

## Research Article

# Assessment of Knowledge, Attitude and Practice Towards Childhood Vaccination among Pregnant Mothers Attending ANC Follow-Up at SPHMMC

**Abstract**

**Introduction:** A vaccine-preventable disease is an infectious disease for which an effective preventive vaccine exists. The Expanded Program on Immunization (EPI) was established globally in 1974 to protect child health by routine immunization against diphtheria, tetanus, pertussis, poliomyelitis, measles and tuberculosis. Apart from the scarce resource of vaccines, awareness towards vaccines, the attitude towards it and practicability are major issues. Since Antenatal period is a birth preparedness period awareness towards VPD is essential.

**Objectives:** Assessment of knowledge, attitude and practice towards vaccine preventable disease among Pregnant mothers attending ANC follow up at SPHMMC

**Methods:** An institutional based cross-sectional study design was employed. The study was conducted at Saint Paul's Hospital millennium medical college at ANC provision center among 311 mothers who came for their ANC follow-up with the study period from January 16 to March 16. The systematic sampling procedure was used. The Collected Data was coded, entered and analyzed by SPSS 21. Descriptive statistics was computed to determine the mean, standard deviation, frequencies and percentages.

**Result:** According to the research we found that of the total 311 study participants 61.7% had poor knowledge and 38.3% had good knowledge. Regarding the assessment of attitude, it resulted that 51.8% had bad attitudes and 48.2% had good attitudes. And lastly regarding assessment of practice it resulted that 83% had bad practice and 17% had good practice.

**Conclusion:** According to this study there is poor knowledge, attitude and practice towards vaccine preventable disease among mothers attending ANC. For this different factor have contributed and a lot should be done by different stakeholders since it is a huge public health concern

**Keywords:** Knowledge, Attitude, Practice, vaccination, vaccine preventable disease, antenatal care

**Acronyms**

ANC (Antenatal Care), CDC (Center for Disease Control and Prevention), EPI (Expanded Program on Immunization), HIB (Haemophiles Influenza type B), KAP (Knowledge, Attitude, Practice) OPV (Oral Polio Vaccine), PCV (Pneumococcal Vaccine), SPHMMC (Saint Paul's Hospital Millennium Medical College), SPSS (Statistical Package for Social Sciences), UIP (Universal Immunization Program), VPD (Vaccine Preventable Disease), WHO (World Health Organization).

**Introduction****Background of the study**

A vaccine-preventable disease is an infectious disease for which an effective preventive vaccine exists. According to the Center for Disease Control and Prevention (CDC), tens of thousands of people in the United States get sick with VPDs. Infections caused by these diseases can result in hospitalizations and can sometimes be fatal. If a person acquires a vaccine-preventable disease and dies from it, the death is considered a vaccine-preventable death. The most common and serious vaccine-preventable diseases tracked by the World Health Organization (WHO) are Diphtheria, hepatitis B, Hemophilus influenza type B, yellow fever, diphtheria, measles, meningitis, mumps, pertussis, poliomyelitis, rubella, tetanus, tuberculosis. The WHO reports licensed vaccines being available to prevent, or contribute to the prevention and control of, vaccine-preventable infections. [1-3].

The epidemiology and burden of vaccine-preventable diseases vary by country and region partly because of differences in vaccine uptake. Numerous other factors that contribute to the disease burden

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**Received Date:** 05 Dec 2024

**Accepted Date:** 20 Dec 2024

**Published Date:** 24 Jan 2025

**Citation:**

Teshome T, Zegeye S. Assessment  
of Knowledge, Attitude and Practice  
Towards Childhood Vaccination  
among Pregnant Mothers Attending  
ANC Follow-Up at SPHMMC. *Collect  
J Gynecol Obstet.* Vol 2 (1) 2025;  
ART0052.



include geography, seasonal patterns, crowding, nutritional status, travel to and from other countries and possibly genetic differences in populations that affect disease severity [3].

A number of vaccine-preventable diseases are not reportable events in many countries. The estimates of the burden of disease by the World Health Organization (WHO) are based on a combination of often incomplete vital registration data, mortality survey data and mathematical models using numerous assumptions. Most models of vaccine-preventable diseases are derived from the susceptible fraction of the population (calculated from natural immunity from presumed historical infections in regions without previous vaccination and historical immunization coverage rates), infectivity rates of disease, sequelae of diseases. The degree of accuracy of these models is only as good as the data supporting the assumptions [3].

Many of the diseases prevented by vaccines have dramatically declined since the introduction of vaccination programs. When a disease is eradicated around the world, vaccines are no longer needed. For example, smallpox was eradicated in 1979. As a result, the smallpox vaccine is no longer provided in routine vaccination programs.

Diseases are eliminated when the disease is reduced to zero, or close to zero, in a defined geographical area. Polio, for example, is eliminated in North America and South America [4,5].

Globally, it is estimated that around 22.6 million infants were partially protected. In 2016, routine immunization services such as the DTP3 vaccine did not reach about 19.5 million children under 1 year of age worldwide. About 70% of these children are in 10 countries and more than 50% of them are living in Africa including Ethiopia, Kenya and South Africa. Previous studies carried out worldwide showed that the death of children is more common in underdeveloped countries. Among 9 million deaths of children worldwide as a result of VPDs, a higher proportion happened in Sub-Saharan Africa, which was 4.4 million, from this about 472,000 children passed away every year before their fifth birthday largely from VPDs in Ethiopia. Various reports revealed that VPDs are still responsible for about one-fourth of deaths occurring annually among children less than 5 years of age. Thus, VPDs put a significant economic and social crisis among individuals, families and communities as a whole. Children who are exposed to these preventable diseases usually suffer from numerous growth and developmental squeals [3,4].

At present, vaccination is being given on a static, outreach and mobile basis. Ethiopia follows the WHO-recommended immunization schedule. Infants should receive vaccination 1 year after birth with: one dose of Bacillus Calmette–Guerin (BCG) and oral polio vaccine given at birth or as soon as possible; three doses of OPV, three doses of Penta-valent, three doses of pneumococcal vaccines, two doses of rotavirus are given at an interval of 4 weeks duration at the 6th, 10th and 14th weeks, the 9-month first dose of measles. The second dose of the measles vaccine was launched and integrated into routine immunization in the year of 2019 and was provided to 15-month-old children. Of these vaccines, the third dose of DPT (DPT 3) is often used as a measure of immunization system performance. Instead of DPT, some countries use a Penta-valent vaccine, which includes (Diphtheria, Pertussis, Tetanus, Haemophiles influence type B and Hepatitis B) [4].

However, awareness of VPDs continues to be a priority so that members of the public and health professionals understand why it is important to keep vaccinating against those diseases. The knowledge and practicability of vaccination is still in question in most developing countries including Ethiopia, apart from availability.

### Statement of the problem

Immunization saves lives and is considered to be one of the most cost-effective public health interventions available. Immunization has also been widely accepted as one of the great global public health success stories and an essential component of primary health care to protect children from unnecessary death, disease and disability due to highly contagious diseases. The United Nations Millennium Development Goals (2000) and discussions during the United Nations' General Assembly Special Session for Children (2002) indicate immunization is not only an effective intervention to reduce death and disease in children under five, but a strategy to help address the poverty gap in high risk and vulnerable populations. Every child has the right to be protected against vaccine-preventable disease and preventing disease through immunization is beneficial, not only for health but also for economic and social reasons at global, national and community level. It increases the security of all populations against disease, reduces inequalities and provides an important mechanism to contribute to poverty reduction. Effective immunization program has been an integral part of public health services in the Region for decades. The Expanded Program on Immunization (EPI) was established globally in 1974 to protect child health by routine immunization against diphtheria, tetanus, pertussis, poliomyelitis, measles and tuberculosis [3,4,5].

Despite this the awareness towards vaccinations is still low. Most of the problem lies in adequate awareness apart from scarcity of vaccines. Mothers are not well informed about vaccination during their pregnancy time and post-partum.

Apart from the scarce resource of vaccines, awareness towards vaccines, the attitude towards it and practicability are major issues. Antenatal period is a preparedness period for such kind aspects.

However, several factors are related to low immunization status. Rural residence, wealth status, child sex and age, long-distance to a health facility, low access to immunization service, poor health infrastructure, inadequate awareness of mothers/caregivers, mothers' perception to the accessibility of vaccines, missed opportunity, place of delivery, living altitude, lower number of trained manpower and high staff turnover.

Optimal vaccination coverage is one of the most essential indicators of immunizations success and children's better health outcome. Considering this, Ethiopia has envisioned ending all preventable new born and child deaths by 2035.

Despite the implementation of these strategies, to accomplish universal coverage in the EPI and reduce under-five mortality, vaccination coverage in Ethiopia was found to be less than the expected one and under-five mortality rates are also higher. According to the Ethiopian Mini Demographic and Health Survey (EMDHS) report, in 2019 showed that under-five mortality rate was 55 deaths per 1000 live births, close to 2 in 10 children (19%) have not received any vaccinations at all and only 4 out of 10 children (43%) have received all basic vaccinations [4,5].

Vaccination programs, possible side effects, missed doses, benefits should be major areas to be focused in order to address the problem. But still in the 21st century vaccine preventable disease is still a major public health problem [2,6,7].

Moreover, some studies have been published globally regarding parents' knowledge, attitude and practices about infant immunizations. There are only a few studies published nationally and no studies have been reported in the study area. Therefore, this study aims to assess the knowledge, attitude and practices of parents regarding immunization of infants at SPHMMC.

We need to know the significance of the problem in order to help intervene the problem for better outcome.

### **Significant of the study**

One of the major areas of antenatal care is birth preparedness which in practicable areas mostly focuses on the place of birth and the like. But points such as exclusive breast feeding, sunlight exposure, vaccination schedules and importance, child health are not mostly focused due to several reasons.

Parents' knowledge, attitude and practices regarding immunization are the most important factors that could contribute to their immunization decisions. Thus, parents' decisions about immunization are very crucial for enhancing the immunization rate and compliance. Their compliance, in turn, leads to full immunizations of children, which prevents VPDs in children and for inhibiting any possible immunization errors.

Moreover, some studies have been published globally regarding parents' knowledge, attitude and practices about infant immunizations. There are only two studies published nationally and no studies have been reported in the study area. It will also help policymakers, program implementers and service providers in identifying the obstacles to utilization of EPI service and enhance infant immunization status to attain the goals of universal immunization. It also helps as a foundation for future studies attain the required outcome in terms of vaccination coverage for most of the VPDs [7].

### **Literature Review**

#### **Concept of VPDs**

Vaccination is crucial to decrease the burden of epidemics and vaccine-preventable disease [8].

Parents' knowledge about immunization and their attitudes towards them are likely to influence uptake. Previous studies revealed misconceptions on parents' knowledge and negative attitudes towards childhood immunization. Mothers' knowledge about vaccination was found to be quite low and their educational status was significantly associated with child's coverage. Negative attitude, for example mothers' fear from vaccination, was found to significantly affect the immunization status of their children [9].

Parents are strongly influenced by the perceived benefits of vaccination and brought their children for vaccination although their knowledge and positive attitudes to vaccination are moderate. Misconception in knowledge and attitudes about vaccination have been identified, especially belief that vaccines cause autism which may contribute to vaccine hesitancy [9,10,11].

### **World**

#### **Knowledge, attitude and practice of Pregnant mother on Vaccination**

Lack of awareness of the next/further dose of vaccine was found to be the major reason for incomplete immunization. So, there is a need to increase awareness and knowledge about the benefits of vaccination, as well as the potential disadvantage of partial immunization. audio visual aid should be used to narrate the importance of vaccination focusing on the illiterate and backward section of society. Health workers and medical personnel

should educate the parents about the importance of routine immunization [12].

A significant association was seen between age, marital status, occupational status and parents' knowledge on the importance of immunization (thinking if all child immunization was important). Association was also seen between parents' perception that immunization causes serious side effects and the age of the respondents [13].

knowledge regarding individual vaccines, their dosages and schedule were found to be low. Majority of mothers had a good attitude about immunization. Immunization coverage of the locality was relatively good. Significant relation was established between attitude and practice. Sick at the time of vaccination was the most common cause of being partially immunized.

It was also suggested that intensifying the awareness classes for mothers and religious leaders on immunization [14].

Researchers stated that mothers in rural areas were unaware about the vaccination and its implications. Even in the urban areas we found significant lacunae in the KAP of mothers towards childhood vaccination [15].

Health educational programs are needed to improve the levels of parental knowledge and practices [16].

Studies done in a community where the level of education was high showed positive results, for example in a study done in Saudi, The Saudi mothers in the sample were knowledgeable, with positive attitudes regarding vaccination and they demonstrated good practices. This might be explained by the higher educational level of the sample [17].

In another study Comparison of pre- and post-intervention scores showed that mother's knowledge is improved after counselling. Most of the mothers had pre-intervention scores of 2-4 out of 13 and whereas the post-intervention scores of the same subjects were 10-12 out of 13. It was therefore suggested that proper health education and health promotion interventions be taken as measures to improve knowledge, attitude and perception of mothers towards immunization as a disease prevention tool [17,18].

In other studies, done where there is a scarcity in vaccines shows that even though most of the mothers had satisfactory knowledge, attitude and practice, almost 25% children were identified as un-immunized or partially immunized. Educational status of mothers was identified as an independent factor in the determination of their children's vaccination status. There is an urgent need to increase the coverage of UIP (Universal Immunization Program) vaccines and there is a dire need to arrange for health education program sessions for all the parents regarding the importance of complete adherence of vaccination among children. TV, newspaper and other Medias can be also promoted as most important sources which can be used for spreading educational messages regarding vaccination [19,20].

Regarding sources of information there are reports showing potential impact of internet health information and social media platforms on parents' hesitancy toward childhood vaccination. In one study, Forty-nine percent of parents use the internet as a source to seek vaccination information, while only 21% trust online information. As for social media, 27% mentioned that they use it to seek vaccine information but only 15% trust them as a source of information. 13.2% indicated that they changed their minds regarding vaccination because of information from the Internet and 11.7% changed their minds from social media. We found a strong statistically significant association between vaccine hesitancy and information obtained from the internet and social media platforms ( $P = 0.000122$  and  $0.000025$ ), respectively. Vaccine hesitancy and information from family and friends were statistically significant ( $P = 0.00003$ ) [21].

Another reason for non-vaccination despite most parents having an acceptable and good knowledge of the importance of vaccinations was fears and misconceptions which will result in non-compliance [22,23].

Over all Strengthening of primary health care facilities, collaboration between health-care professionals, social media and community to improve their awareness for immunization are suggested solutions in almost all researches [24,25,26,27,28].

## Africa

### Knowledge, attitude and practice of Pregnant mother on Vaccination

Research done in Nigeria showed that Health education campaigns about vaccination for mothers especially those in rural areas, slums and villages emphasis on the less educated mothers. Immunization sessions should be held for mothers with children less than one year as well as social group meetings between mothers with children in the same age to exchange information at maternal and child health centers. Provide mothers with vaccination booklets explaining the importance of vaccination and how to manage its side effects. Also, continuous educational programs for mothers about the types and availability of others' vaccinations are not included in the obligatory ministry of health vaccination schedule [29].

In one research done in Nigeria Only a small proportion of respondents (17%) had good knowledge of childhood immunization; their attitude towards childhood immunization was generally positive (96.6%) and their immunization uptake was good (88.1%). The prevalence of individuals who had missed their immunizations was 14%. The commonest immunizations missed were measles and yellow fever. Higher maternal educational level, Christian religion and better knowledge of immunization had significant, positive influence on the uptake of childhood immunization. Mothers had poor knowledge but high uptake of childhood immunization. A high rate of incomplete immunizations was also observed. It was recommended that health education as well as female education to improve maternal knowledge and further improve the uptake of immunization. In addition, Short Message Service (SMS) reminders may also be considered to reduce incidence of incomplete immunization [30].

In addition, research done in Sudan revealed that the correlation between knowledge and practice of the studied mothers was statistically insignificant. More than two third of studied mothers (65%) had poor knowledge, while on other hand their practice was good towards vaccination [31].

Other reviews also found that most men have good knowledge, positive attitude with poor practice and involvement in immunization. There is a need to increase awareness about the benefits and importance of vaccination, as well as the harmful consequences of incomplete immunization for both mothers and fathers [33].

## Ethiopia

### Knowledge, attitude and practice of Pregnant mother on Vaccination

In a meta-analysis where Twenty-eight articles were included with a total sample size of 20,048 children (12–23 months old) The pooled prevalence of immunization among 12–23-month-old children in Ethiopia was found to be 47% (95%, CI: 46.0, 47.0). A subgroup analysis by region indicated the lowest proportion of immunized children in the Afar region, 21% (95%, CI: 18.0, 24.0) and the highest in the Amhara region, 89% (95%, CI: 85.0, 92.0). Nearly 50% of 12–23-month-old children in Ethiopia were fully vaccinated according to this systematic review and meta-analysis; this indicates that the coverage is still low with a clear disparity among regions. As a suggestion the need for mobile and outreach immunization services for hard-to-reach areas, especially pastoral and semi-pastoral regions [34].

In research done in Wadla Woreda, North East Ethiopia, 65.1%, 57.3% and 55.3% of the parents had good knowledge, a favorable attitude and good practice towards infant immunization, respectively. Parent's educational status (AOR=5.330), urban residency (AOR=2.788), favorable attitude (AOR=4.308) and got immunization service two–three times (AOR=3.227) and four–five times (AOR=2.254) were statistically associated with knowledge of parents. Parents who attend primary school [AOR=0.451] and secondary school [AOR=0.320], parents who were mothers of the child [AOR=3.813] and respondents who had good knowledge about infant immunization (AOR= 4.592) were significantly associated with a favorable parental attitude. Infant immunization practice was significantly associated with parental education who attend primary school (AOR=2.513), secondary school (AOR=2.546) and higher education (AOR=11.988), parents who had good knowledge of infant immunization (AOR= 4.206) and short waiting time (AOR=3.881) [35].

Also, in a study done in Bench maji zone showed that Occupation of mothers/caretakers, educational level of father and mother, knowledge on vaccine and vaccine-preventable disease, antenatal care follow-up, postnatal care service utilization, TT vaccination, birth order and place of delivery of the child were statistically significant predictors of full immunization of children [36].

## Objective

### General objective

The general objective of this research is to assess knowledge, attitude and practice towards vaccine preventable disease among Pregnant mothers attending ANC follow up at SPHMMC

### Specific objectives

- The specific objectives of this research study were To assess knowledge of vaccine preventable disease among Pregnant mothers attending ANC follow up at SPHMMC
- To assess attitude of vaccine preventable disease among Pregnant mothers attending ANC follow up at SPHMMC
- To assess practice of vaccine preventable disease among Pregnant mothers attending ANC follow up at SPHMMC

## Methods and Materials

### Study setting/area

The study was conducted at Saint Paul's Hospital millennium medical college at ANC provision center from

January 16 to March 12. St. Paul's Hospital Millennium Medical College which is located in Addis Ababa the capital city of Ethiopia, with an estimated 5 million metropolitan inhabitants. The Hospital was built by Emperor Haile Selassie I in 1969 with the help of the German Evangelical Church. And currently it has an inpatient capacity of more than 700 beds and serves an average of 1000 emergency and outpatient clients on daily basis.

The College was established through a decree of the council of ministers in 2010 although the medical school opened in 2007. It has more than 2800 clinical, academic and administrative and support staffs that provide medical specialty services to patients who are referred from all over the country, teach medicine, masters of public health and nursing students and do basic and applied researches. It also gives 15 post graduate residency programs and 17 subspecialty or fellowship programs. Of which the obstetric and gynecologic department plays a big role. This research was at the Gynecology and Obstetrics department which gives both outpatients services (regular and emergency room) and admits patients who are in need. This research particularly will be done in the Antenatal care center where pregnant mothers come for follow up as a part of outpatient service of the department.

The total number of mothers who come for ANC follow up per day ranges from 40-60. These mothers can have their regular follow up at the center or they might come through referral.

### Study design/ Period

An institutional based cross-sectional study design was employed. The study was conducted at Saint Paul's Hospital millennium medical college at ANC provision center among mothers who came for their ANC follow-up with the study period from January 16 to March 16, 2023.

### Population

**Source population:** All Pregnant women who visited Saint Paul's Hospital in Addis Ababa for antenatal care follow-up during January 16 to March 16, 2023.

**Study population:** Sampled pregnant women who came to Saint Paul's Hospitals in Addis Ababa for ANC follow up during January 16 to March 16, 2023.

### Eligibility criteria

**Inclusion criteria:** All pregnant women who came to the Saint Pauls' Hospital for ANC follow-up at the time of data collection were included in the study.

**Exclusion criteria:** Pregnant women who were critically ill in labor will be excluded under this study.

Those who were having their first pregnancy were excluded since we cannot assess the attitude and practice.

### Sample size determination and sampling technique

**Sample size determination:** It's important to calculate the optimum number of sample size to infer appropriate conclusion from the study. From previous study done Wadda Woreda, North East Ethiopia, 2019 which revealed that among 418 mothers, 65.1%, 57.3% and 55.3% of the parents had good knowledge, a favorable attitude and good practice towards infant immunization, respectively from the above p values the sample size with good knowledge was larger so by considering p value of 65.1%. By utilizing Hollander's formula with Confidence level 95% and margin of error 5%. Where: The sample size will be determined by using the formula:  $n_0 = (Z_{\alpha/2})^2 \times P(1-p) / d^2$  using the  $n_0$  = the minimum sample size  $Z_{\alpha/2}$  = the standard normal deviation, 1.96, which corresponds to the 95% confidence interval.

$P$  = the best estimate of the prevalence in the target population, for this study proportion estimate of 65.1% (0.651)

$q$  = complementary proportion =  $(1-P) = 0.349$

$d$  = degree of accuracy expressed as proportion (0.05)

$n_0 = (1.96)^2 \times 0.651 \times (1-0.651) / (0.05)^2 = 349.1, 376$  and  $379$

Hence  $n_0 = 379$ . So based on this formula the minimum sample size is 379

However, since the average numbers of pregnant women attending ANC follow up are about 1112 women which is less than 10,000. Hence the reduction formula will be used alternatively

$n = n_0 / (1 + n_0 / N)$

Where  $n$  = reduced sample size

$N$  = Total study population

Hence, by substitution the corrected sample size will become 283

We will consider 10% for incomplete chart and non-response data=28

Total of 311 sample sizes is needed.

Variables	Prevalence in the Target Population	Sample Size
Knowledge	65.1	349
Attitude	57.3	376
Practice	55.4	379

**Sampling technique and procedures:** A systematic random sampling technique was used in this study, meanwhile Individuals are chosen at regular intervals from the sampling frame. Since the average numbers of pregnant women attending ANC follow up are about 1112 which is a sampling frame.  $K=N/no = 1112/311 \sim 3$

The first person will be selected inclusively between the first and the 3rd person. And the first person was selected randomly by lottery, therefore, by choosing participants every 3rd person as they registered were included in the sample at each antenatal care unit until the desired sample size was attained.

We have done pre checking with 10 volunteer mothers prior to the main data collection.

#### Study variables

- **Dependent variable** Maternal knowledge on vaccine preventable disease and vaccination
- Attitude towards vaccine preventable disease and vaccination
- Practices regarding vaccination

#### Independent variable

- Socio-demographic characteristics: age, marital status, religion, ethnicity, education level, husband educational level, occupation and monthly income.
- Family Size
- Number of pregnancies
- previous delivery
- Health conditions
- Antenatal visits
- Means of transport
- Time is taken to reach health institution
- Waiting time

#### Operational definitions

**Antenatal care:** is the care provided by skilled health-care professionals to pregnant women and adolescent girls in order to ensure the best health conditions for both mother and baby during pregnancy [35].

**Vaccine:** a preparation that is used to stimulate the body's immune response against disease

Vaccine preventable disease: are infectious diseases caused by viruses or bacteria that can be prevented with vaccines [35].

**Knowledge:** it refers to an individual's understanding of vaccines and vaccine preventable disease including the intellectual ability to remember and recall VPD [35].

**Knowledgeable:** participants who scored the median and above will be considered to have a "good knowledge" [35].

**Not knowledgeable:** those who scored below were considered as having a "poor knowledge" about immunization [35].

**Attitudes:** are emotional, motivational, perceptive and cognitive beliefs that positively or negatively influence the behavior or practice of an individual [35].

**Favorable attitude:** the respondents attitude score  $>$  or equal to the median [35].

**Unfavorable attitude:** the respondents' attitude scores the median [35].

**Practices:** are observable actions of an individual that could affect his/her or others' engagement towards VPD such as getting their child vaccinated, getting updated information, following programs [35].

**Good practices:** the respondents had practiced according to EPI and the respondents score  $>$  the median [35].

**Poor practices:** the respondents had no practices according to EPI and the respondents' attitude score  $<$  the median [35].

#### **Data collection method**

**Data Collection Instrument (Tools) Procedure:** Data was collected through a pretested, structured and interviewer-administered questionnaire developed from an extensive literature search. Most of the questionnaires are adapted from previously conducted studies with some changes based on the local context and it consisted of five main themes: (1) demographics, which surveyed parents' socio-demographic information (2) source of Information: (3) knowledge about immunization; (4) attitudes toward immunization and (5) practices relevant to immunization.

**Data collectors:** Four data collectors were recruited for the data collection.

**Data collection procedure:** The medical registration numbers of the participants who were involved in the study were recorded on a separate sheet to avoid repeated recruitment of the study participants who come for the next visit and they were also being asked if data was collected from them previously.

The data was collected using a face- face interview by 4 trained students and one supervisor all recruited from the SPHMM College. The data was collected during the ANC visit after the mothers have finished their medical evaluation and on their waiting area

Following this, the collected questionnaire was checked for completeness and consistency of the data by the principal investigator on a daily basis.

#### **Data quality control and data quality assurance**

Data collectors were making frequent checks on the data collection process to ensure the completeness and consistency of the gathered data and daily-based corrections were made accordingly. The questionnaire was elaborated with translation from English to Amharic.

The questionnaire was pretested on 5% of the mothers who are not primarily selected for the study and the findings were excluded from the main study. Based on the pretest, the time needed to complete an interview and the total number of days needed for data collection was estimated.

The necessary amendments were made accordingly. Data was collected and after completion each question was being cross checked once to make sure no information was missed and then data was entered into SPSS 21 based on those set codes and then rechecked again for completeness and finally analysis was done.

#### **Data processing and analysis**

The data was processed by checking the gathered data for accuracy, utility and completeness. After which the data was managed by proper entry into SPSS 21 and then the questionnaire responses were analyzed using Statistical Package for Social Sciences (SPSS 21) software to observe the overall trends in the data descriptive statistics such as frequency and graphics. Frequencies and percentages were calculated to all the variables that are related to the objectives. Descriptive statistics using cross tabulations was employed. The data is presented using tables and graphs.

#### **Ethical Consideration**

Ethical clearance was obtained from the Department of Public health and Institutional Review Board. The informed verbal consent of the participants of this study has signed to express their willingness to be part of the study. Afterwards, every information about the participants is confidential in a way it is going to be used only at the interest of the study. Every participant was registered to the study out of their willingness.

#### **Dissemination of result**

The results of the study will be presented to Saint Paul's Hospital Millennium Medical College, school of Public Health as part of the degree of doctorate of medicine. Efforts will be made also in future for this study to be published and reviewed on public journal publications in the country.



## Result

### Socio-demographic characteristics of the respondents

Three hundred eleven study participants enrolled in the study with a response rate of 100%. The highest proportion of respondents 187 (60.1%) were within the age group of 21–30 years the mean age being 25. The majority of the respondents (47.9%) were orthodox Christian followers and 264 (63.2%) of the parents were housewives. Regarding the educational status of the respondents, the highest portion of respondents 120 (38.6%) attended primary school. Employment status showed that 219 (70%) of respondents were unemployed, meanwhile, 33.8% of respondents had income ranging from 3000 -5000. The majority of the respondents, 58.5%, had 1-2 children. Regarding immunization places, 98.7% of them vaccinate their children at government health centers. While 50.2% used transportation and 49.8 percent used walking as a means of transportation. Among the respondent's majority of them (55.6%) took 15-30 min to reach the centers (Table 1).

### Knowledge, attitude and practice towards vaccine-preventable disease

**Level of Knowledge:** Among the participants, 98.7% of them agreed that childhood immunization is important and that its benefit weights the risk and 96.1% agreed that it is safe for their child. In relation to the ideology of religion forbidding immunization 48.6% of the respondents disagreed 3.9% agreed and 3.2% of them were neutral about it. Respondents were asked about the relation between autism and 7.4% agreed that it causes Autism whereas 38.9% disagreed and 23.2% were neutral about it. 67.8% of the respondents agreed that hepatitis B and tetanus can be prevented by immunization whereas 1.6 % disagreed and 29.3 % of them were neutral about it.

On the assessment of their knowledge on the relation of diseases that are non-vaccine preventable, they were asked if diabetes can be prevented by vaccine and 19% of respondents agreed and 29.3 % of them disagreed, whereas 51.8% of them don't have knowledge about it.

**Table 1:** Socio-demographic characteristics of Hospital among Pregnant mothers attending ANC follow-up at PHMMC.

Variable	Frequency (N)	Percent (%)	
Age in years	15-20	7	2.3
	21-30	187	60.1
	31-40	114	36.7
	Greater than 40	3	1.0
Religion	Muslim	106	34.1
	Orthodox Christian	149	47.9
	Protestant	55	17.7
	Waqqa	1	.3
Education	Can write and read	4	1.3
	Can't write and read	16	5.1
	Degree	44	14.1
	Diploma	21	6.8
	Primary	120	38.6
	Secondary	106	34.1
Occupation	Employed	92	29.6
	Unemployed	219	70.4
Household Income	<3000	83	26.7
	>10000	47	15.1
	3000-5000	105	33.8
	5000-10000	76	24.4
Number of Children	>5	4	1.3
	1-2	182	58.5
	3-5	125	40.2
Time taken to reach immunization center	>2hr	3	1.0
	1-2 hr	42	13.5
	15-30 min	173	55.6
	5-10 min	93	29.9

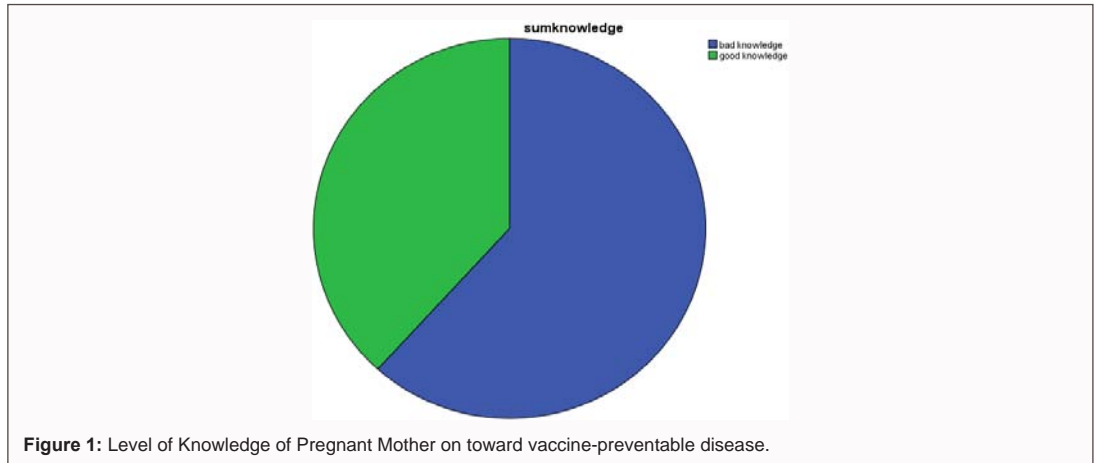


Figure 1: Level of Knowledge of Pregnant Mother on toward vaccine-preventable disease.

Table 2: Assessment of attitude about vaccine-preventable disease among Pregnant mothers attending ANC follow-up at SPHMMC.

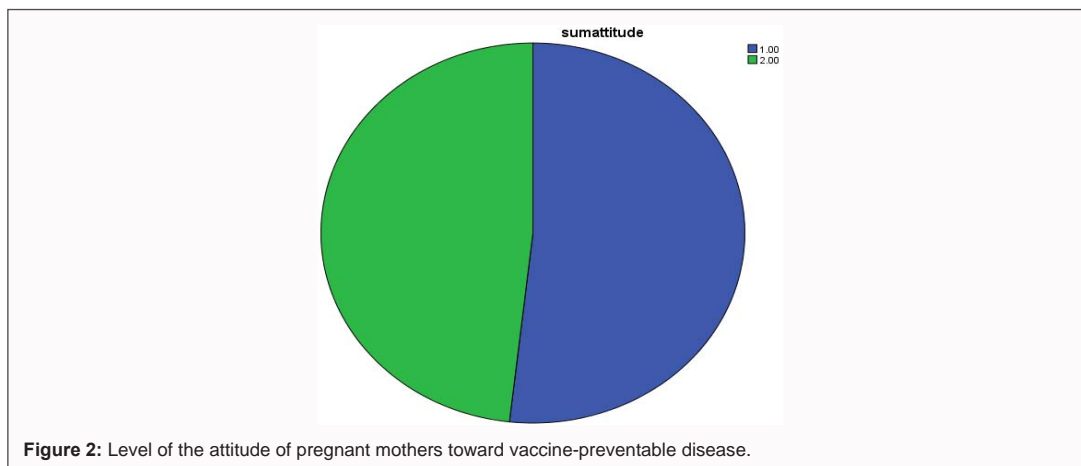
Variable	Frequency (N)	Percent (%)	
Exposed to immunization side effects	I Don't Know	3	1
	No	157	50.5
	Yes	151	48.6
Have children been infected by a disease in spite of being immunized against it?	I Don't Know	2	0.6
	No	262	84.2
	Yes	47	15.1
Immunization of your children with all obligatory immunizations?	I Don't Know	2	0.6
	No	7	2.3
	Yes	302	97.1
Do you start immunization on the first day of birth	I don't know	7	2.3
	No	55	17.7
	Yes	249	80.1
Are you keen to immunize your children during immunization campaigns?	I don't know	3	0.1
	No	12	3.9
	Yes	296	95.2
What do you do when immunization campaigns are postponed?	Do not immunize	5	1.6
	Skip this immunization shot	9	2.9
	Wait for other campaigns	297	95.5

Regarding their knowledge on the right time of the last shot of immunization they were asked if the last shot is at first year of age, 24.1% of the respondents agreed that they stopped at first year of age. Whereas 69.1% of the respondents stated that they continued vaccination till age of 15 months and used other supplementary vaccines till age of 5. Whereas 6.8% of the respondents don't know when the last shot is given. 82.3% of the respondents believe that immunization can reduce the rate of death and disability. Whereas 11.3% of them believe it doesn't reduce and 6.4% don't know the correlation.

Respondents were also asked if being sick was a contraindication for vaccination and 52.7% of respondents believe it is not contraindication and that they will take on the date of immunization, whereas 32.5% of respondents believe, they shouldn't take to immunization while their child is sick. 15.1% of respondents don't know the correlation. 80.4% of respondents stated that they get information from health workers, 12.9% from Television. The others get from family members, radio, newspaper and in all forms.

We analyzed good and poor knowledge based on our definition stating that participants who scored the median and above will be considered to have "good knowledge" and those who scored below were considered as having "poor knowledge" about immunization.

After we find our median by the 50th percentile, we found that 61.7% had poor knowledge and 38.3% had good knowledge (Figure 1).



**Level of Attitude**

Regarding their attitude about Vaccine preventable disease, they were asked if they vaccinated their child with the obligatory vaccines and 96% of the respondents did. Among the respondents, 80.1% of them started vaccination on the first day of life whereas 17.7% didn't start. The majority of the respondents (95.2%) keen to vaccinate their children on community vaccine campaigns. In cases where campaigns are being postponed, most of the respondents replied that they would wait for another campaign or ask the nearby health center for it.

Among the respondents, 48.6 % of them stated that they have encountered side effects after their child was immunized whereas 50.5 % of them haven't encountered side effects. Only 15.1% of the respondents have their child infected by a specific vaccine-preventable disease, whereas 84.2 % of them haven't encountered such scenarios (Table 2).

We analyzed good and poor attitudes based on our definition stating that participants who scored the median and above will be considered to have a "good attitude" and those who scored below were considered as having a "poor attitude" about immunization.

Based on this after we find our median by the 50th percentile, it resulted that 51.8% had bad attitudes and 48.2% had good attitudes (Figure 2).

**Sum attitude**

	Frequency	Percent
1.00	161	51.8
2.00	150	48.2
Total	311	100.0

**Level of Practice**

Among the respondents, 95.8% of them responded that their child had received obligatory vaccinations. 81.7 % of them knew the next date of them knew follow-up dates of vaccination and 95.7% of them followed the compulsory vaccination listed on the schedule. 55.9 % of the respondents stated that they look for other available vaccines, whereas 43.4 % of them stated that they don't ask and look for further information on other available vaccines. Even if most of the respondents have encountered side effects after vaccination only 33.1 % of them used painkillers for the symptoms (Table 3).

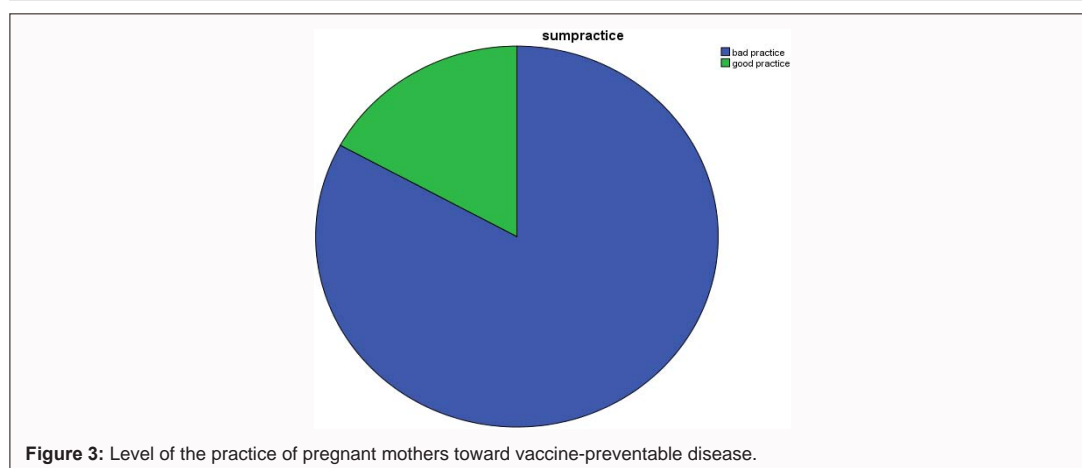
We analyzed good and bad practice based on our definition stating that participants who scored the median and above will be considered to have a "good practice" and those who scored below were considered as having a "bad practice" about immunization. Based on this after we find our median by the 50th percentile, it resulted that 83% had bad practice and 17% had good practice (Figure 3).

**KAP of mothers on childhood immunization and associated factors**

On binary logistic regression time taken to reach immunization center, employment status and immunization center had significant association with knowledge of mothers on childhood vaccination having P value of less than 0.25(0.01,0.184, 0.169 respectively) when they are analyzed by bivariate. Whereas age, number of children, educational level, religion, house income and means of transportation has no significant association having P value greater than 0.25(P> 0.25).

**Table 3:** Assessment of practice about vaccine-preventable disease among Pregnant mothers attending ANC follow-up at SPHMMC.

Variable		FRequency (N)	Percent (%)
Has your child received the mandatory childhood vaccines?	I Don't Know	1	0.3
	No	12	3.9
	Yes	298	95.8
Do you know the next date for your child's vaccination	I Don't Know	9	2.8
	No	48	15.4
	Yes	254	81.7
Do you follow the compulsory vaccination programs listed in the vaccination schedule?	I Don't Know	3	1
	No	8	2.6
	Yes	300	96.5
Do you use pain relievers to relieve swelling and pain after having your child vaccinated?	I don't know	3	1
	No	205	65.9
	Yes	103	33.1
Do you look for other vaccines available to your child?	I don't know	2	0.6
	No	135	43.4
	Yes	174	55.9



**Figure 3:** Level of the practice of pregnant mothers toward vaccine-preventable disease.

Then the three variables were analyzed by multivariate binary logistic regression. Time taken to reach the immunization center being 5-10 minutes was significantly associated with knowledge of mothers on childhood vaccination. Those mothers who took 5- 10 minutes to reach the immunization center were 2.18 times more likely to have good knowledge about childhood vaccination than those mothers who took more than 10 minutes to reach the immunization center (AOR=2.18, CI;95% (1.71-8.33)).

Regarding the association between attitude of mothers on childhood vaccination and independent variables, attitude of mothers on childhood vaccination was found to be significantly associated with level of education with P value of 0.05. But since the CI at 95% (0.996-4.158)) is at a range of 1, they won't be an association

Regarding the association between Practice of mothers on childhood vaccination and independent variables, practice of mothers on childhood vaccination was found to be significantly associated with employment status with P value of 0.015. Those who are employed were 2.2 times more to have good practice about childhood immunization than those mothers who are unemployed ((AOR = 4.13, CI; 95% (1.161-14.013)).

**Association of knowledge of mother with time to take to immunization**

Variable		Knowledge of mothers		95% CI		P-value
		Good	Poor	COR	AOR	
Time taken to reach immunization center	5-10 min	91(97.8%)	2(2.2%)	3.89(1.77-8.56)	2.18(1.71-8.33)	00.01H0.0
	>10 min	208 (95.4%)	10(4.6%)		1	

### Association of practice of mother with employment status

Variable		Practice by the mother		95% CI		P-value
		Good	Poor	COR	AOR	
Employment status	Employed	90 (97.8%)	2 (2.2%)	2.2 (1.46-9.87)	4.13 (1.161-14.013)	0.015
	Unemployed	209 (95.43%)	10 (4.57%)		1	

### Reason of respondents for incomplete vaccination

Respondents were asked what some of the reasons were for incomplete vaccination. This question was forwarded to mothers who didn't complete vaccination and to those who were willing to answer this question based on what they observed in their environment.

Based on the responses collected the reasons for incomplete vaccinations were not a single reason but rather multifactorial. Lack of awareness about vaccination was the highest response suggested as a reason for incomplete vaccination. The reasons stated are mothers being unaware of age-related vaccination, lack of awareness for the need for vaccination, lack of awareness about the next vaccination schedule, lack of time, unavailability of vaccines and inconvenient time of session were the reasons being raised by the respondents. They also stated that being reluctant is also seen among mothers.

### Discussion

Vaccination is considered the best cost-effective strategy to decrease hospitalization and treatment costs, in addition to morbidity and mortality of vaccine-preventable diseases. However, there are many obstacles that vaccination faces including misconceptions about vaccines, side effects of vaccines and vaccine-avoidable diseases. The perception of parents regarding vaccination is crucial to improve the vaccination rate as well as parental compliance. The most important factor influencing the behavior of parents toward their children's vaccination is their knowledge about vaccination itself [8]. Previous studies have revealed that educational and training programs to improve parents' knowledge could increase the success rates of vaccination programs in a country. In spite of observable progress in addressing immunization services globally, still, now immunization coverage is not sufficient enough in contrast to its immense advantage.

The present study is an institutional-based cross-sectional study design aimed at the assessment of knowledge, attitude and practices toward vaccine-preventable disease at St. Paul's Hospital.

According to this study, 38.3% had good knowledge which is lower than. study carried out in Addis Ababa (55%),[36] Alma Dinah, Saudi Arabia (50.5%),[8] South India (50.43%),[19] Kerala, India (39.5%) [38], Minia city, Egypt 89.2% [39], Nigeria Lagos state (72%) [30], Nepal (72.7%) [32] and India (72.7%). But it is higher than the study In Egypt (31.2%) [37] and Lithuania (36.3%) [40] Among the participants 98.7% of them agreed that childhood immunization is important and that its benefit weights the risk and 96.1% agreed that it is safe for their child. In relation to the ideology of religion forbidding immunization 48.6% of the respondents disagree, 3.9% agree and 3.2% of them were neutral about it. Respondents were asked about the relation between autism and 7.4% agreed that it causes Autism whereas 38.9% disagreed and 23.2% were neutral about it.

80.4% of respondents stated that they get information from health workers, 12.9% from Television. The others get from family members, radio, newspaper and in all forms. This is similar to a study carried out in Addis Ababa [36], Nigeria [30], Saudi Arabia [8], Pakistan [27], India, [19,35], Nepal,[32] Afghanistan [42], Lithuania [40] and Georgia [35] and health care workers were the major source of information. This might be nowadays most parents got delivery service at a health facility with skilled birth attendants and healthcare worker plays an indispensable role, during ANC and PNC period by convincing parents to link the newborn baby to an Immunization unit to acquire immunization service as well as the intimate relationship between a service provider and the parents at primary health care levels and these health facilities seem to be most readily available and accessible to the people. This is, however, contrary to studies carried out in Egypt [36], Libya [37] and Nigeria [38,39], television, paramedical workers and antenatal clinics were the main source of information about infant immunization, respectively.

According to this study, 48.2% of the participants had a good attitude which is lower than research done in northwest Ethiopia (58%) [4], Addis Ababa (53.8%) [36] and Alma Dinah, Saudi Arabia (56.4%) [26]. But lower than the study carried out in Egypt (70%) [37], Libya (80.5%) [44], Jos North Nigeria (97%) [44], Edo state Nigeria (99.1%) [43], Saudi Arabia (80%) [8], India (64.33%) [45], Lithuania (83.2) [40] and Georgia (97%) [46].

In this research Among the respondents, 95.8% of them responded that their child had received obligatory vaccinations. 81.7 % of them of know the next date of them knew the follow up dates of vaccination and 95.7% of them had followed the compulsory vaccination listed on the schedule. 55.9 % of the respondents stated that

they look for other available vaccines, whereas 43.4% of them stated that they don't ask and look for further information on other available vaccines.

Even if most of the respondents have encountered side effects after vaccination only 33.1% of them used pain killers for the symptoms. According to this research it resulted that 83% had bad practice and 17% had good practice which is lower than in relation to studies done in northwest Ethiopia (55.3%), Addis Ababa (84%) [36], Libya (81%) [44], Edo State (Nigeria) (86.4%) [39], Saudi Arabia (77.7%) [37], Al Madinah (Saudi Arabia) (92.8%) [44] and India (90.20%) [45].

### **Strength and Limitation of the Study**

#### **Strength of the study**

It was able to have adequate samples and information within a given time.

#### **Limitations of the study**

Regarding limitations of this study, immunization coverage might have been underreported or over reported by mothers/caretakers because mothers may not remember doses that the child took due to recall bias. Another limitation of the study is the method being used being a cross sectional study method. Social bias was the other limitation.

#### **Conclusion**

According to this study there is poor knowledge, attitude and practice towards vaccine preventable disease among mothers attending ANC. For this, different factors have contributed. And a lot should be done by different stakeholders since it is a huge public health concern. Also, further studies should consider investigating any relationship between the level of education of parents and other socio demographic factors and their knowledge, attitude and practice toward childhood vaccination.

#### **Recommendation**

According to this study the main reasons described for not completing immunization by respondents were forgetting the appointment date and lack of awareness of immunization. It is also recommended to improve the accessibility of information provided at the units, especially the service waiting time. The role of media in the form of advertisements on radio, television and especially social media should take the important share to encourage people for immunization activities.

In order to solve this problem, we recommend massive public health education must be intensified through the provision of Information, Education and Communication materials to enhance the knowledge, attitude and practice of parents about immunization and vaccine-preventable diseases. For this ministry of health, regional health biro, health facilities, media and community-based organizations must be responsible in order to get the needed change. Community based associations such as 'Eidir', religious organizations should help the society in teaching and work in association with health facilities for creating awareness as well as notifying people

#### **To health office and health facility**

In addition, the health office and health facilities in town should work on reasons provided by the mothers/caregivers for vaccination incompleteness such as lack of awareness of vaccination and vaccine-preventable disease, absence of trained health workers and other factors.

Also, it was better that health facilities that provide EPI services should strengthen continuous staff motivation, regular supervision and continuous monitoring and evaluation to detect a decline in vaccination coverage very early.

#### **To health extension workers and healthcare providers**

It is also important that health extension workers encourage mothers to have ANC follow-up and institutional delivery and they should discuss immunization with mother's one-to-one. We emphasize that Antenatal care should be a very golden opportunity in order to teach mothers on vaccine-preventable disease and child-related topics.

#### **To the mass media**

Since it is the era of technology and globalization the media should be a main way that the society should be aware of such topics. Radio and television especially can be a main source of information. In addition to this different broadcasting organizations can use their social media platform to spread different legit information through their posts.

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