



SAINT PAUL'S HOSPITAL MILLENIUM MEDICAL COLLEGE
DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

**ASSESSMENT OF KNOWLEDGE, ATTITUDE AND INFLUENCING
FACTORS TOWARD PRENATAL SCREENING AMONG WOMEN
ATTENDING ANC CLINIC AT SPHMMC, ADDIS ABABA-ETHIOPIA,
2023G.C**

Descriptive cross-sectional study

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ST. PAUL'S HOSPITAL AND MILLENNIUM MEDICAL COLLEGE

DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

ADDIS ABABA

Assessment of Knowledge, Attitude and influencing factors toward Prenatal Screening among pregnant women attending ANC at St. Paul's Hospital Millennium Medical College: A cross-sectional descriptive study

A Thesis submitted to the Department of Gynecology and Obstetrics, SPHMMC in partial fulfillment of the requirements for the Specialty Certificate Gynecology and Obstetrics

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ACRONYM

SPHMMC-----St. Paul's Hospital Millennium Medical College

PNS-----Prenatal screening

WHO-----World Health Organization

DNA-----Deoxyribonucleic acid

ACOG-----American College of Obstetrics and Gynecology

LMICs-----Low and Middle-Income Countries

NCD-----Non-Communicable Disease

CT-----Combined Tests

FAS-----Fetal Anomaly Scanning

ANC-----Ante-natal Care

NGO-----Non-Governmental Organizations

PNC-----prenatal care

COR-----Crude odd ratio

AOR-----Adjusted odd ratio

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Abstract

Background

Prenatal screening is tests done to identify individuals at risk of having a child with inherited conditions, chromosomal abnormalities or birth defect using sample from fetal tissue, amniotic fluid or fetal anomaly scanning, and is not popular procedure in our country, maternal age, educational background, employment status are suggested to influence knowledge level and attitude toward prenatal screening.

Objective:

To assess the level of knowledge, attitude and influencing factors toward prenatal screening among women following Antenatal care at St. Paul's Millenium Medical College during study period. May 1,2023 to August 31,2023G.C.

Method:

Institutional based cross-sectional study of 356 women visited Antenatal Care at St. Paul's Millenium Medical College during study period were conducted to assess level of knowledge, attitude and influencing factors toward prenatal screening. Binary logistic regression and multivariate analysis was used to identify influencing factors.

Results: - Mean age of participant was 27.8years. The proportions with good knowledge of prenatal screening were 32% and those with positive attitude was 58%. Women with age 35 and above (AOR 3.3;95%CI 1.2-9.5), secondary education (AOR 14.5;95%CI 1.7-121.8), higher education (AOR 41.9 ;95%CI 4.9-358.4), multiparity (AOR 2.5 ;95%CI 1.2-5.2) were significantly associated with knowledge. Government employed women (AOR 5.0 ;95%CI 2.3-10.8), self-employed (AOR 2.3 ;95%CI 1.3-4.1) were significantly associated with the attitude toward prenatal screening.

Conclusion and Recommendation: - Compared to most of study done in different country, it's found out that women attending ANC at SPHMMC were having lower knowledge and attitude score. This study is, the first on this topic in our country with the objective to assess the level of knowledge attitude and influencing factors toward prenatal screening among pregnant women, and I hope this will open door for future further study that could assess large group of pregnant women to find out how well they are informed about all possible investigations in pregnancy.

Introduction

1.2 Background

To date, more than 6500 inherited diseases have been identified worldwide, and common genetic diseases are increasingly posing a major health challenge (1). Early and accurate diagnosis of these diseases is crucial for optimal patient care (2). However, the diagnosis of genetic diseases can be challenging and depends on understanding the molecular etiology of that particular disease (3). Although our understanding of many human diseases has advanced significantly in the postgenomic era, knowledge of most genetic diseases is still limited. This is primarily because most of these diseases are rare and clinically heterogeneous, and there are thousands of genetic diseases with only a few patients identified and whose causative factors have yet to be deciphered (4,5,6). Additionally, the expertise, infrastructure, and costs required to treat genetic diseases are often unavailable. In addition, several complex and interrelated strategic, sociocultural and ethical issues, including the lack of a non-directive delivery approach to genetic services, inadequate psychosocial support, family and religious values, and sociocultural stigmatization, often influence the utilization and understanding of genetic services (7).

Prenatal screening is part of pregnancy care. The goal of the prenatal care (PNC) is to identify women whose fetus is at risk for congenital and hereditary diseases. Therefore, genetic assessment, screening, and testing related to PNC have been offered for many years and in many countries (8). In most countries, this is an optional service that requires health professionals to provide health education to help them make an informed decision. However, in some countries it is integrated into routine prenatal care (9).

Prenatal screening is offered in one of the following ways; Double screening, triple screening and quadruple screening using the determination of maternal serum markers and ultrasound examination to determine the fetal risk level for congenital anomalies and chromosomal syndromes. Dual screening includes maternal serum pregnancy-associated plasma protein A (PAPP-A) and free beta-human chorionic gonadotropin. Triple screening includes maternal serum fetoprotein (AFP), unconjugated estriol, and human chorionic gonadotropin (hCG). Quad screening (AFP/HCG/estriol/inhibin) and noninvasive prenatal screening with cell-free fetal DNA (10).

Prenatal screening has been integrated into many health systems for two competing reasons. The first model is the principle of reproductive autonomy (i.e., access to prenatal testing supports and promotes women's informed choices and empowers them to manage their pregnancy and therefore their lives in a way that is consistent with their preferences and values . The second model is the public health principle, in which prenatal screening is viewed as the goal of reducing the incidence of certain diseases in the population and thus reducing the burden of disease. This second model emphasizes the social consequences of reproduction and the overall impact of women's individual reproductive decisions on the general health of future populations (11).

1.2 Statement of problem

Each year, 7.9 million children are born with a major congenital anomaly of genetic or partially genetic origin, which represents a significant cause of child mortality and morbidity. While congenital anomalies are a global problem, low- and middle-income countries (LMICs) bear the greatest burden of disease, with 94 percent of births with major congenital anomalies and 95 percent of deaths from these conditions occurring in LMICs (12). Over the past two decades, noncommunicable diseases (NCDs) have steadily increased as a cause of global disability and mortality, with a concomitant decline in the disease burden of communicable, maternal, neonatal and nutritional diseases (13).

Congenital anomalies, the most common noncommunicable disease in children, have recently become the fifth leading cause of death in children under five years of age worldwide, ahead of other diseases such as malaria, neonatal sepsis and malnutrition (14). This epidemiological transition, currently occurring in most LMICs, was already seen in many high-income countries in the 1960s and led to the well-established preventive, diagnostic and managerial medical genetics and public health services that exist today, unfortunately, many LMICs lack the necessary personnel, infrastructure and technology to implement identical approaches used in many high-income countries. To address this service gap, various strategies have been recommended, all of which require careful consideration of a country's unique cultural, religious, legal and epidemiological characteristics (15).

With the introduction of ultrasound in the 1970s and its routine use in prenatal care to visualize the fetus, advances in this technology and other medical technologies such as genetic analysis and biochemical testing pave the way for prenatal screening and diagnosis for the early detection of congenital malformations and genetic disorders, even rare ones. (16)

Both biochemical screening and ultrasound screening provide women with the opportunity to make reproductive decisions and even potentially difficult decisions such as abortion in light of subjective variability and cultural, ethical and religious issues. In addition, it offers women and their partners information that can help them better prepare for the birth of their child and the opportunity to deliver in an environment that allows rapid access to specialized surgical or medical care. In addition, studies have shown that prenatal diagnosis provides pregnant women with information that may be associated with better psychological care. (17)

1.3 Significance of study

- In Ethiopia despite high mortality and morbidity burden of congenital anomalies, birth defect to the family, the community and health facility, is less known and being done to include prenatal screening into broader pillar of prenatal care. However, there are ongoing activity to include prenatal screening into one of the pillars of prenatal care.
- However, St. Paul's Hospital Millennium Medical College (SPHMMC) in Addis Ababa, Ethiopia, a low-income country, has recently improved our ability to prenatally screen for and diagnose congenital anomalies and genetic diseases. This is being accomplished through the training of maternal fetal medicine (MFM) specialists with prenatal ultrasound expertise, genetic counseling education of nurses and in-country diagnostic genetic testing able to detect pregnancies affected with aneuploidies and other anomalies.
- There is no research done so far in our country about this topic except the one done on patient preference for prenatal testing and termination of pregnancy for congenital anomaly and genetic disease in 2016.
- Hence this study aim was to assess level of knowledge, attitude and influencing factors toward prenatal screening among women attending ANC clinic at SPHMMC.
- This study will be a greater input to identify gaps of knowledge and attitude from pregnant mother's perspectives and design strategies to improve the prenatal screening.

2. Literature review

The prenatal screening test bridges knowledge and uncertainty, safety and risk, unpredictability and the desire to know in order to gain control. It can be accepted either not to have a child with a congenital anomaly or to prepare to have a child with this condition. The implications and possible follow-up scenarios make this type of test different from the usual biochemical tests performed during pregnancy. Prenatal screening presents opportunities that are highly valued by pregnant women, but also limitations, ethical questions, and potentially difficult decisions. There is a growing consensus that the purpose of offering these screening programs should be to empower pregnant women to make decisions about their own pregnancy and that participation should be based on informed consent (18).

Prenatal screening tests for congenital anomalies consist of two noninvasive tests: a maternal serum analyte performed between 11 and 20 weeks to determine the possibility of Down syndrome, and the Fetal Anomaly Scan (FAS) at approximately 20 weeks 1 week of pregnancy to detect structural abnormalities. Both the maternal serum analyte and the FAS may require three decisions: 1) whether or not to perform (one of the) screening tests, 2) whether or not to follow up positive screens with diagnostic tests associated with a risk of miscarriage 0.5% and 3) If diagnostic tests confirm a positive result, whether to terminate the pregnancy before 24 weeks of gestation or whether to prepare for the birth of a child with an anomaly. In some countries, such as the United Kingdom, Denmark and Iceland, the tests are routinely offered as part of antenatal care (19).

2.1 Prenatal screening practice across the world

In a cross-sectional quantitative survey, pregnant women ($n = 274$) receiving prenatal care in a hospital in Turkey were recruited and asked to complete questionnaires developed by the researchers: almost half (44.2) % of women were first-time mothers, the majority (97.8%) were in the third trimester of pregnancy. Only 36.1% of women reported that they had undergone prenatal screening using double or triple testing. Women had a low level of knowledge regarding prenatal screening: the average knowledge score was 4.32 out of 10 possible values. They had a consanguineous marriage, a history of spontaneous abortion, a child with a genetic disorder, polyparity, or a longer marriage duration were positively correlated with acceptance of a prenatal screening test (20).

A cross-sectional study was conducted to assess knowledge and attitudes and practice towards prenatal screening survey among 1111 women of childbearing age recruited at Obstetrics and gynecology clinic nationwide in Jordan. The overwhelming majority (>94%) consider prenatal screening procedure comfortable and reasonable (81.7%/). Nearly three-quarters (74.1%) of participants were aware existence of prenatal screening for genetic abnormalities exists. However, only 39% were aware of the existence of riskier and more invasive diagnostic PGT (eg, amniocentesis and CVS). About 95% encouraged the implementation of prenatal screening within the Jordanian health system, but most preferred it to be optional. Overall, nearly 95% of women in the study expressed positive attitude toward prenatal screening. There was a significant association between participants' age ($P = .007$), level of education ($P \leq .0001$), employment status ($P = .0439$), a husband's cigarette smoking ($P = .0209$), and a family history of genetic diseases ($P = .0102$) and a higher KAP score. (21)

The aim of the study was to determine the opinions and preferences of Croatian pregnant women regarding prenatal screening tests for trisomy's. Of the 437 screened pregnant women who were positive about screening, the majority would prefer the combined test in the first trimester (160/219; 73.1%), while 37/219 (16.9%) would prefer biochemical screening in the first trimester decided in the second trimester. The remaining 22/219 (10.0%) would only accept ultrasound examination. Of the 224 respondents who would accept the combined first trimester test, 95 (42.4%) had a college and university degree, while of the 59 women who would have chosen the second trimester biochemical screening, 14 had one had a high level of education (23.7%). The difference was statistically significant ($P = 0.016$). (22)

2.2 Prenatal screening practice in Africa

A descriptive cross-sectional study was conducted among 422 antenatal mothers who were consecutively recruited while attending antenatal clinics at the University of Lagos Teaching Hospital. An interviewer-completed questionnaire was used to assess their knowledge attitude and their decision toward prenatal testing. The education level of most of the respondents (92.2%) was at least secondary education and a majority (76.1%) were employed. Most of the respondents (67.5%) were multigravidas. Majority of respondent (72.7%) know that is possible to know whether their unborn baby has congenital anomaly, and 84.6% knew ultrasound scan can be used to check age, sex and wellbeing of the baby, 82% knew that first trimester screening includes ultrasound scan and blood testing. Around 79.1% knew that further test could be done if first trimester test shows baby at increased risk. Most, 79.4% knew that second trimester scanning done at fifth month, 56.4% know that it's able to detect congenital heart disease. Mean knowledge score was 47.5%. Majority, 83.4% felt that screening is valuable, 81.3% felt that they should be offered to all pregnant mothers, 66.1% felt cost shouldn't influence whether to get service, 82.6% felt they could plan for future pregnancy based on information gained from test, only 33.2% felt to accept the accuracy of the screening result. Overall majority of the respondent, 89.6% had positive attitude. (23)

A total of 351 Egyptian women of childbearing age who had given birth to at least one child completed a structured questionnaire to assess their knowledge of prenatal diagnosis and willingness to undergo prenatal screening, as well as their opinion on abortion when medically indicated. More than half of the women examined (52.71%) lack knowledge about the availability of accurate tests for prenatal early detection of congenital malformations. According to PNS data, more than three quarters (77.5%) of the women examined were positive about prenatal screening for congenital malformations. The other quarter either disagreed or were unsure of their opinion (4.6% and 17.9% respectively). Only 58.7% accept abortion if medically indicated. The positive attitude towards PNS was significantly higher both in women of older age ($p = 0.019$) and in women from a higher social class, as reflected by a higher level of education ($p = 0.026$) and a higher urban residence ($p = 0.046$). reflected) and working women ($p = 0.046$) was displayed ($p = 0.005$). (24)

In study done in Nigeria, Lagos university hospital among 327 pregnant women, the majority of participants (92.2%) had at least a secondary school education. The average overall knowledge score of respondents was 63%. Age and knowledge scores were not significantly correlated ($r=-0.071$, $p=0.14$). Employment led to higher knowledge scores (95% CI: 0.09, 2.09, $p = 0.03$). Respondents with primary school education and those who answered “I don’t know” to “willingness to test” had significantly lower knowledge scores (95% CI: -15.001, -1.19, $p=0.02$ and 95% CI: -4.52, -0.68, $p=0.01$). or the majority (79.1%) of respondents were willing to undergo a test. The respondents' level of education was significantly associated with willingness to test ($p=0.03$). (25)

2.3 Prenatal screening practice in Ethiopia

A hospital-based, retrospective, descriptive, cross-sectional study was conducted. The subjects were babies/children aged 0 to 17 who visited selected hospitals between 2010 and 2014. Fourteen hospitals (8 in Addis Ababa, 6 in Amhara region) were purposively selected based on caseload. A data retrieval form was developed to extract relevant information from medical records. 319,776 different medical records of children aged 0 to 17 were found. Of these, 6,076 (1.9% with 95% CI: 1.85% - 1.95%) children were diagnosed with birth defects. The majority (58.5%) of the children were male and 41.5% were female. Just over half (51.1%) of the children were urban residents, while 48.9% were from rural areas. Among the study participants, the proportion of birth defects was as follows: orofacial (34.2%), neural tube (30.8%), upper and lower limbs (12.8%), cardiovascular system (10.3%), digestive system and abdominal wall (4.8%), unspecified congenital malformations (2.5%), Down syndrome (2%), genitourinary system (2%), head, face and neck defects (0.4%) and others (0.3%). The trend in birth defects increased linearly over time [Extended Mantel-Haenszel chi-square for linear trend = 356.7 ($P < 0.0001$)]. Approximately 275 (4.5%) of the cases had multiple (associated) birth defects and 5,801 (95.5%) had isolated (single) birth defects. Of the total birth defects, 6,018 (99%) were major and 58 (1%) were minor. (26)

A cross-sectional descriptive study was conducted on children aged 0 to 17 years who visited the 16 selected hospitals in Addis Ababa and Amhara Region between January 1 and July 5, 2015. For abnormalities, whether major or minor abnormalities were estimated: Of 76,201 children, 1,518, 57.6% of whom were men, were diagnosed with congenital anomalies. The overall proportion of congenital anomalies was 1.99% (95% CI: 1,892,091), i.e., H. 199 per 10,000 children. The proportion of neural tube defects, orofacial clefts, musculoskeletal anomalies, syndrome disorders and cardiovascular system problems were 40.3% (37,743), 23.3% (21,325.4), 23.1% (20,925.2), 8% (6,79.4) and 2.6% (1,83.4). each with a 95% CI. The majority (72.5%) of the mothers were multigravida; 38 (2.5%) of the mothers and 32 (2.1%) of the fathers had a history of other children with congenital anomalies. Likewise, 20 (1.3%) of the mothers of the participating children and 17 (1.1%) of the fathers had a family history of congenital anomalies. Iron folate and multivitamin intake by mothers was found to be low during preconception and early pregnancy. (27)

One hundred one pregnant patients were surveyed on their preferences for prenatal testing and termination of affected pregnancies using a survey covering various congenital anomalies and genetic diseases in 2019, among pregnant women in Addis Ababa. Eighty-nine percent of patients reported interest in testing for all conditions. Three percent of patients were not interested in any testing. Over 60% of patients reported interest in termination for anencephaly, early infant death, severe intellectual disability, hemoglobinopathy, and Amelia. Patients were more likely to express interest in prenatal testing and termination for conditions associated with a shortened lifespan. (28)

3.Objectives

3.1 General objectives

To assess knowledge, attitude toward prenatal screening and influencing factors among women attending ANC at SPHMMC during study period from, May1 2023 to August 31 2023.

3.2 Specific objectives

To assess knowledge level of prenatal screening among ANC attendee women at SPHMMC during study period.

To assess the attitude of pregnant women attending ANC at SPHMMC toward prenatal screening during study period.

To identify influencing factors toward prenatal screening at SPHMMC among women attending ANC clinic during study period.

4. Methods and materials

4.1 Study site and design

The study was conducted in Addis Ababa, the largest and the capital city of Ethiopia. A descriptive cross-sectional institutional based study was conducted at SPHMMC in Addis Ababa from May 1 to August 31, 2023.

SPHMMC is the second largest Ethiopian public tertiary hospital and teaching center with undergraduate and post graduate academic center, and provides most of its care to an underserved population often from surrounding rural areas.

4.2 Source of population

All pregnant women who visited St. Paul's Hospital Millennium Medical College during study period.

4.3 Study population

All women who came for ANC follow up at St Paul's Hospital Millennium Medical College during study period from.

4.4 Inclusion and exclusion criteria

4.4.1 *Inclusion criteria*

Pregnant women attending ANC at SPHMMC who gave informed consent.

4.4.2 *Exclusion criteria*

Pregnant women who were critically ill and unable to communicate at the time of data collection.

4.5 Sampling technique and procedure

In SPHMMC, all pregnant women attending antenatal clinic within the study period were recruited at triage center and participants was selected consecutively according to their arrival from referring center by using systematic random sampling selecting every other patient until the desired sample size was achieved to ensure that the entire population of antenatal attendees seen at the facility who consented to participate were involved (the assumption is average number of monthly new ANC attendee were around 440, over two month about 880).

4.6 Sample size determination

The sample size was calculated by using a single population proportion formula $n = Z^2 p(p-1)/d^2$ with, assuming 95% confidence interval, marginal error of 5% (0.05)

$$n = \frac{Z^2 \times (pq)}{d^2} \quad p=16.27\% = 0.163 \quad q=1-p, Z_{\alpha}=1.96 \text{ and } d=0.05$$
$$= \frac{1.96^2 \times 0.35(1-0.35)}{0.05^2} = 324$$

Adding 10% of no respondent participants; $324 + 0.1 \times 324 = 356$

Where, N= sample size, Z = confidence interval at 95% that is at $Z=1.96$; p= population proportion of client knowledge, attitude and influencing factors toward PNS, and d = 5% margin of error and 10% non-response rate. Since no previous study has been done in the setting, the proportion of pregnant women knowledge, attitude and influencing factors toward PNS will be assumed to be 50%.

This assumption was used as it will yield the largest sample size possible.

4.7 Study variables

Independent variables

- Sociodemographic: age, marital status, educational background, occupation, family income.
- Obstetrics and maternal characteristic: parity

Dependent variables

Knowledge and attitude of pregnant mother toward prenatal screening.

4.8 Operational definition

Prenatal screening: tests done to identify individuals at risk of having a child with inherited conditions, chromosomal abnormalities or birth defect using sample from fetal tissue, amniotic fluid or fetal anomaly scanning.

Prenatal care: care given to pregnant women with intent of risk assessment, health promotion and intervention.

Good knowledge: those who have scored more than 50% of the correct responses to prenatal screening knowledge questions (24,25).

Poor knowledge: those who have scored 50% and less of the correct responses to prenatal screening knowledge questions (24,25).

Positive attitude: those who have more than 70% score on prenatal screening were considered positive attitudes (24,25).

4.9 Data collection and analysis

Data was collected by a validated semi-structured questionnaire developed from previous Published literature. The questionnaire was used to elicit information regarding sociodemographic characteristics, knowledge about PNS, attitude toward utilization PNS and influencing factors toward PNS using the questionnaire. The data was collected by trained nurses and midwives, using uploaded questionnaire into kobo toolbox app, after the data was collected from the respondents, exported to SPSS, cleaned, processed. Statistical analysis was performed using frequency, percentage, mean and standard deviation.

Binary and multivariable logistic regression was done to see association between dependent and independent variables using the statistical package SPSS version 26, odds ratio were used to measure the strength of association at p-value of <0.05 .

4.10 Data Quality Assurance

Training was given for data collectors and supervisors. Data compilation system and data completeness was checked and strictly controlled by the principal investigator and supervisors. Confidentiality and privacy of the participants were kept during the training session and data collection time.

4.11 Ethical Consideration

Ethical clearance was obtained from SPHMMC ethical review committee and oral informed consent was obtained from each eligible subject prior to the administration of the questionnaire.

The anonymity and confidentiality of the participants was kept private.

The name of the participants was included in the data collection format.

5.Result

5.1 Sociodemographic characteristics

Mean age of participants was 27.8 years (SD=4.8). More than two-thirds of women attended secondary school and/or above. Muslim and Orthodox religion followers accounted for 80% of the participants. Almost all (96.6%) of women were married and non-employed women accounted for 36.2% of the cases. Majority of women (45.8%) were multiparous. Those women who had good knowledge and positive attitude were 32% and 58%, respectively (**Table 1**).

TABLE 1: SOCIODEMOGRAPHIC CHARACTERISTICS, KNOWLEDGE AND ATTITUDE LEVEL OF THE PARTICIPANTS, N=356.

		Frequency	Percent	95% CI	
Sociodemographic characteristics		(n=356)	%	LL	UL
Age category	<25	85	23.9%	19.7%	28.5%
	25-29	137	38.5%	33.5%	43.6%
	30-34	96	27.0%	22.6%	31.7%
	35 or above	38	10.7%	7.8%	14.2%
Educational status	No formal education	27	7.6%	5.2%	10.7%
	Primary education	83	23.3%	19.1%	27.9%
	Secondary education	108	30.3%	25.7%	35.3%
	Higher education	138	38.8%	33.8%	43.9%
Religion	Orthodox	140	39.3%	34.4%	44.5%
	Muslim	140	39.3%	34.4%	44.5%
	Protestant	76	21.3%	17.3%	25.8%
Marital status	Non-married	12	3.4%	1.9%	5.6%
	Married	344	96.6%	94.4%	98.1%
Occupation	Unemployed	129	36.2%	31.4%	41.3%
	Government employed	101	28.4%	23.9%	33.2%
	Self employed	126	35.4%	30.6%	40.5%
Parity	Primigravida	94	26.4%	22.0%	31.2%

	Para one	99	27.8%	23.3%	32.6%
	Para two or more	163	45.8%	40.7%	51.0%
Knowledge	Poor knowledge	242	68.0%	63.0%	72.7%
	Good knowledge	114	32.0%	27.3%	37.0%
Attitude	Negative attitude	149	41.9%	36.8%	47.0%

5.2 Knowledge level analysis part

Knowledge was assessed using ten questions and 32% of women had good knowledge related to prenatal screening. Those who ever heard about prenatal screening were 69.7% of the participants. Those who know that women should undergo prenatal screening and presence of a test for early detection of fetal malformation were 48.0% and 39.6%, correspondingly. Almost all (95.5%) of women know that age, sex, and wellbeing can be assessed using ultrasound. Only around one third (34%) know that sonographic scanning at fifth month detect congenital heart disease. Those who know that amniocentesis can be used to detect chromosomal abnormalities and hereditary conditions were 16% of the participants. Only 33.4% of studied women know that ultrasound done during fifth month of gestations to detect congenital anomaly. Only 18.3% of participant know that further testing could be done if baby is at increased risk from third month screening (**Table 2**).

TABLE 2: QUESTIONS RELATED TO KNOWLEDGE ON PRENATAL SCREENING, N=356

Knowledge questions	Yes		No	
	n	Row %	N	Row %
Have you ever heard about prenatal screening?	248	69.7%	108	30.3%
Do you know these is test for early detection of fetal malformation by sonography or by taking sample of amniotic fluid?	141	39.6%	215	60.4%
Do you know that pregnant women should undergo prenatal screening?	171	48.0%	185	52.0%
Do you know that it is possible to find out if your unborn baby has congenital anomaly or genetic disease?	173	48.6%	183	51.4%
Do you know that ultrasound scan could be used to check the age, sex, or wellbeing of baby?	340	95.5%	16	4.5%
Do you know that prenatal screening can be done as early as three months by ultrasound and blood sample?	61	17.1%	295	82.9%
Do you know that ultrasound is done at third and fifth month of gestation to detect congenital anomaly?	119	33.4%	237	66.6%
Do you know that ultrasound scanning done at fifth month can detect congenital heart disease?	121	34.0%	235	66.0%
Do you know that amniocentesis (amniotic fluid taken) detects chromosomal anomalies, hereditary conditions?	57	16.0%	299	84.0%
Do you know further testing could be done if baby is at increased risk from first (third month) screening result?	65	18.3%	291	81.7%

5.3 Predictors of knowledge

A binary logistic regression model composed of four variables (age, education, occupation, and parity) was fitted to identify predictors of knowledge on prenatal screening. The adjusted odds of good knowledge were three times higher in women age 35 or above compared to women below the age of 25 ($p=0.026$). The odds of good knowledge were 14.5 and 41.9 times higher in women who attended secondary education and higher education, respectively, compared to women who didn't attend any formal education. Compared to primigravida women, multiparous women had 2.5 times higher odds of good knowledge ($p=0.017$). The model was good fit for the data (Hosmer-Lemeshow test: $p=0.951$).

TABLE 3: PREDICTORS OF KNOWLEDGE ON PRENATAL SCREENING AND DIAGNOSIS, N=356.

Sociodemographic characteristics		COR [95% CI]	p	AOR [95% CI]	P
Age category					
	<25	1		1	
	25-29	2.9 [1.4, 5.8]	0.003	1.4 [0.6, 3.1]	0.451
	30-34	4.5 [2.2, 9.4]	<0.001	2.3 [0.9, 5.5]	0.073
	35 or above	4.9 [2.0, 11.9]	<0.001	3.3 [1.2, 9.5]	0.026
Educational status					
	No formal education	1		1	
	Primary education	4.4 [0.5, 35.5]	0.165	5.7 [0.7, 47.3]	0.107
	Secondary education	8.2 [1.1, 63.7]	0.043	14.5 [1.7, 121.8]	0.014
	Higher education	31.0 [4.1, 234.5]	<0.001	41.9 [4.9, 358.4]	<0.001
Occupation					
	Unemployed	1		1	
	Government employed	5.6 [3.0, 10.3]	<0.001	1.3 [0.5, 2.9]	0.583
	Self employed	2.8 [1.5, 5.2]	<0.001	1.5 [0.8, 3.1]	0.230
Parity					
	Primigravida	1		1	
	Para one	2.5 [1.3, 4.7]	0.006	1.7 [0.8, 3.6]	0.155
	Para two or more	2.1 [1.2, 3.9]	0.014	2.5 [1.2, 5.2]	0.017

5.4 Attitude level analysis part

Except one, all women consider prenatal screening as valuable. More than 90% of women feel that prenatal screening is comfortable and information gained from this screening is important for future plans. Four-fifths (79.2%) of participants think that prenatal screening should be offered to all women. Those women who readily accept abnormalities detected by prenatal screening accounted for 85.7% of participants. One out of five women feel that prenatal screening shouldn't be obligatory and may affect the health of their baby. About 61% of women would like to know the result of prenatal screening while they are pregnant. About 86% of women support integration of prenatal screening to the routine prenatal care (**Table 4**). Overall, 58.1% of women had positive attitude towards prenatal screening and diagnosis.

TABLE 4: ATTITUDE QUESTIONS RELATED TO PRENATAL SCREENING AND DIAGNOSIS, N=356.

Attitude questions	Yes		No	
	n	Row %	n	Row %
Do you feel that prenatal screening is valuable?	355	99.7%	1	0.3%
Do you feel that performing these prenatal screening tests is comfortable?	331	93.0%	25	7.0%
Do you feel that prenatal screening should be offered to all pregnant women?	282	79.2%	74	20.8%
Do you think that the cost of prenatal screening shouldn't influence whether they are done or not?	213	59.8%	143	40.2%
Do you think it would help for the future with the information gained from prenatal screening and diagnosis?	332	93.3%	24	6.7%
If prenatal screening test shows abnormalities, would you accept the accuracy of result?	305	85.7%	51	14.3%
Do you feel that prenatal screening test would affect the health of your baby?	67	18.8%	289	81.2%
Do you feel that prenatal screening test should be obligatory?	289	81.2%	67	18.8%

If prenatal screening and test tells the chance of having the genetic disease, would you still like to know that while you are pregnant?	220	61.8%	136	38.2%
Would you support of prenatal screening and diagnosis integrated into routine prenatal care in Ethiopia?	305	85.7%	51	14.3%

5.5 Predictors of attitude towards prenatal screening and diagnosis

To identify independent predictors of attitude towards prenatal screening, again, a binary logistic regression was fitted and the only significant predictor identified was occupation. Accordingly, compared to unemployed women, the odds of positive attitude were 5 times higher in government employed women ($p<0.001$) and 2.3 times higher in self-employed women ($p=0.003$). Knowledge level was not significant predictor of positive attitude toward prenatal screening. The model was good fit for the data (Hosmer-Lemeshow test: $p=0.701$) (**Table 5**).

TABLE 5: PREDICTORS OF ATTITUDE TOWARDS PRENATAL SCREENING AND DIAGNOSIS, N=356.

Sociodemographic characteristics		COR [95% CI]	p	AOR [95% CI]	p
Knowledge					
	Good knowledge	1.4 [0.9, 2.3]	0.123	1.0 [0.6, 1.7]	0.956
	Poor knowledge	1		1	
Educational status					
	No formal education	1		1	
	Primary education	0.9 [0.4, 2.1]	0.753	0.7 [0.3, 1.7]	0.408
	Secondary education	3.0 [1.3, 7.2]	0.012	1.9 [0.8, 4.8]	0.163
	Higher education	2.9 [1.2, 6.8]	0.013	0.9 [0.3, 2.7]	0.917
Occupation					
	Unemployed	1		1	
	Government employed	4.6 [2.6, 8.2]	<0.001	5.0 [2.3, 10.8]	<0.001
	Self employed	2.7 [1.6, 4.4]	<0.001	2.3 [1.3, 4.1]	0.003

6. Discussion

In this study of women attending ANC clinic at SPHMMC, we will try to describe relationship of socio-demographic factors with knowledge and attitude toward prenatal screening.

Most of the women in this study were in the range of 25 to 30 years of age, whom has relatively lower risk of major congenital anomalies. While 10.7% were above 35 years of age. Which is similar to study carried out at Nigeria Ibadan,2014. (25)

Those women who had good knowledge were 32%, which is relatively comparable to study carried out at Nigeria, Legos primary and secondary health facility ,2018 which is 21%. (23) Lower compared to what was reported in study carried out in Alexandria 2017 where 47.3% of women had good knowledge regarding prenatal screening, the one reported in study carried out in Nigeria, Ibadan, 2014 is 63%, and in Lagos University Hospital,2021 was 47.5% (23,24).

This lower knowledge score in this study may largely attributed to unavailability of these test formally integrated to our health facility, except for recent introduction of fetal anatomic sonographic survey.

Only 48% know that women should undergo prenatal screening and presence of a test for early detection of fetal malformation in 39.6%. lower than what was found in Jordan study 74.1%, and 80% in Nigeria, Lagos,81.3% from study done in Alexandria. (21,22,23). Only 16% of the participant knew amniocentesis is used to detect chromosomal anomalies and genetic conditions, and 34% knew ultrasound done at fifth month can detect congenital heart disease. Lower than study finding in Jordan (39%), and Lagos study (21,22).

Older maternal ages, higher educational level, multiparity were significantly associated with knowledge about prenatal screening in this study, which is relatively similar to study from Alexandria, Egypt ,2017, but Ibadan study only occupational status, educational level was significantly predicting good knowledge. Probably these group of women do more searching about their pregnancy and risks, had previous contact of health facility during their previous pregnancy. (22,23).

Around 58% have positive attitude among studied women, which is lower compared to what was reported in study carried out in Alexandria 2017 where 77.5% showed positive attitude toward prenatal screening, and lower than what was reported in Lagos University 2021, study which showed those having positive attitude toward prenatal screening was 89.6%(n=296). Majority ,95% from Jordan study (24,21,22).

Only being government and self-employment status were significantly associated with attitude. We cannot possibly explain why employment status could positively influence attitude toward prenatal screening. Attitude toward prenatal screening was not significantly predicted by knowledge level. Unlike Lagos study where it was associated with educational level, Alexandria study found out significant association with older age, educational status, employment status.

Although population receiving care at tertiary center like SPHMMC seem to be more knowledgeable about their health, this study still highlights important deficits in their health literacy. Majority of the respondents didn't know that amniocentesis can be used to detect chromosomal abnormalities and hereditary conditions, only 16% of the participants were aware of it.

Major contributing factor could be due to unavailability of these tests in our country and availability of only few trained MFM, geneticists and genetic counselors and recent introduction of fetal medicine training program to our country, whom are confined to very limited institutions in Capital city to introduce the practice in health facility.

There is therefore a need to further develop facilities for fetal medicine and further train obstetricians in this sub-specialty. Most of the respondents except one in this study population feel prenatal screening is valuable, most of respondent feel information gained from prenatal screening is important for future plans, which is positive input to start considering introduction of these tests to routine prenatal care wherever the set up allows.

7.Limitation of the study

The fact that the study done in single institution at tertiary center, it's difficult to generalize to general population.

Further qualitative research is recommended to assess women's understanding about prenatal screening.

Moreover, the study shares the limitations of cross-sectional study design.

8. Conclusion

In conclusion from this study, it was found that those women who had good knowledge and positive attitude were 32% and 58%, respectively, which is relatively lower than most of study done in different continent. Those who attended higher education, multiparous, older age were found to have more adjusted odds of knowledge than their counter part.

Almost all of women studied consider prenatal screening valuable, most of them information gained from prenatal screening is important for future plan. Overall ,58% of women had positive attitude towards prenatal screening, which could give good background for our institution to introduce the testing prenatal care for at risk groups of population.

In conclusion there is ample room for improving knowledge of pregnant women in SPHMMC catchment area in particular, about prenatal screening by health professional, and strengthening and expanding fetal medicine training to cover wide range of pregnant mother.

The incidence of genetic disease in Ethiopian context is high, and knowledge among pregnant women attending ANC clinic at SPHMMC is low and needs to be promoted ,with educational campaigns in hospitals ,schools, universities and introduction of prenatal screening for high risk mothers in government regulated facilities equipped with necessary infrastructures and trained professionals since there is current gradual change in reproductive trend toward older age to give birth to first child, which make them at risk to develop chromosomal disorders, genetic disease and whom benefit from prenatal screening.

In prenatal screening, knowing pregnant women's opinions and knowledge level can inform health care professionals regarding women's educational needs in this respect. Health professionals should provide information about screening tests to all pregnant women with more attention to pregnant women who are at risk for any genetic condition.

9.Recommendation

This study is, the first on this topic in our country with the objective to assess the level of knowledge, attitude and influencing factors toward prenatal screening among pregnant women, and I hope this will open door for future extensive study that could assess large group of pregnant women to find out how well they are informed about all possible investigations in pregnancy.

Saint Paul's Hospital Millenium Medical College need to take a lead in integration of prenatal screening to routine prenatal care.

Ministry of Health need to take initiative to introduce in-country diagnostic genetic testing able to detect pregnancies affected with aneuploidies and other anomalies.

Introduce into curriculum training about prenatal screening, genetic counselling and education for low level health professional, so that they educate ANC attending mother about prenatal screening.

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11. Annexes

11.1 Annex 1: Information sheet

Title of the study: assessment of knowledge, attitude and influencing factors toward prenatal screening among women following ANC at SPHMMC: descriptive cross-sectional institutional based study.

Name of organization: SPHMMC, Department of Obstetrics and Gynecology

Consent form

Purpose of research:

Hello, my name is

First of all, I would like to thank you for your time.

I am working for a research team led by Dr. Tesema Eshete at Saint Paul's Hospital Millennium Medical College. The research team is conducting a study on prenatal screening. The aim of the study is to assess knowledge, attitude and influencing factors toward prenatal screening among women attending ANC clinic at SPHMMC during May1,2023 to August 31,2023. You have been chosen to participate in this study.

Procedure:

In order to collect our data, we invite you to take part in our study. If you are willing, you need to understand and sign the consent form. We will ask some questions about your socioeconomic status, reproductive history, and more data will be collected from your medical records. You don't need to tell your name to the data collector and all your responses and the result obtained will be kept confidentially by using a coding system whereby no one will have access to your response.

Risk and / or discomfort:

By participating in this research, you will sacrifice your time only. The interview will take about 10-15min. There is no risk in participating in this research.

Benefits:

If you are willing to participate in this research, there may not be a direct benefit to you but your participation is likely to help us meet the research objective and improve the quality of care in our hospital.

Incentives /payments for participating:

You will not be provided with any incentive or payments to take part on this study.

Confidentiality:

The information collected from this research will be kept confidential. Information will be stored in a file, without your name, only a code number is used. It will not be revealed to anyone except the principal investigator.

Right to ask questions:

Don't hesitate to ask question if you are in need.

Right to refusal or withdrawal:

You have the full right to refuse from participating in this research. You can choose not to respond to some or all of questions if you don't want to give your response. You also have full right to withdraw from this study at any time you wish. Your refusal will not affect you from getting any kind of health-related service.

Person to contact:

This research was reviewed and approved by the IRB of Saint Paul's Hospital and Millennium Medical College. In case you need more information about the study you can contact: -

Name: Dr. Tesema Eshete

[Tel: +251942342972](tel:+251942342972)

Email: -wakjira.me@gmail.com

11.2 annex 2: Informed consent:

I, the undersigned, have understood the objective of the study and agreed to be included in the study as explained by the researchers. I also understand that I am at autonomy to withdraw from the study at any time.

Signature /fingerprint of participant

Date

Name and signature of data collector

Name

signature

Date

11.3 Annex 3: Data Collection Tool

Part I: Socio-demographic data

1. Age in completed years

2. Highest level of education completed

A. Primary ☐

B. Secondary ☐

C. Tertiary ☐

D. No formal education ☐

3. Religion

A. Christian ☐

B. Muslim ☐

C. Protestant ☐

D. Catholic ☐

E. Others (specify)

4. Marital Status

A. Single ☐

B. Married ☐

C. Divorced ☐

D. Widowed ☐

5. Occupation

A. Employed ☐

B. Self- employed ☐

C. Unemployed ☐

6. Parity A. Primigravida ☐ B. Para I ☐ C. Para II or more

7. Monthly income in ETB.....

Part II: Knowledge on prenatal screening

1. Have you ever heard about prenatal screening?

A. Yes ☐

B. No ☐

2. If yes, where did you hear about prenatal screening?

A. In community ☐

B. Health facility ☐

C. Place of worship ☐

D. Mass media e.g., radio, television ☐

E. Others (specify)

Knowledge assessment part

Knowledge level assessment	Yes	No
Do you know there is test for early detection of fetal malformation by sonography or by taking sample of amniotic fluid?		
Do you know that pregnant women should undergo prenatal screening?		
Do you know that it's possible to find out if your unborn baby has congenital anomaly or genetic disease?		
Do you know that ultrasound scan could be used to check the age, sex or well-being of the baby?		
Do you know prenatal screening can be done as early as third month by ultrasound and blood test?		
Do you know that ultrasound is done at third and fifth month of gestation to detect congenital anomaly?		
Do you know that ultrasound done fifth month can detect congenital heart disease?		
Do you know that amniocentesis detects chromosomal abnormalities, hereditary condition?		
Do you know that further testing could be done if baby is at increased risk from first screening result?		

Attitude assessment part

Attitude assessment	Yes	No
Do you feel that prenatal screening test is valuable?		
Do you feel that performing these prenatal screening tests is comfortable?		
Do you feel that prenatal screening should be offered to all pregnant women?		
Do you think that the cost of prenatal screening should not influence whether they are done or not?		
Do you think it could help for the future with the information gained from prenatal screening and diagnosis?		
If prenatal screening test shows abnormalities would accept the accuracy of result?		
Do you feel that prenatal screening test would affect the health of your baby?		
Do you feel that prenatal screening should be obligatory?		
If prenatal screening and test tells the chance of having genetic disease, would you still like to know that while you are pregnant?		
Would you support of prenatal screening and diagnosis integrated into routine prenatal care in Ethiopia?		

St. Paul Hospital Millennium Medical College

Department of Obstetrics and Gynecology

Student Declaration

I declare that this thesis has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

Name of resident: _____

Signature _____ Date: ____ / ____ / ____

Supervisors' Declaration

I have undersigned and certify that I have read and here by recommend for acceptance to SPHMMC thesis entitled "Assessment of knowledge, attitude and influencing factors toward prenatal screening among women attending ANC at SPHMMC in Addis Ababa, Ethiopia"

Dr. Feiruz Surur (Obstetrics and Gynecologist, REI Sub-specialist)

Signature Date

Reviewer's Declaration

I have undersigned and certify that I have read and here by recommend for acceptance to SPHMMC dissertation entitled "Assessment of knowledge, attitude and factor influencing uptake of prenatal screening among women attending ANC at SPHMMC in Addis Ababa, Ethiopia"

Dr Lemi Belay (Obstetrician and Gynecologist, FP and RH sub-specialist)

Signature Date