of data collection were excluded.

Sample size determination

The sample size for the three dependent variables (knowledge, attitude and practice) was calculated by using single population proportion formula (Table 1).

For dependent variables, it was calculated based on a single population proportion formula.

$$n = (Z \alpha/2)^2 \times P \times (1-P)/d^2$$

Where:

n=The required sample size

Z=Level of significance corresponding to 95% confidence interval ($Z\alpha/2=1.96$)

P=Proportion of good knowledge 50.4%, favorable attitude 46% and practice 30.9%

d=Absolute precision or margin of error that can be tolerated 5% ($d=0.05$)

Sampling techniques and procedures

A multistage stratified sampling technique was used to select study participants. Firstly, there are a total of seventeen (ten governmental and seven private) health institutions in Dessie town that provide maternal and child health related services. The health institutions were stratified into two groups as governmental and private. The governmental health institution has two hospitals and eight health centers. Then, governmental

health institutions were stratified in to two: From hospital one (1) and from health center four (4) and private health institution has four hospitals and three clinic then private health institutions were stratified in to two: From hospital two (2) and from clinic two (2) were selected by using simple random sampling technique.

Secondly, the numbers of ANC attending pregnant women surveyed from ANC follow-up registration book from the nine selected health institutions in the last three months was 1194. The total sample size was proportionally allocated for nine health institutions depending on the number of pregnant women flow in each health institutions in the last three months. Each study participant was selected by using systematic random sampling technique at every K^{th} interval from the nine health institutions.

$$K=N/n$$

Where:

K =Interval size

N =Total number of pregnant women who had attended ANC follow-up in all nine health institutions in the last 3 months (1194)

n =Total sample size (614)

$$K=1194/614=2$$

The first study participant was selected by using lottery method either from order 1 or 2 participant. Then the subsequent study participants were selected by systematic random sampling technique every one ($K=1$) from each health institutions until the desired sample size was reached (Figure 1).

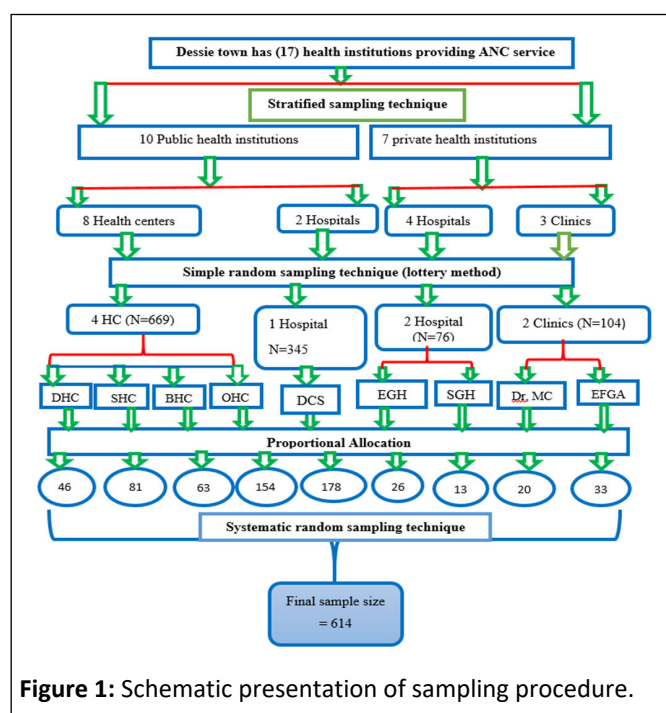


Figure 1: Schematic presentation of sampling procedure.

Note: DRH: Dessie Comprehensive Specialized Hospital; EFGA: Family Guidance Association; DHC: Dessie Health Center; SHC:

Segno Gebaye Health Center; EGH: Ethio General Hospital; BHC: Buambuha Health Center; W/r SGH: W/r Sihm General Hospital; QHC: Qurqur Health Center; Dr. MC: Dr. Mnase Clinic

Study variables

Dependent variables

- Pregnant women's knowledge towards PEx during pregnancy.
- Pregnant women's attitude towards PEx during pregnancy.
- Pregnant women's practice of PEx during pregnancy.

Operational definitions

Knowledge of PEx during pregnancy: Pregnant women ideas about the health benefits and contraindications of PEx during pregnancy.

Good knowledge: Participants whose responses were greater than or equal to the mean value (2.4942) of knowledge towards PEx during pregnancy questions.

Poor knowledge: Participants whose responses were less than the mean value (2.4942) of knowledge towards PEx during pregnancy questions.

Attitude of PEx during pregnancy: The opinion of pregnant woman with respect to performing PEx during pregnancy.

Favorable attitude: Participants whose responses were greater than or equal to the mean value (3.6439) of attitude towards PEx during pregnancy questions.

Unfavorable attitude: Participants whose responses were less than the mean value (3.6439) of attitude towards PEx during pregnancy questions.

Currently practiced: Study participants who were performed any type of physical exercise in the current pregnancy at least three times per week.

Not currently practiced: Study participants who were performed any type of physical exercise in the current pregnancy less than three times per week.

Data collection tools and procedures

Data were collected using a pretested, face to face interviewer-administered and semi-structured questionnaire. The tool were adopted and adapted from different literatures reviewed and based on ACOG recommendations of PEx during pregnancy.

The questionnaire consisted of six parts:

- Socio-demographic characteristics (both open and close-ended questions)
- Obstetric characteristics (open-ended questions)
- Awareness of pregnant women towards PEx during pregnancy (close-ended questions)
- Knowledge of PEx during pregnancy (close-ended questions)
- Attitude towards PEx during pregnancy (close-ended questions)
- Practice of PEx during pregnancy (both open and close-ended questions)

Nine data collectors (four diploma and five degree midwives) and one master's degree public health officer (supervisor) were involved in data collection. Training was provided for two days covering study objectives, data collection procedures, participant confidentiality, eligibility criteria, informed consent and interview techniques. Close monitoring was carried out throughout the data collection process.

Data quality control

The tool was developed in English, translated into Amharic, and then back-translated to ensure accuracy. Four academicians reviewed the tool to determine its content validity, resulting in a content validity index of 0.95 (I-CVI=0.95) based on their evaluations. Valuable suggestions and recommendations from experts were incorporated into the tool. Data were collected using the Amharic version questionnaire for better understanding by data collectors and study participants. A pretest was conducted at Kombolcha general hospital with 5% of the sample size. The tool was assessed for clarity, readability, comprehensiveness and accuracy. Feedback was incorporated. The data collection process was monitored by the supervisor and principal investigator throughout the data collection period.

Internal consistency/reliability of the item was checked by computing Cronbach's alpha. The value of Cronbach's alpha for knowledge assessment was 0.83 and attitude assessment was 0.76.

Data processing and analysis

Data were manually checked for completeness and cleaned. The questionnaire was coded, and data were entered into Epi-Data version 4.6.0.0, then exported to SPSS version 25 for analysis. Descriptive statistics (mean, median, standard deviation, and percentage) were used to summarize the data. The main aim of this study was to know the proportion of knowledge, attitude and practice of PEx during pregnancy among pregnant women attending ANC. Finally, the whole results were presented in the form of texts, tables and graphs.

Ethical consideration

Institutional Research Ethical Review Committee (IRERC) of Wollo University, College of Medicine and Health Science ethically approved the study with a letter reference number (CMHS/749/2023 on the date of 01/05/2023). After ethical clearance, a formal permission letter was written to Dessie town administration health department from Wollo University. A letter of support was then obtained from Dessie town administration health department with a letter reference number (-3/955/2015 on the date of 08/05/2015). Letters of support was submitted to nine health institutions. In addition, permission was obtained from each study health institutions and then heads of the ANC ward. Prior to enrollment, the pregnant women were informed about the objectives of the study, its importance, the right not to participate in the study, to stop at any time in between or not to answer any questions they were not willing to answer and informed verbal consent was taken from all study participants before data collection because some of the study participants can't read and write. Anonymity and confidentiality were maintained. Any personal identification of the study participants were not recorded during data collection.

Results

Socio-demographic characteristics of study participants

Out of 614 pregnant women who were expected to participate, 600 pregnant women were participated in this study with a response rate of 98%. The median age of the participants with Interquartile Range (IQR) were 28 years. More than half (58.8%) of the participants were in the age category between 25-34 years. The great majority 98.7% (n=592) of the participants were married. One third (33.7%) of study participants attended primary school. Regarding their occupation, 44.3% of the study participants were housewife (Table 2).

Table 2: Socio-demographic characteristics of pregnant women among ANC attendants at selected health institutions in Dessie town, Amhara region, Northeast Ethiopia, 2023 (n=600).

Variables	Category	Frequency (n)	Percent (%)
Age of women	<25	142	23.7
	25-34	353	58.8
	≥ 35	105	17.5
Religion	Muslim	314	52.3
	Orthodox	267	44.5
	Protestant	6	1.0

	Catholic	13	2.2
Women's educational level	No formal education	99	16.5
	Primary school	202	33.7
	Secondary school	193	32.2
	College and university	106	17.7
Women's occupation	Governmental employed	96	16.0
	Private business	177	29.5
	Housewife	266	44.3
	Non-governmental	61	10.2
Average monthly income in ETB*	<1987 ETB	374	62.3
	≥ 1987 ETB	226	37.7
Note: *ETB=Ethiopian Birr			

Obstetrics characteristics of study participants

Regarding ANC follow-up, nearly half (44.2%) of the participants had attended three and more than three times ANC follow-up. More than half (58%) of the participants were multigravida and nearly half (46.2%) of the participants were nulliparous. Nearly

half (46%) of the participants hadn't child and 11% of the participants had a history of abortion. Almost half of the study participants were within 7 to 9 months of pregnancy (Table 3).

Table 3: Obstetrics characteristics of pregnant women among ANC attendants at selected health institutions in Dessie town, Amhara region, Northeast Ethiopia, 2023 (n=600).

Variables	Category	Frequency (n)	Percent (%)
ANC follow up	Not started	98	16.3
	1-2	237	39.5
	Three and above	265	44.2
Gravidity	Primigravida	252	42.0
	Multigravida	348	58.0
Parity	Nulliparous	277	46.2
	Primiparous	197	32.8
	Multiparous	126	21.0
Number of alive children they have	No child	276	46.0
	1-2 child	241	40.2
	>2 child	83	13.8
History of abortion	Yes	66	11.0
	No	534	89.0

Gestational age	<4 months	71	11.8
	4-6 months	233	38.8
	7-9 months	296	49.3

Awareness of pregnant women about physical exercise during pregnancy

Two hundred thirty-six (39.3%) of the study participants had heard about PEx during pregnancy. Of those who heard about PEx during pregnancy all (100%), 13.6%, 10.2% and 4.2% of the study participants were heard walking, relaxation/breathing,

preparing for labor: Squatting and pelvic tilts and pelvic floor muscle exercise respectively. A great majority (88.2%) of the study participants didn't practiced PEx before becoming pregnant (Table 4).

Table 4: Awareness of pregnant women about PEx during pregnancy among ANC attendants at selected health institutions in Dessie town, Amhara region, northeast Ethiopia, 2023 (n=600).

Variables	Category	Frequency (n)	Percent (%)
Ever heard about PEx during pregnancy (n=600)	Yes	236	39.3
	No	364	60.7
Types of PEx during pregnancy you heard or aware (n=236)*	Walking	236	100
	Relaxation/breathing	32	13.6
	Pelvic floor exercise	10	4.2
	Back care exercises	1	0.4
	Ankle and toe exercise	1	0.4
	Swimming	5	2.1
	Preparing for labor: Squatting and pelvic tilts	24	10.2
Ever done PEx before becoming pregnant (n=600)	Yes	71	11.8
	No	529	88.2

Note: *Multiple responses

Source of information of pregnant women about physical exercise during pregnancy

Their source of information about physical exercise during pregnancy were family and friend, mass media (television and radio), healthcare providers and social media accounting for 44.92%, 24.15%, 20.34% and 10.59%, respectively (Figure 2).

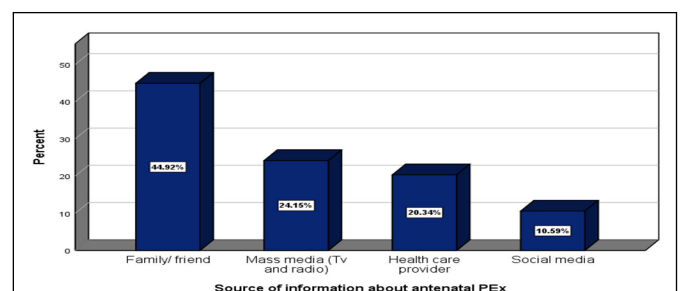


Figure 2: Source of information of pregnant women about PEx during pregnancy among ANC attendants at selected health institutions in Dessie town, Amhara region, northeast, Ethiopia, 2023 (n=236).

Pregnant women's knowledge level towards benefits and contraindications of physical exercise during pregnancy

Regarding knowledge assessment questions about benefits of PEx during pregnancy 40.7%, 63.5%, 88.8%, 75.3% and 62.5% of the study participants knew that PEx during pregnancy can reduce the risk of excessive weight gain, strengthening pelvic floor muscles, prevent antenatal, postnatal depression, had

benefit for general health and development of baby and better ability to cope with labor and delivery respectively. Regarding contraindications of PEx during pregnancy 56%, 59.7%, 100% and 54% of the study participants knew that chest pain, difficulty in breathing, vaginal bleeding and decreased fetus movement during pregnancy were contraindicated for doing PEx during pregnancy respectively (Table 5).

Table 5: Pregnant women's knowledge level towards benefits and contraindications of PEx among ANC attendants at selected health institutions in Dessie town, Amhara region, Northeast Ethiopia, 2023 (n=600).

Variables	Category	Frequency (n)	Percent (%)
Benefits			
Reduces risk of back pain during pregnancy	I don't know	72	12
	No	23	3.8
	Yes	505	84.2
Reduces the risk of gestational diabetes mellitus	I don't know	98	16.3
	No	25	4.2
	Yes	477	79.5
Reduce risk of hypertension	I don't know	125	20.8
	No	25	4.2
	Yes	450	75
More rapid post-natal recovery?	I don't know	199	33.2
	No	5	0.8
	Yes	396	66
Contraindications			
Poorly controlled gestational diabetes mellitus during pregnancy	I don't know	253	42.2
	No	7	1.2
	Yes	340	56.6
Uncontrolled hypertension during pregnancy	I don't know	112	18.7
	No	7	1.2
	Yes	481	80.1
Uterine contractions during pregnancy	I don't know	46	7.7
	No	0	0
	Yes	554	92.3

Out of 600 pregnant women, more than half (56.33%) of the study participants had overall good knowledge towards physical exercise during pregnancy, while the remaining 43.67% of study participants had overall poor knowledge towards physical exercise during pregnancy (Figure 3).

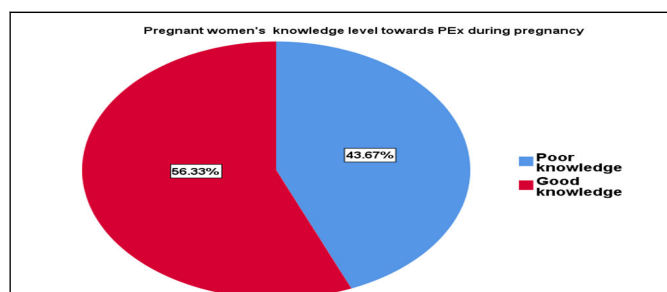


Figure 3: Pregnant women's proportion of overall good and poor knowledge towards PEx during pregnancy among ANC attendants at selected health institutions in Dessie town, Amhara region, Northeast Ethiopia, 2023 (n=600).

Pregnant women's attitude level towards physical exercise during pregnancy

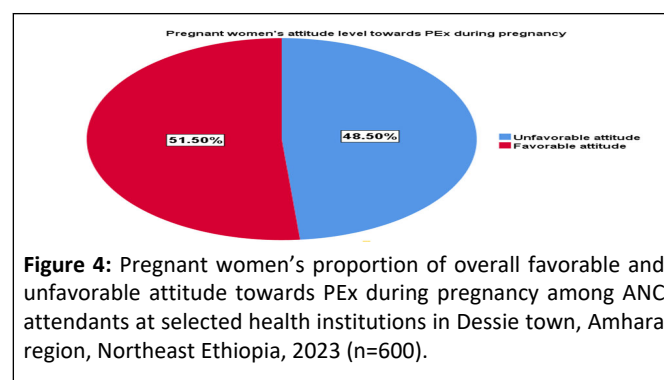
Regarding attitude assessment questions towards PEx during pregnancy about 63.7% (382) of the study participants were agree that PEx during pregnancy is necessary. One third (33.8%) of the study participants strongly disagreed that PEx during pregnancy has risk to fetus. More than half (57%) of the study participants were agree that PEx during pregnancy should perform under the guidance of health care professional. Four hundred twenty-two (70.5%) of the study participants were agree that personally like doing PEx (Table 6).

Table 6: Pregnant women's attitude level towards PEx during pregnancy among ANC attendants at selected health institutions in Dessie town, Amhara region, northeast Ethiopia, 2023 (n=600).

Variables	Strongly disagree		Disagree		Neutral		Agree		Strongly agree	
	N	%	N	%	N	%	N	%	N	%
Do you feel performing PEx during pregnancy is necessary ?	4	0.7	15	2.5	32	5.3	382	63.7	167	27.8
Do you feel performing PEx during pregnancy has risky to the fetus?	203	33.8	167	27.8	200	33.3	28	4.7	2	0.3
Do you feel antenatal exercise suit with our culture?	2	0.3	19	3.2	133	22.2	316	52.7	130	21.7
Do you feel pregnant women should	7	1.2	26	4.3	62	10.3	342	57	163	27.2

perform PEx under the guidance of health care professional?										
Do you feel performing antenatal PEx can reduce pregnancy-related complications?	0	0	42	7	204	34	240	43.3	94	15.7
Do you feel practicing PEx during pregnancy helps in post-delivery recovery?	1	0.2	35	5.8	230	38.3	255	42.5	79	13.3
Do you feel PEx exercising will helps you get back to your shape?	1	0.2	29	4.8	223	37.2	247	41.2	100	16.7
Do you think regular PEx facilitates normal delivery?	1	0.2	36	6	183	30.5	300	50	80	13.3

Out of 600 pregnant women, around half (51.33%) of the study participants had overall favorable attitude towards physical exercise during pregnancy, while the remaining 48.5% of study participants had overall unfavorable attitude towards physical exercise during pregnancy (Figure 4).



Pregnant women's practice of physical exercise during pregnancy

Regarding practice of PEx during pregnancy almost one-third (32.2%) of the study participants were practiced PEx in their current pregnancy. Among those who practiced PEx during pregnancy all 100% (n=193) of the study participants were practiced walking, followed by relaxation/breathing, pelvic floor muscle exercise, preparing for labor: squatting and pelvic tilts with

value of 9.8%, 7.8% and 6.7% respectively. Eighty-three (43%), 36.5% and 20.7% of the study participants were advised by self, other person and health care provider respectively. Among those who practiced PEx during pregnancy, 21.8% and 54.9% of the study participants were practiced PEx with frequency of equal or more than three times per week and 30 or more minutes of duration of PEx during pregnancy per session, respectively (Table 7).

Table 7: Pregnant women's practice of PEx during pregnancy among ANC attendants at selected health institutions in Dessie town, Ethiopia, 2023 (n=600).

Variables	Category	Frequency (n)	Percent (%)
Do you practice any type of PEx in current pregnancy (n=600)	Yes	193	32.2
	No	407	67.8
Who advised you to do PEx during pregnancy (n=193)?	Healthcare provider	40	20.7
	Self	83	43
	Other person	70	36.3
How many times per week you exercised (n=193)?	<3 times	151	78.2
	≥ 3 times	42	21.8
For how many minute you exercised per session (n=193)?	<30 minutes	87	45.1
	≥ 30 minutes	106	54.9

The most common reasons for pregnant women's didn't practiced PEx during pregnancy were my health professional didn't advised me to do exercise, lack of time and I don't have information were 39.9%, 27.2% and 19.2% respectively (Table 8).

Table 8: Reasons for pregnant women's didn't practiced PEx during pregnancy (n=407).

Reasons (n=407)*	Frequency (n)	Percent (%)
Is afraid that it may be harmful for fetus	27	6.7
Lack of time	110	27.2
Lack of motivation	39	9.6
I don't have information	78	19.2
Pregnancy discomfort	8	2.0
My health professional didn't advised me to do exercise	162	39.9
I am not in good health	4	1.0
Because of cultural reason	0	0.0

Feel tired	25	6.2
Note: *Multiple response		

Discussion

The present study aimed to assess pregnant women's knowledge, attitude and practice towards Physical Exercise (PEX) during pregnancy among Antenatal Care (ANC) attendants at selected health institutions in Dessie town, Amhara region, northeast Ethiopia, in 2023.

Proportion of pregnant women's knowledge towards physical exercise during pregnancy

This study found that 56.33% (95% CI: 52.35%-60.31%) of pregnant women had good knowledge towards benefits and contraindications of PEX during pregnancy. This finding aligns with studies conducted in Nigeria 52.4%, Bahir Dar, Ethiopia 55.8% and Pakistan 53.8%.

However, the current study's findings were lower than those from studies in Brazil 65.6% and India 66%. This discrepancy may be due to differences in educational levels, as many participants in the current study had only primary education and nearly two-thirds had not heard about PEX during pregnancy.

Conversely, the findings were higher than those reported in Addis Ababa, Ethiopia 50.4%, Gonder, Ethiopia 39.5%, Arbaminch, Ethiopia 46.3%, Saudi Arabia 50.67%, Sirilanka 27.33%, Zambia 19% and Iraq 7%. Possible reasons for this higher results include socio-cultural differences, sample size, study population and the variety of health institutions surveyed. Increased awareness over time and a higher proportion of study participants with better educational backgrounds may also contribute to these differences. Additionally, urban residents might have more access to information about PEX during pregnancy through various media sources.

Proportion of pregnant women's attitude towards physical exercise during pregnancy

This study revealed that 51.50% (95% CI: 47.49%-55.51%) of pregnant women had favorable attitude towards PEX during pregnancy. This finding was in line with study conducted in Gonder, Ethiopia 55.3%, Bahir Dar, Ethiopia 53.3% and Saudi Arabia 56.1%.

In contrast, the finding of this study was lower than the finding of previous study conducted in Pakistan 79%, Brazil 93.8%, Zambia 93% and Nigeria 84.2%. The possible explanations for the discrepancy might be due to that in Brazil and Nigeria, majority of their study participants had secondary and above educational level, heard about PEX during pregnancy and good knowledge about PEX during pregnancy. Additionally, the study noted in these countries that their study participant's attitude level was assessed using a single questions. Furthermore, the discrepancy may be due to that in Pakistan and Zambia, there were a higher proportion of study

participants who had attended college and above educational level. In addition, majority of study participants in Zambia were counseled by doctors and midwives about PEX during pregnancy. So, better education of the study participants and counseled by healthcare providers during ANC follow-up were important factors of pregnant women's attitude towards PEX during pregnancy.

The finding of this study was higher than the study conducted in Addis Ababa, Ethiopia 27.9%, Arbaminch, Ethiopia 46% and Sirilanka 35.5%. This higher result may be due to the following reasons. First, it may be due to the influence of pregnant women's knowledge towards PEX during pregnancy on pregnant women's attitude towards PEX during pregnancy. So, good knowledge of study participants about PEX during pregnancy can change pregnant women's misconceptions about PEX during pregnancy. Second, difference in time lag when the previous researches were conducted, currently awareness level of pregnant women is increasing might cause the discrepancy. Third, it might be due to educational background and socio-cultural differences as well as difference in study populations.

Proportion of pregnant women's practice of physical exercise during pregnancy

According to the current study, 32.2% of pregnant women were practiced physical exercise (95% CI: 28.42%-35.91%) during their current pregnancy. This finding was in line with previous study conducted in Gondar, Ethiopia 30.9% and Brazil 29%.

However, the finding of the current study showed a lower rate of pregnant women's practice of PEX during pregnancy compared with the previous study conducted in Turkey 67.1%, Pakistan 46.2% and Arbaminch, Ethiopia 62.7%. This disparity may be due to that their study participants had good knowledge, had habit of PEX before becoming pregnant and advised by health care providers to practice PEX during pregnancy.

On the other hand, the result of the current study with respect to pregnant women's practice of PEX during current pregnancy was higher than study conducted in Addis Ababa, Ethiopia 22.3%, and Mekelle, Ethiopia 20.7%, India 18%, Saudi Arabia 18%, Sir Lanka 13.6% and South Africa 27.7%. This higher result in the present study may be due to the fact that, this study include study participants from both private and governmental health institutions, used larger sample size compared to other studies, had better good knowledge and better favorable attitude towards PEX during pregnancy.

Strength of the study

This study's strength lies in its focus on pregnant women in both governmental and private health institutions within the study area.

Limitations of the study

Firstly, there may be social desirability bias as the study utilized interview questions to gather data on the practice of PEx assessment. Additionally, there is a risk of recall bias as participants were asked to recall past experiences.

Conclusion

This study revealed that around half of pregnant women had good knowledge and favorable attitude towards PEx during pregnancy. However, almost one-third of pregnant women practiced PEx during their current pregnancy.

Recommendation

For antenatal care providers

Should advice pregnant women to strengthen ANC follow-up, giving special attention for those pregnant women with a history of abortion and encourage women to practice PEx before becoming pregnant.

Should provide health education and counseling regarding benefits and contraindications of PEx during pregnancy for pregnant women during ANC follow-up to improve their knowledge, attitude and practice towards PEx during pregnancy.

For minister of health

Create adequate awareness regarding PEx during pregnancy and its health benefits through the use of various media sources like television, radio and social media.

The country's minister of health has better to design strategies to provide appropriate information about PEx during pregnancy by including it in the health education system.

For future researchers

Better to incorporate objective method for assessing practice of PEx during pregnancy such as pedometer.

Ethical Approval and Consent to Participate

Ethical approval and consent were obtained for this study. The ethical clearance letter was granted by the ethical review committee of Wollo University and oral informed consent was obtained from all participants. Information obtained from each study participants were kept confidential.

Consent for Publication

Not applicable.

Availability of Data and Materials

The dataset was used in this study is available from the corresponding author on reasonable request.

Competing Interests

The author declare no conflicts of interest related to this article.

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Not applicable.

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