Addis Ababa University

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Factors Affecting Immunization Coverage of Children 12-23 months old in Ejere District, West Shewa Zone of Oromia Regional State

By

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Advisor

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Declaration

I declared this thesis is my original work and has not presented in any other university and all sources of materials used for this thesis have been properly acknowledged.

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APPROVAL SHEET

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As members of the examining board of the final master thesis open defense, we certify that we have read and evaluated the thesis prepared by **Ketema Bukure** entitled," Factors Affecting Immunization Coverage of Children 12-23 months old in Ejere District, West Shewa Zone,Oromia Region" and recommend that it is accepted as fulfilling the thesis required for the degree **Master of Population Studies (MSc)**.

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ACRONYMS

ANC: - Antenatal Care

BCG: - Bacillus Calmette- Guarini

CDC: - Communicable Disease Control

CI: - Confidence Interval

CSA: - Central Statistics Agency

DPT: - Diphtheria, Pertussis and Tetanus

EDHS: - Ethiopian Demographic and Health Survey

EMDHS: - Ethiopian Mini Demographic and Health Survey

EPI: - Expanded Program of Immunization

FMOH: - Federal Minister of Health

GAVI: - Global Alliance for Vaccines and Immunization

GIVS: - Global Immunization Vision and Strategy

HepB: - Hepatitis type B

HEP: - Health Extension program

HEW: - Health extension worker

HH: - House Hold

Hib: - Hemophilus influenza type b

HP: - Health Post

MCV: - Measles Containing Vaccine

OPV: - Oral Polio Vaccine

OR: - Odds Ratio

PCV: - Pneumococcal Conjugated Vaccine

PENTA: - pentavalent vaccine

PHCU: - Primary Health Care Unit

RED: - Reach Every District

TT: - Tetanus Toxoid

UNICEFF: -United Nation International Children`s Emergency Fund

VPD: -Vaccines Prevented Disease

WHO: - World Health Organization

Abstract

Vaccination is one of the most powerful protective strategies to reduce disability, morbidity and mortality among children under five years old. Existing evidence suggests that immunization prevents 2 to 3 million deaths every year at globally. 1.5 million deaths of children could be prevented if global vaccination coverage and outreach improved. Although global coverage rates for the third dose of the diphtheria, tetanus and pertussis vaccine (DTP3) had increased substantially. The existing evidence also showed that 19.4 million children under 1 year of age worldwide did not receive the three recommended doses of DTP in 2018, and 13.5 million children in the same age group did not benefit from any vaccination. In Ethiopia, 60–80% of the health problems were accounted by infectious and communicable diseases, about 16% of whose under-five mortality is attributable to vaccine-preventable diseases. The objective of this study used to identify immunization coverage level and associated factors with it among the children12-23 months old in Ejere District, West Shewa Zone, Oromia region. The method of study was conducted a community- based cross sectional study among 694 mothers who had children of aged among 12-23 months from March to April 2020 in ten kebeles selected by clustering and simple sampling technique from Ejere District, West Shewa Zone, Oromia region. Data were entered and,cleaned using SPSS version 26. And also,data were analyszed using logistic regression. Results show that 38.6% of the children were fully vaccinated, whereas 39.6% didn't complete their vaccination according to schedule for routine immunization, the 21.8% of children were not took any immunization. Mothers who complete the attendance of ANC were 365(56.4 %) and mothers who delivered at health service center during their last child were 282(43.6%). Married mothers vaccinated their children were 2.813 *times more than unmarried mother. The governmental employment of mothers vaccinated their children were 4.17 (81%) times greater than not governmental employment of mothers. As the conclusion derived from the result, the vaccination coverage in the Ejere woreda (38%) is low compared to the national target (90%) and global target (100%). And also, mothers` educational level, the mothers had information on benefit of vaccinating the child, age of children, ANC follow up and institutional delivery are significantly associated with in completion of the immunization coverage of children. The results of this study clearly show the great importance for the EPI practice of the vaccination coverage of children. Therefore, the woreda health office, Health Bureaus and Federal Ministry of Health should be allocating specific budget, policy and strategy for EPI plan performance and need to increase community awareness through health education about fully vaccination coverage of children.*

Keywords: *Immunization coverage, vaccination, Children aged 12–23 months, Ejere**,**Oromia*

CHAPTER ONE: INTRODUCTION

1. Introduction:

1.1. Background

Childhood immunization against vaccine-preventable diseases has been the most cost-effective intervention among different public health interventions in developing countries. It is one of the most powerful preventive strategies to reduce disability, morbidity, and mortality among children under five years old (Wolfson et al., 2006).

Moreover, global coverage rates for the third dose of diphtheria, tetanus, and pertussis vaccine (DTP3) reached 86% in 2018, up from 72% in 2000 and 20% in 1980. Statistics highlighted that 19.4 million children under 1 year of age worldwide did not receive the three recommended doses of DTP in 2018, and an estimated 13.5 million children in the same age group did not benefit from any vaccination which is alarming (UNICEF, 2019a).

In 1974, the World Health Organization launched its expanded program on immunization (EPI) with the purpose of preventing six childhood: tuberculosis, diphtheria, pertussis, tetanus, polio, and measles (Gentile, 2010). Accordingly, Ethiopia initiated the EPI program in 1980, and the national EPI aims to immunize all children between the ages of 0 and 23 months controlling eight vaccine-preventable disease: tuberculosis, diphtheria, pertussis, tetanus, hepatitis B, homophiles influenza, polio, and measles (Berhane, 2008). Currently, the EPI program is expanding its service both in area and number of vaccines from time to time in Ethiopia (WHO/UNICEF, 2016). Ethiopia also seriously attended the World Health Organization for developing countries' immunization schedule of child vaccination (EMDHS, 2019). At present, there are 13 EPI vaccines available in Ethiopia: BCG, measles, Pentavalent, Rotavirus, PCV, measles, and OPV, etc. (EMDHS, 2019). Additionally, it is directed in the performance guideline to introduce inactivated poliovirus, measles-rubella, meningitis, and yellow fever immunizes for less than one-year-old children (EMDHS, 2019).

Table 1: Routine immunization schedule in Ethiopia

No	Age of child	Vaccination	Vaccine	Disease
1	At birth	BCG and OPV 0	BCG →	Tuberculosis
2	06 weeks	DPT1 + HebV1 + OPV1 + Hib1+RV1+ PCV1	DPT →	Diphtheria, Pertussis, Tetanus
3	10 weeks	DPT2 + HebV2 + OPV2 + Hib2+RV2+PCV2	OPV →	Oral Polio vaccine
4	14 weeks	DPT3 + HebV3 + OPV3 + Hib3+PCV3	RV →	monovalent human rotavirus vaccine
5	9 months	Measles	PCV →	pneumococcal conjugate vaccine
6	Two years	Measles	Measles →	Measles

Source: From schedule guidance (WHO/EPI, 2019)

The government of Ethiopia has shown a strong commitment to EPI as evidenced by the expanded program of immunization services and commodities are provided free of charge in the health facilities and the service has been provided to the rural child population through health extension workers. Despite these efforts, the routine child vaccination coverage is still not reached the target figure and realized the planned objectives "reach 90% national coverage and 80% in every district with all dose vaccine by 2020" (FMOH/EPI, 2015).

According to the Ethiopian mini demographic health survey report, the percentage of 12–23 months aged children who received all basic vaccinations was 43%, and who did not receive any vaccines was 19% at the national level ((EMDHS ,2019). There is a large difference among regions based on full immunization coverage which ranging from 83% in Addis Ababa, 73% in Tigray 31% in Oromia region, and to the lowest in Afar region (20%) (EMDHS, 2019).

Unfortunately, this variation of child vaccination status might be related to social, political, economic, geographic, and cultural factors or the attitudes and capabilities of parents (EMDHS, 2019).

1.2. Statement of the problem

Worldwide, the mortality rate for children under five dropped by 47 percent from 90 deaths per 1,000 live births in 1990 to 48 in 2012(UNICEF, 2012). Despite this accomplishment, more rapid progress has been needed to meet the 2015 target of a two-thirds reduction in under-five mortality. In 2012, an estimated 6.6 million children died from mostly vaccination-preventable diseases. These children tend to be among the poorest and most marginalized in society such as sub- Saharan Africa and Southern Asia which accounted for 5.3 million (81 %) of the 6.6 million deaths in children under five worldwide as explained by Global Immunization Vision and Strategy (2006-2015).

According to WHO and UNICEF national immunization coverage estimate, Ethiopia is the fifth country in the world with a large number of unimmunized children. The 872,828 Ethiopian children were not immunized for the third dose of pentavalent vaccine and 1,215,724 children were not immunized with the first dose of measles vaccines (WHO &UNICEF, 2018).

More deaths can be prevented through optimal use of currently existing vaccines, Poor coverage in a region contributes to a high burden of disease and has been reflected in the number of child deaths. Despite the successes of immunization programs worldwide, global estimates of vaccine-preventable disease mortality and DTP3 coverage underscore that available vaccines are not being used to their full potential. Challenges include sustaining current vaccination coverage levels, extending vaccination to unreached children and households beyond infancy, and introducing new vaccines and technologies (UNICEF, 2018).

In 2018, 19.4 million children missed out on the basic vaccines they need to stay healthy globally. In 2018, estimated global coverage with three doses of diphtheria-tetanus-pertussis containing vaccine decreased to 80.6% compared to 81.3% in 2017. An estimated 116 million infants were vaccinated. However, an estimated 19.4% million infants worldwide are still not being reached by routine immunization service. About 60% and above of these/un-vaccinated children live in ten countries (the Democratic Republic of the Congo, Ethiopia, India, Indonesia, Kenya, Nigeria, Pakistan, Vietnam, and South Africa) (WHO/UNICEF, 2019).

A large proportion of vulnerable infants and children in Ethiopia are facing vaccine-preventable deaths, especially in communities that are hard-to-reach, poor, and sparsely populated areas. The deaths are mainly due to diarrheal diseases (18%) and pneumonia (18%) (Berhane &Yigzaw, 2006).

Several pieces of research indicated that home delivery, place of residence, mothers` knowledge about vaccination, health workers household visit, distance to health center /extension, shortage of awareness about the advantage of immunization, and misunderstanding about vaccine contraindication were predictors for children vaccination (Lake et al.,2016; Sullivan et al.,2010; Etana & Deressa,2012; Lakew et al.,2015; Tesfaye et al.,2018; Yenit et al.,2015; Debie &Taye,2014; Mekonnen et al.,2019; Abadi &Abel, 2019; Asrat et al.,2017), etc.

Researchers had also considered that the ways health workers perform their activities, how immunization activities were organized and services are delivered, the interaction between parents and health workers greatly influence the immunization coverage (Sanou et al., 2009). Still, system-wide barriers are linked to incomplete vaccination or non-vaccination of children (Gualu & Dilie., 2017; Makonnen et al., 2019), etc.

Oromia region where low coverage of immunization of children 12-23 month aged compared with other regions (Tigray, Amhara, Addis Ababa, SPNN, etc.)

In Ejere district, Oromia region there were challenges of follow-up of the maternal care and TT vaccination of mothers which vulnerable infants to death.

Until now, no cross-sectional community-based on immunization coverage and associated factors research was demonstrated in Ejere District. Therefore, the aim of this research has been designed to identify the immunization coverage level and related factors of children 12-23 months old in Ejere District, Oromia Region.

1.3. Objectives

1.3.1. General Objective.

The general objective of this study used to identify the factors influencing the full vaccination coverage of children aged 12–23 months in Ejere woreda, West Shewa zone, Oromia region.

1.3.2. Specific Objectives

- To assess the existing level of immunization coverage of children 12-23 months old in Ejere District, West Shewa Zone, Oromia region.
- To examine the factors associated with incomplete vaccination of children 12-23 months old in Ejere District, West Shewa Zone, Oromia region.

1.4. Research Questions:

- What is the existing level of immunization coverage of the children12–23 months old from the health centers of Ejere District, West Shewa Zone, Oromia region?
- Which factors associated with incomplete vaccination of the children aged 12-23 months from health centers of Ejere District, West Shewa Zone, Oromia region?

1.5. Significance of the Study

Immunization coverage has an important element of the strategy mix used to combat rising cases of the preventable disease to improve health outcomes in developing countries such as Ethiopia. The information obtained from this study is expected to fill gaps seen in the availability of studies done on factors of vaccination incompletion which may vary among communities. The result of the study will also help to inform program managers to consider the important contributing factors for incomplete vaccination while planning to improve vaccination programs. The study will contribute to the effective utilization of resources by coming up with relevant, evidence-based recommendations for addressing issues related to vaccination incompletion rate. Findings from this study can guide program managers on how to reduce incomplete vaccination and consequently, reduce the incidence of vaccine-preventable diseases in the study areas and probably other parts of the country with similar challenges. The resulting improvement in health outcomes will lead to improved welfare and socio-economic development.

The study will form a basis for future discussion and research in the area of vaccination to facilitate the adoption of better strategies to improve access and coverage of child immunization. And also, it will contribute to the existing literature and data concerning the factors associated with the incomplete dose of immunization coverage in Ejere District, Oromia Region.

1.6. Rationale of the study

Studies conducted so far on immunization coverage and factors related to it of children 12-23 months old in West Shewa zone, Oromia region were few and most of the studies employed quantitative study design only. And the Ejere woreda was identified as one of the five high-risk Woreda in this zone for maternal and neonatal tetanus. And also, the bad traditional concern of several numbers of household on immunization of their children as it exposes for evil and ill.

Moreover; a similar study was not conducted among the target group in this woreda so far. So, this assessment is intended to use quantitative study design supported by qualitative study

design to identify factors that determine immunization coverage of children 12-23 months old in Ejere woreda, West Shewa zone

1.7. Scope and Limitation of the study

The study will completely focus on factors influencing immunization coverage of children 12-23 months aged in Ejere District, Oromia region. The independent variable for this study will be the associated factors with incomplete dose immunization coverage while the dependent variable for this study will be the complete dose of immunization coverage, the partial complete dose of immunization coverage, and not immunized.

This study will use the methodologies such as both qualitative and quantitative research, correlation design (research), multi-stage, and simple random sampling for data collection, and logistic regression model for data analysis.

The study was predicted to begin from February to April 2020. Also being a cross-sectional study, it was not possible to establish whether the independent variables preceded the outcome, and thus cause and effect relationships are not certain.

The searcher believes that the study would have come up with more generalizable results and include more Woredas and Kebeles in the country. Although, Oromia region was low immunization coverage of 12-23-month-old children compared with Tigray, Amhara, A. A City and SPNN region (EMDHS, 2019). However, due to factors such as distance, time, and financial constraints, the study will be limited to Ejere woreda, Oromia Region. The Ejere woreda was chosen due to its geographical proximity to the researcher and some best friends support me with important information and properly prepare things to need for the study.

1.8. Organization of the Thesis

This thesis includes five chapters. Chapter one brief the background, problem statement, objectives, research questions, scope and limitation, and significance of the study. Chapter two discusses literature reviews of the research topic. Chapter three describes methodological research used in the thesis. Chapter four explains the data analysis and discussion of the results of the study. The final chapter involves the conclusion and recommendations.

CHAPTER TWO: LITERATURE REVIEW

This chapter reviews related literature under four sub-heading namely, Conceptual literature, Theoretical literature, Empirical literature, and Synthesis.

The Conceptual literature includes and conceptual description and discussion related to factors influencing complete child immunization. This can include a definition of important words and concepts in the study, etc. Theoretical literature covers the various economic theories that explain the effect of socioeconomic, demographic, and health inputs on vaccination coverage. It is simply the discussion of relevant theories to be used in this study. In other words, this is a discussion of the theoretical literature regarding factors influencing complete child immunization.

The empirical literature on the other hand covers the empirical studies that have analyzed the factors that affects immunization coverage. Or it is a discussion of existing literature based on actual research instead of a theoretical one. This reviews the available global, regional/continental, national, or local research-based evidence base regarding factors affecting schedule delay in road construction. Synthesis is a synthesis (summarized commentary) of existing knowledge (theoretical and/or empirical) in terms of what is known well (knowledge base), what is not known well or missing (knowledge gap), and the relevance or role of this research in this regard. It is the summarize the gaps in the literature is also presented.

2.1. Conceptual Literature

Numerous of factors including socioeconomic and health access system characteristics determine full immunization coverage. Socioeconomically, literacy levels, poverty index, and distance from health facilities, which signifies the availability of health infrastructure, define the capacity of government to provide vaccination services. These factors have also been extensively captured in the literature as drivers of increased immunization coverage. A sound health system is characterized by a high nurse /doctor-patient ratio, access to antenatal care, and births in a medical facility, as well as, ownership of immunization in the card. Based on existing literature, these factors influence the full immunization in a given community.

The government also has a role to play in facilitating full immunization coverage. For instance, in Ethiopia, the national government is charged with the responsibility of providing policy direction and resources to the country governments for health care service provision. In

return, the country government is required to run a sound health system ensuring access to primary health care and management of the facilities that provide immunization services.

Country governments, in their jurisdictions, hold mandates to take decisions to develop their respective health systems using the resources from the national government. This decision may include increasing the number of medical facilities to reduce the distance to be covered by the household in seeking health services or increasing doctor/nurse-patient ratio. Besides, both governments have a bigger role in improving literacy levels and reducing poverty levels through various development programs.

Households, especially those with children under five years are responsible for ensuring that the children undergo full vaccinations including the three basic categories of vaccinations including BCG vaccination, 3 doses of DPT, and the 3 doses of polio as per the WHO standards. However, both demand and supply factors affect households` ability to access vaccination differently.

2.2. Theoretical Literature

Several theories confirm that demand for health care services at the individual level is mostly determined by socioeconomic and demographic factors. Andersen (1968) developed a model of healthcare utilization. This considered factors such as age, location (either rural or urban) provider incentives, position within the social structure, and health belief as key variables in the utilization of health services. The theory states that an individual will opt to use health services based on their location. Which can either be rural or urban. Individuals in urban areas tend to utilize health services more than their counterparts in rural areas.

An individual's status within the social structure also determines the utilization of health services. Individuals better placed in the social structure in terms of higher education and good occupation is likely to utilize health facilities services more than those placed lower in the social structure. The belief an individual has on health also influences the level of utilization of services such as immunization. Individuals' belief in the usefulness of health services is likely to access them. Other factors that act as enabling characteristics such as resources available in the family and within the community Individuals of high economic status are expected to utilize health services more than those of low economic status due to their higher purchasing power. He then later reviewed to include the health care system (Anderson, 1970). The updated model recognized that the type of health outcomes. In the revised model, utilization and frequent use of

a specific health care service will have different determinants based on the population characteristics and health services availability (Andersen, 1995; Andersen & Newman, 2005).

Young (1981) ended up proposing a choice-making model based on his ethnographic studies of health services utilization in Mexico It included 4 components essential to the choice by an individual of health Service. The first component is perceptions of gravity which young describes as to how an individual perceives the severity of illness as well as their social network's consideration of the same. If the illness is viewed as severe, individuals would tend to utilize health facilities Otherwise they would not. The second component he stated as knowledge of a home treatment by an efficacious individual, then they are likely to use it before utilizing a professional health care system due to among other factors convenience and the need to save costs (Wolindky, 1988b). The third component is faith in the remedy which is how much an individual believes if the treatment of the present illness is effective which is how much an individual believes if the treatment of the present illness is effective which is the reason whether they will use it or not. The fourth component is access to treatment, which incorporates how an individual evaluates the cost of health services and their availability He further stated that access may be an important influence on health care utilization. The economic cost of seeking health care includes not only how to pay for costly treatment, but also loss of productive time, and transportation expense which also factors in the time needed to access medical care considering their location geographically, inaccessibility may increase (Young & Young-Garro,1982).

Grossman (1999) argued that demand for medical care generally and other health inputs are got from basic demand for health. This model considers age, education, health status, and income as key variables in health production through the demand for health capital (Grossman, 1972). Health is therefore demanded by consumers as a consumption commodity because it directly satisfies their utility because sick days act as a source of disutility. Demand for health as an investment commodity is because health determines the sum amount of time required for market and non-market related activities. An individual inherits an initial health stock that depreciates with age and may be increased by investment. Grossman (1999) further suggests that the quantity of health capital demanded rises as the wage rate: the higher a person's rate of wage, the greater is the value to him of an increase in healthy time, because more healthy time translates to earning more wages making people invest more in health. Education too increases the efficiency of production of health hence it reduces the number of inputs required to produce a certain

quantity of health. Capital Educated people demand more health since they value their health more but demand less health care than the uneducated.

The previous immunization comprehensive multiyear plan covered the period from 2011-2015 and the two main priority areas indicated in the document were improving routine immunization coverage and introduction of PCV and Rotavirus vaccine into the national immunization Program DPT3-HepB-Hib3 coverage of 96 % was planned to be attained by 2015 and the actual coverage for 2014 was 87% (Udessa, et.al.,2018).

As EDHS 2016 report vaccination coverage increases with mother's education; about 3 in 10 (31 percent) of children whose mothers have no education are fully vaccinated compared with more than 7 in 10(72%) of children whose mothers have more than secondary education. Similar patterns are observed by household wealth (EDHS, 2016).

Full immunization coverage was heterogeneous among Ethiopian administrative regions, ranging from 8.8% in Afar region to 86.8% in Addis Ababa. Full immunization coverage among rural dwellers was 31.7 and 66.6% in urban areas. The overall full immunization coverage was 38.3% (95% CI: 36.7 41.2) according to the Ethiopian EPI schedule. Vaccine specific coverage for Pentavalent 3, OPV3, PCV3, Rota 2, and Measles were 56.1, 60.4, 51.9, 58, and 57.8%, respectively (Tamirat & Sisay,2019).

Different factors determine a child's complete vaccination status, depending on whether the child lives in an area with a low or high routine EPI coverage. Socioeconomic and demographic factors, maternal characteristics, child characteristics, knowledge of age begins, finishes, Session needed for immunization, knowledge of mothers on vaccination and vaccine-preventable diseases, availability and accessibility of vaccination service, Antenatal care (ANC) follow up and TT status of mothers, factors associated with missed opportunities and Perception of mothers may influence complete immunization status of children (Lakew, et al., 2015).

2.3. Empirical Literature

Ashleshar et al. (2005) conducted a study in rural parts of India with data from the National Family Health Surveys 1993 and 1998 consisting of 43,416 children aged 2-35 months. The qualitative study used separate multinomial logit regression models for polio and non-polio vaccines for estimation of the probability whether a child would receive "no cover" or "full age-appropriate cover" "some cover" or "full age-appropriate cover" Based on the best health facility available in the child's village, health infrastructure was used as a hierarchical variable that was

assigned to every child as categories (no facility, dispensary or clinic, sub-Centre, primary health Centre and hospital). It also included the presence of different disciplines of community health workers in the village and other related health infrastructure as variables. The outcomes showed that whereas the availability of health infrastructure had a modest effect, larger and better-equipped ones had bigger effects on immunization coverage Availability of community health workers in the village had no association with increased immunization coverage.

Generally, those who are poor, are more likely not to have their children vaccinated while those from wealthier families are likely to be vaccinated due to their knowledge of better health states. Godi et al. (2008) undertook both qualitative and quantitative studies to show a comparison of immunization cover of different vaccines used among tribal and rural children in a distinct socioeconomic environment in India. The result showed although the majority of mothers were aware of vaccination, their reception of vaccination services was mainly determined by their habitat, caste, and occupation. The qualitative data indicated non-satisfaction by the community of available vaccines was moderate in tribal areas and poor in rural areas. The demand for vaccination was dependent on the demand for public health services.

Mothers`/caregivers` level of education is an important determinant for vaccination outcomes. Olumuyiwa et al. (2008) used primary data to investigate vaccination coverage and associated factors in children aged 12-23 months in Nigeria. A simple random method was used for sample selection. Multivariate logistic regression was applied and results showed that immunization coverage of the children higher in areas where most mothers had knowledge about vaccination and vaccine-preventable disease. The study also found immunization coverage of the children high in areas where vaccination services available at the private's health.

A study done in Hosanna Town, South Ethiopia for bivariate analysis (COR) Educational status, occupation, age of mothers, religion, and family income of the mother showed significant association with the immunization status of the children. Experiences of child death also make mothers vaccinate their children even if not have enough understanding about the use of vaccination (Ayano, 2015).

The study in Jigjiga district shows in the multiple logistic regression analysis, maternal age and literacy, place of residence, TT vaccine status, place of delivery, and a household visit by health workers were found to be the most important predictors of completing immunization (according to the vaccination cards plus mothers/caregivers response) ($p < 0.05$) (Mohamud, et al.,2014).

Hussein et al. (2012) used multivariate logistic analysis to identify the factors that influence immunization coverage among children aged 12-23 months in Oromia Regional state Eastern Ethiopia. This community-based cross-sectional survey involved bout qualitative and quantitative data analysis. Stratified multi-size. The results showed overall low vaccination coverage due to mothers being unaware of the end for immunization, mothers did not return the children for the 2nd and 3rd doses sue to fear of side reaction, wrong perception on contraindication of immunization and absence of information on the place and time vaccination. The study however did not show the effect of involving the health worker to enhance coverage.

Distance to a health facility according to Ibnouf et al. (2007) determines vaccination outcomes. He undertook a cross-sectional study in Khartoum State, Sudan, and revealed that children whose mothers walked less than 30 minutes to the immunization place were 3.4 times more likely to have the correct vaccinations than children whose mothers walked 30 minutes longer. Hence walking time to the nearest vaccination Centre had a strong influence on the correct vaccination status of the child.

Etana et.al. (2012) used a modified cross-sectional community-based study and modified the World Health Organization EPI cluster sampling method for selection to investigate the determinants of immunization coverage. The results showed that the mother's residence and her socio-demographic characteristics were not significantly associated with full immunization coverage among children being born in a health facility; ante-natal care follow-up and mother's knowledge about the age at which vaccination begins were significant determinants of immunization coverage. The study however did not consider that the mother's report may under- or over-estimate the dose of immunization coverage.

Ndiritu et al. (2006) estimated the contribution to timely immunization of family size, seasonal rainfall, distance from clinic, and mother`s age in Kilifi Country Kenya. Cluster sample surveys and simple random surveys were conducted in 2002 and 2004 respectively. Coverage was then estimated by Kaplan -Meier survival analysis of vaccine-card and mother`s recall data and corroborated by reviewing administrative records from national and provincial vaccine stores. The model was fit to recurrent vaccination data to determine the contribution of sex, family size, clinic distance, mother`s age, and rainfall season to immunization rates. The results showed that immunization rate ratios went down with every kilometer of distance from home to

vaccine clinic, rainy seasons, and the increase of family size up to four children. The study however did not explore the outcomes of vaccination that occurs during seasonal rains.

Lilian et al. (2013) used descriptive, binary, and multinomial logistic regression to identify independent predictors to full immunization among children aged 12-23 months in Kaptembwo location, Nakuru country in Kenya. Across sectional community-based survey was done using cluster sampling method for sample selection. Also, the predicted full immunization coverage was the birth place of the child, family size, advices on date of next visit for growth monitoring and how they viewed the kind of health services offered. The study however did not take into consideration health service-related factors like accessibility in terms of distance to identify defaulters and reduce the drop-out rate.

A study done in Addis Ketema sub-city showed that the association of child characteristics like sex of the child, place delivery, and birth order of the child with completion of the child is also a factor for completion of immunization. Male children were 1.64 times more likely to be vaccinated but, no significant difference between both sexes on completion of vaccination. But birth order of the child did not show a significant association with the immunization status of children aged between 12-23 months (Demeke, 2014).

Maternal level of education is also a contributory determinant of vaccination outcomes. Lisa et al. (2014) used primary data to investigate full and timely vaccination coverage and associated factors in children aged 12-23 months in Gem, Siaya country Kenya. A simple random method was used for sample selection. Multivariate logistic regression was applied and results showed that children of mothers with lower maternal education or children in households with the spouse absent were less likely to be fully vaccinated. The study also found evidence of the distance decay effect, where vaccination decreased with increasing distance from the vaccination considering the study was conducted in a rural setting Etana (2011) in Ethiopia. Across sectional community-based survey was done using cluster sampling method for sample selection. The results showed that low access to services, inadequate awareness of caregivers, missed opportunities, and high dropout rates are major factors contributing to low immunization coverage. Thus, the purpose of this study was to identify factors affecting the vaccination coverage level among children 12-23 months old in Ambo Woreda and to generate data that could be used for better planning and strengthening of immunization services.

2.4. Synthesis of the Reviewed Literature

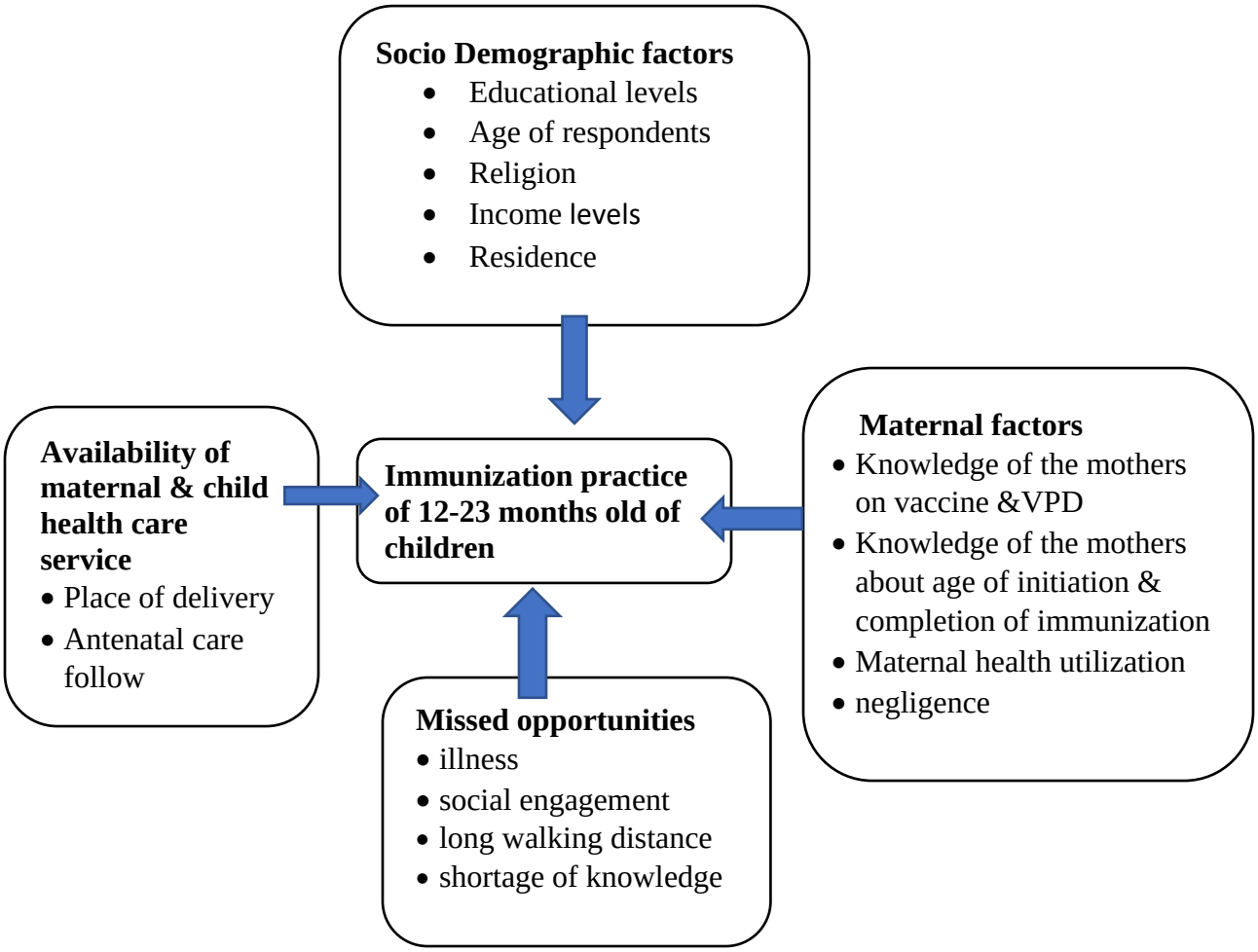
The Synthesis in the foregoing paragraphs reveals that several studies have been done to analyze the factors influencing complete child immunization. Most of the studies relied on cross-sectional data due to a lack of time series data on coverage levels. Additionally, most studies were done using data for select regions, districts within a country (Ethiopia). And also, it tries to compare the results overtimes in a bid to establish what is causing the decline in immunization coverage.

Several types of research indicated that home delivery, place of residence, mothers` knowledge about vaccination, health workers household visit, distance to health center /extension, shortage of awareness about the advantage of immunization, and misunderstanding about vaccine contraindication were predictors for children vaccination coverage (Lake et al., 2016; Sullivan et al., 2010; Etana & Deressa, 2012; Lakew et al., 2015; Tesfaye et al., 2018; Yenit et al., 2015; Debie & Taye, 2014), etc. Researchers had also considered that the ways health workers perform their activities, how immunization activities were organized and services are delivered, the interaction between parents and health workers greatly influence the immunization coverage (Sanou et al., 2009). Still, system-wide barriers are linked to incomplete vaccination or non-vaccination of children (Gualu & Dilie, 2017). Until now, no community-based cross-sectional studies on immunization coverage of children and with associated factors studies were conducted by previous researchers in Ejer District, West Shewa zone, Oromia region.

2.5. Conceptual framework

The conceptual framework explains factors contributing to immunization practice and highlights the interrelationship between the variables considered in this study. This study considers vaccination practice as outcome variables/dependent variable and socioeconomic factors such as the age of the mother, religion, family income, etc., that affect the result of the variable through proximate determinants namely; maternal factors, environmental factors, and health service factors are considered as independent variables.

Figure 1: Conceptual framework adapted from Mosley and Chen in 1984 classical framework describing factors contributed to neonatal mortality.



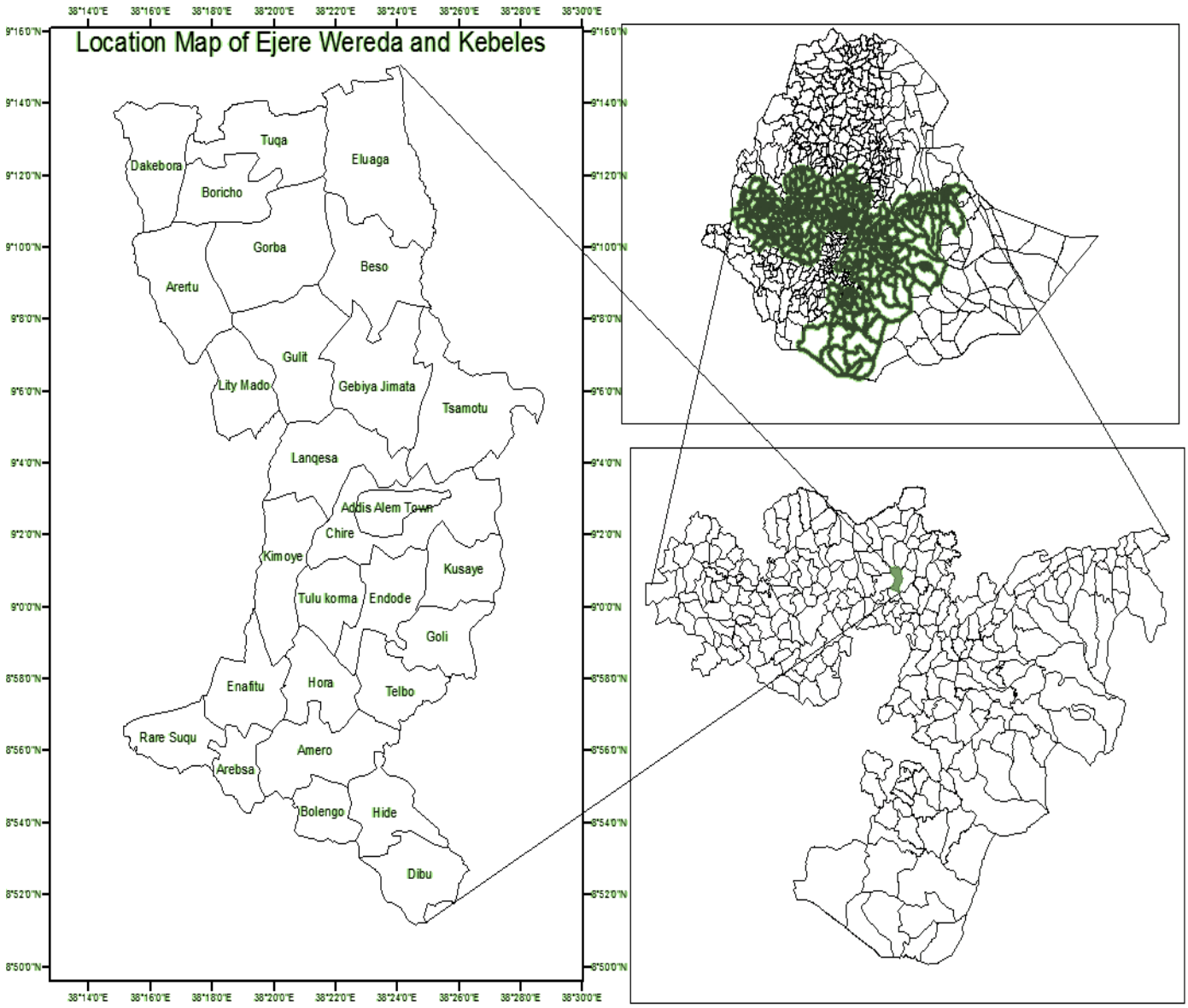
CHAPTER THREE: METHODOLOGY

This chapter discussed the research procedure which was used in the study. It was described the research approach, design, and method of data collection, the data collection procedure, and the method of data analysis. These components were discussed in the following subsections.

3.1. Study Area, Period, and population

A community-based cross-sectional study was conducted from March to April 2020 in Ejere district, West Shewa zone, Ethiopia. The district is located at 50 Km far from Addis Ababa and bounded the West by Dendi, the Northwest by Jeldu, North by Meta Robi, the Northeast by Adda Berga, and the East by Walmara district. Based on the 2007 national census reported the population projected in 2020 of this woreda were 122,586, from this 62,519 were male and 60,067 were female; 20% of this population were urban dwellers, 26,094 were households and 7,139 of the total population were children at the age of 12–23 months. Ejere woreda contains 25 rural kebele and 4 urban kebele, and also, the woreda has 4 health centers and 29 health posts (Unpublished Ejere Woreda health office report, 2020).

Figure 2: Location Map of Ejere District, Oromia Region (27 May, 2020)



3.2. The Research Approach

The study was assessed the impact factors on immunization coverage of children aged 12-23 months in Ejere Woreda, Oromia region. To answer the questions raised in the question section and achieve the corresponding objectives, the research approach was mixed research (qualitative and quantitative).

3.2.1. Qualitative Research Approach

Qualitative method was used to achieve a valid data for the study or to gain a better picture of the reality of the issue on the research questions and its objectives in a natural way (Christopher & Sunday, 1995). The data qualitative methods used to collect different data from the health workers group discussion and document such as health policy, health program (plans) and EPI program manuals produced by WHO, UNICEF &MOH.

3.2.2. Quantitative Research Approach

In quantitative methods, the sole approach to data was statistical and took place in the form of tabulations and frequency. To identify the factors that affect the immunization coverage of children aged 12-23 months, the quantitative research approach was used. The questionnaires were used to collect quantitative data (Kabir, 2016).

3.3. Research Design

The research design refers to the overall strategy that was chosen to integrate the different components of the study coherently and logically. A correlational design was considered as research design based on research nature (data natures).

3.3.1. Correlational Research Design

Correlation design was used to examine the relationship among the knowledge, beliefs, attitudes, opinions, and experiences of mothers/caretakers of Ejere Woreda who had children aged 12-23 months and immunization coverage. It is also used to identify the impacts of different factors on children vaccination by using a different statistical tests such as chi-square, Wald test, and Lemeshow and Hosmer test, etc. Correlational studies were used to predict to support a theory or test a hypothesis; however, the correlation could not prove a causal relationship (Meyers et al., 2006).

3.4. The Research Methods

The specific procedures, tools, or techniques of gathering and analyzing data were the actual activity of data gathering and analyzing.

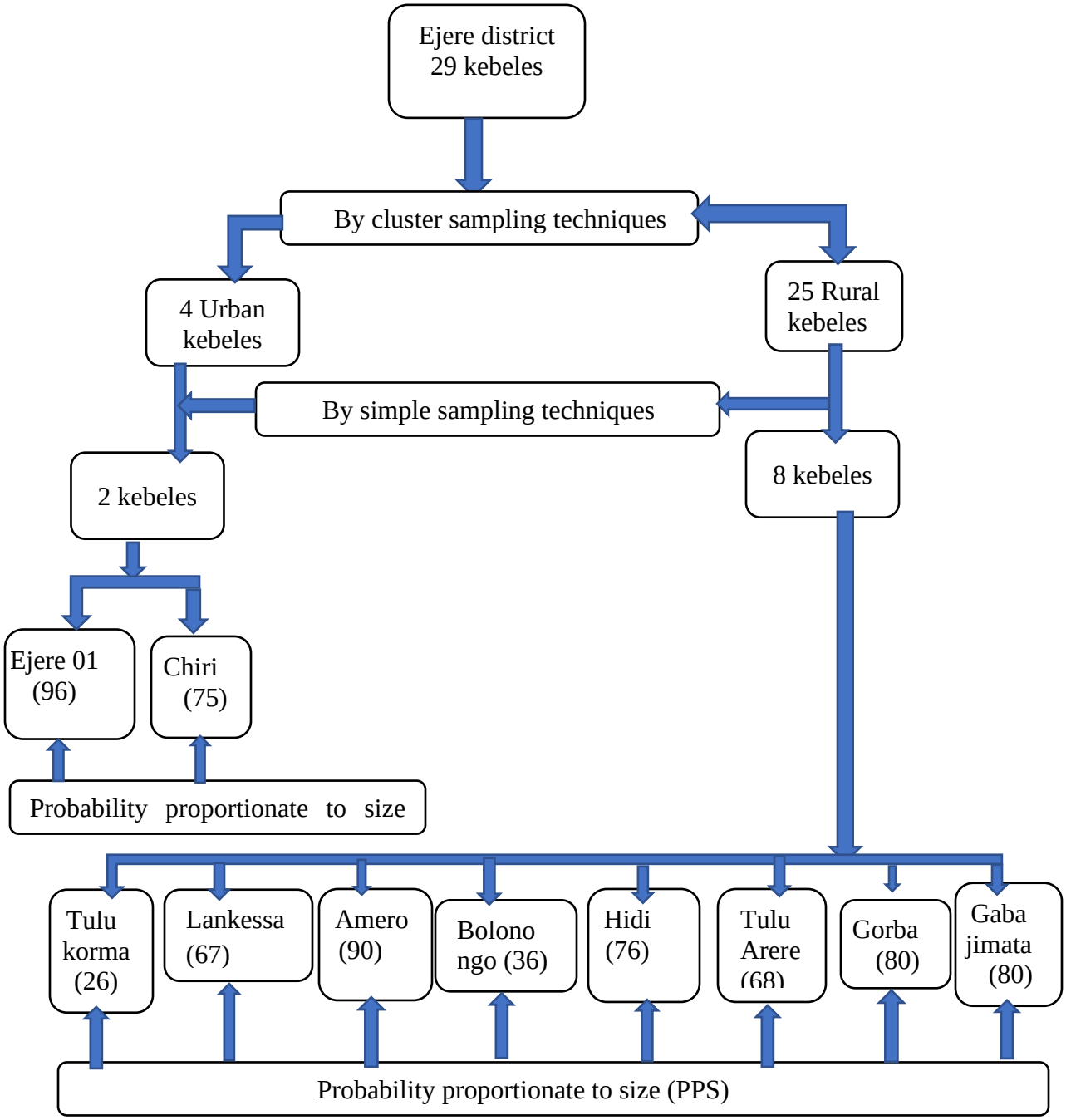
3.4.1. Sampling Techniques and Sample Size

3.4.1.1. Sampling Techniques

The researcher was used single-stage cluster sampling technique, the probability proportionates to size (PPS), and simple random sampling to select mothers who have children 12-23 months aged from the Ejere Woreda, Oromia region. Mothers who have children 12-23 months of aged were important to consider for this study, because the members of this age group of children almost completed all needed doses of immunization.

The woreda of Ejere was first clustered into urban and rural kebeles. From each cluster, eight rural and two urban kebeles were selected by simple random sampling. From each kebeles the numbers of mothers who have children 12-23 months aged were identified by using probability proportionated to size method (WHO, 2015).

Figure 3: - Sampling procedure in the study area, Ejere Woreda, 2020



3.4.1.2. Sample Size Determination

The sample size was determined to depend upon the proportion of fully immunized coverage of children aged between 12-23 months. For household sample surveys, the World Health Organization has developed the following method to yield a representative sample (WHO, 2015).

The sample size was determined by using a single population proportion formula with the following assumptions:

- Considering p (the proportion of fully vaccinated coverage children in Oromia regional states) which was 31% taken from Ethiopian Mini demographic health survey report of 2019 report,
- Considering 95% confidence interval (CI) WHO household cluster survey guidelines (WHO, 2015).
- Considering 10 % of non-respondents because of Covid-19 pandemic numbers of mothers who have children 12-23 months aged reject their participation on answering questionnaires (which is possible to consider greater or less than this value based on the forecast of challenges will happen during data gathering/interviewing) WHO household cluster survey guidelines (WHO,2015).
- Considering 5% margin of error/ desired precision (d) depends on the objectives of the survey, estimated prevalence or rate, and resources available which indicates the higher desired precision is the larger sample size (expected prevalence or proportion /percentage of immunization coverage was 31%, relatively desired precision was 5% WHO household cluster survey guidelines (WHO,2015).
- Considering the 2-design effect because the design effect depends on the prevalence and the size of the clusters: the higher the expected prevalence, the higher DEFF. For example, if your expected prevalence is around 10%, the expected DEFF maybe 1.5, whereas if the expected prevalence is around 25-30% you would increase your expected DEFF to 1.7-1.8. In the same way when the expected prevalence of the immunization coverage of children 12-23 months aged of Oromia region 31% (31-35%), design effect become 2.0 WHO household cluster survey guidelines (WHO,2015).

The sample size: $$\mathbf{n} = \frac{(\mathbf{Z\alpha/2})\mathbf{2}\ (\mathbf{P}(\mathbf{1-p})}{(\mathbf{d})\mathbf{2}}$$

$$\mathbf{n} = \frac{(\mathbf{1.96})\mathbf{2}(\mathbf{0.31}\ (\mathbf{1}-\mathbf{0.31})}{(\mathbf{0.05})\mathbf{2}} = \mathbf{329}$$

Since the total eligible children for this study was less than 10,000, which was N (eligible population) = 7,139, by using the population correction formula the sample size becomes:

$$\mathbf{n} = \frac{\mathbf{ni}}{\mathbf{1} + \mathbf{ni/N}}$$

$$\mathbf{n} = \frac{\mathbf{329}}{\mathbf{1} + \mathbf{329/7139}} = \mathbf{315}$$

Then by considering 10% nonresponse rate the sample size was

n= 315*10/100 =31.5=>315+31.5 =347.

By considering the design effect which the final sample size **n =347*2 =694,** where the tails

(1 - α equals the desired confidence level, e.g., 95%) 1, e is the desired level of precision, p is the estimated proportion of an attribute that is present in the population, and q is 1-p. The value for Z is found in statistical tables which contain the area under the normal curve (Lwanga & Lemeshow, 1991).

3.4.2. Operational Definition

- **Fully immunization** - Infants who received one dose of BCG, three doses of each of OPV, DPT, and Hepatitis B vaccines, PCV 2doses Rotavirus, and one dose of measles vaccine and before reaching one year of age.
- **Partially immunized** - A12-23 months old child who received at least one vaccine, but not all the EPI vaccines.
- **Unimmunized** - A12-23months old child who did not receive any of the EPI vaccines.
- **Immunization coverage by card -** The vaccination coverage calculated with numerator based only on card documentation, excluding from the numerator those vaccinated by history.
- **Immunization coverage by history -** The vaccination coverage calculated with a numerator based only on the mother's/caregivers' report.

3.4.3. Description of the Study Variables

Table 2: Variables and their definition

Variables	Description	Measurement
Dependent variables:		
Every vaccination	Capture the all basic categories of Vaccinations as considered by WHO that includes a BCG vaccination, all doses of DPT, and polio.	Binary variables [0= not vaccinated, 1 = vaccinated]
Vaccination levels	Percentage of vaccination coverage reported per kebeles representing the output from the government interventions.	Dummy variables of vaccination levels (1 = not vaccinated,2= partially vaccinated and 3= fully vaccinated)
I**ndependent variables**		
Mother`s education level	To measure how maternal education affects	Measured as a dummy variable (1= illiterate,2= primary school and 3= secondary school and above)
Mother`s marital status	Measure the effect of being in a marriage union on immunization	Measured as dummy variables (1 =unmarried,2= married, 3= divorced and 4= widowed)
Place of delivery	Determines the influence of delivery in a health facility on immunization	Measured as dummy variables (1=hospital,2=health center, 3=health post and 4=private clinic)
Residence	Measured how geographically location affects vaccination	This is captured by a binary variable (1= urban and 2= rural)
Birth order	Measure the number of children born by the same mother	Measured as dummy variables [1=1,2=2,3=3-4 and 4) ≥5]
Mothers` income	Capture the three categories of wealth; poor, middle, and rich household	Measure us in the dummy variables [1= no income,2= 500-birr,3=1000 birr and 4) >1000]
Mothers` age	Introduced to measure the effect of Mother`s age on vaccination	Measured in dummy variables [1= ≤ 20,2= 21-30,3=31-40 and 4 = 41-50 years]
Family size	There is a sibling in a family	Measured by the number of dummy variables [1=1,2=2,3=3-4 and 4) ≥5]
Religions	Numbers mothers` belief one of the listed religions	Measured as dummy variables (1=Orthodox,2= Protestants and 3= others)

Occupation	Types work mothers` to get income and lead their life	Measured as dummy variables (1= house wife,2= Gov. employee,3= merchant ,4 = daily workers and 5= farmer)
Ethnicity	The measure nation of mothers	Measured as dummy variables [1= Amhara, 2= Oromo, 3= Others (Gurage, Tigray, etc.)]
Sex of child	Biologically given for identify sex	Measured dichotomous variables (0= boy and1=girl)
Experienced child death	Numbers of children died in that household	Measured dichotomous variables (0 = no and 1=yes)
Heard about vaccination and VPD	The way gets information about vaccination	Measured as dummy variables (1=media,2= health professional,3= From friends,4= From school and 5= Not heard)
Number vaccine-preventable disease know	Doses of vaccination important children	Measured as dummy variables [1) ≤2 vaccines,2= 3- 4 vaccines, 3) ≥5 vaccines and 4= not vaccinated]
Age to begin immunization mentioned	The correct time to start immunization of children	Measured as dummy variables (1= After birth,2= At 45 days, 3= At 40 days and 4= I don't know)
Average walking time to reach vaccination service	The distance covered to get the health services	Measured as dummy variables [1) <15 minutes,2= 15-30 minutes, 3= 30-60 minutes and 4) >60 minutes]
No. of TT received by mothers`	The vaccination mothers` took during pregnancy	Measured as dummy variables [1= Not vaccinated of TT,2= ≤2 vaccines of TT and, 3) ≥3 vaccines of TT)
ANC follow up	The attendance of health professional advisor during pregnancy	Measured as dummy variables [1= Not vaccinated ,2) ≤2 Vaccines and, 3) ≥3] Vaccines)

3.4.4. Inclusion and Exclusion Criteria

Inclusion Criteria

- All mothers who have children 12-23 months old and live at Ejere District of kebeles for more than six months were included in this study.
- Mothers aged 15 years and above who can be interviewed were included in this study.
- Mothers' who had at least one living child of 12–23 months aged were included in the study

Exclusion Criteria

- All mothers live in Ejere District of kebeles for less than six months were excluded from this study.
- Mothers aged below 15 years and above 50 years were excluded from this study
- Mothers who were unable to respond or very sick were excluded

3.4.5. **Data Collection Techniques and Procedures**

3.4.5.1. **Qualitative data collection methods**

Qualitative data collection methods play an important role in assessing changes in people's perceptions of their wellbeing. The qualitative method most commonly used in the evaluation was: in-depth- interviews.

In-depth Interviews:

Interviews are a useful qualitative data collection technique that can be used for a variety of purposes, includig needs assessment, program refinement, issue identification, and strategic plan ning. Indepth interviews are most appropriate for situations in which you want to ask openended questions that elicit the depth of information from relatively few people. In this case, due to the covid-19 pandemic were four (4) mothers' representatives of the others considered to reason out why their children not fully vaccinated (not completed all dose of vaccination). And also, two health extension workers and two health center workers were considered to reason out why the mothers do not attend the complete vaccination of their children**.**

3.4.5.2. Quantitative Data collection procedures

It was an interviewer-administered a structured questionnaire to gain information from mothers of the child by trained interviewers. The tools were developed from a review EDHS for vaccination coverage of children aged 12-23 months (EMDHS, 2019). The questionnaires were developed in English and then translated into Afan Oromo and translated back to English for

analysis. The information on socio-demographic characteristics, economic status of mothers, sex of the child, ANC follow up of mothers, place of delivery, maternal immunization, accessibility and availability of vaccination service, family size and knowledge of mothers on immunization, etc. were included. Also, the reasons why not immunized children were also added to the questionnaires.

The questionnaire was pretested using 5% of the sample size, and some modifications were made based on a pre-test. The data were collected through face-to-face interviews with mothers and through a review of the vaccination cards. Mothers were asked to show vaccination cards for tracing the child`s immunization history. For those whose immunization cards were not available or lost, the mothers were asked about the immunization status of their children. Twenty-four health extension workers participated in the data collection. Four supervisors supervised the data collection process in one month. Data collectors and supervisors were oriented for one days before the actual data collection. Data completeness and consistency were checked by the investigators and supervisors.

3.4.6. Techniques of data analysis

The collected data was entered into SPSS version 26 after checked the completeness and consistency. Errors related to inconsistency were verified using cross-tabulation and the data were exported to SPSS version 26.

Descriptive analysis was used to describe the socio-demographic characteristics of respondents and other relevant variables in the study. Furthermore, logistic regression, specifically bivariate and multivariable analysis was used to identify factors related to immunization coverage levels of the children 12-23 months aged.

The odds ratios/unadjusted together with their corresponding 95% confidence intervals were computed. The significant of the study will be determined using a P-value < 0.05 will consider in this study. The results are presented in text, tables, and graphs based on the types of data.

Logistic regression Assumptions

Logistic regression analysis is a statistical technique that examines the influence of various factors on a dichotomous outcome by estimating the probability of the event's occurrence. It describes the relationship between a dichotomous response variable and a set of explanatory variables. Assumptions were should consider for the efficient use of logistic regression as given below (Hosmer & Lemeshow, 1980).

- Logistic regression assumes meaningful coding of the variables. Logistic coefficients were difficult to interpret if not coded meaningfully.
- Logistic regression does not assume a linear relationship between the dependent and independent variables.
- The dependent variable must be categorical.
- The independent variables are not normally distributed, no linearly related, and no equal variance within each group.
- Larger samples are needed than for linear regression because maximum likelihood coefficients are large sample estimates.
- Absence of multicollinearity.
- The assumption of homoscedasticity is not necessary for logistic regression.
- Logistic regression assumes linearity of independent variables and logs odds.

3.5. Ethical consideration

Ethical clearance was obtained from the Center for Population Studies, College of Development Studies, and Addis Ababa University. Official letters were written from the Center for Population Studies to the respective governmental health Institutions (Ministry of Health, Oromia Health Bureau, West Shewa Zone health Office and Ejere District health Office) to announce research to be conducted in that area. The purpose of the study was explained to the study subjects. The study subjects were told that the information they provided was kept confidential and that their identities would not be revealed in association with the information they provided. Informed consent was secured from each participant. For bad working environment assessment findings, feedback will be given to all governmental health Institutions involved in the study. There is a plan to give a copy of the result to the respective governmental health Institutions. The respondents' privacy and their responses were not individually analyzed and included in the report.

CHAPTER FOUR: RESULTS and DISCUSSION

4.1. RESULTS

This chapter presents findings of the study about factors affecting immunization coverage of the children aged 12-23 months in Ejere Woreda, West Shewa Zone, Oromia Region. The frequency and association of these factors were described respectively below.

4.1.1. The Frequency of Factors characteristics of the study

4.1.1.1. Socio-demographic characteristics of the study population

The 694 mothers` of children aged between 12-23 months were invited to interview. But only 647(93%) mothers show interest to participate on interview. 47(7%) mothers were rejected the interview participation due to covid-19 pandemic tension.

As the following table (3) show that about 78.4% of the respondents were from rural areas, while the remaining 21.6 % were from urban (Ejere 01 and Chiri towns). The age of the mothers` participation in this study was ranged from 15-49 with mean and median of 25.3 and 27 respectively (Table3).

From the total of mothers who responded, were 45% illiterate, 38.3% those who completed primary school, and 16.7% were completed secondary school and above (table3). Regarding marital status, the majority of the mothers were married (81.6%), unmarried mothers were 6.8%, divorced mothers were 6.3 % and the rest were widowed (5.3 %) (table3). By considering mothers` occupation, 40% of respondents were farmers, 16.8% were housewives, 13.9 % of mothers were daily workers and 12.7% of mothers were merchants. And also, about 85.5% were Oromo, 10.5 % were Amhara and 4.0 % were another ethnicity (Table 3).

When considered the religion from the next table, the majority of the mothers were Orthodox (72.6%), followed by other religions (Muslim, catholic, and Wakefata) (16.1%) and 11.3% of the participants were Protestant (Table3). By looking at the respondents` income from the below table, 62.1 % of them had an average monthly income of 500-1000 birr,19.9 % of the respondents had an average monthly income < 500 birr and 17.9% of the mothers got > 1000 birr monthly (Table 3).

The average family size of the participants was 4 which ranges from 1 to 12. Many of the mothers had less than 5 members (51.2 %), the mothers who had ≥5 members were 29.2% and ≤ 2 family members were 19.6% respectively (Table 3). On average, the mothers had born 5 children and the maximum mothers' born were 12 children. Also, the majority of them had 3-4

live children (37.7%), some of the respondents also had ≤ 2 live children (32.1%) and ≥5 live children (30.1%) respectively. And also, 93 % of the mothers have not experienced child death. But, only 7% of mothers have experienced child death (Table 3).

The mean and median children`s age was 14 and 17 respectively. From the total children involved in this study about 51.2% of them were boys and 48.8 % were girls. Also, about 56.4% were born at health institutions, while 43.6 % of them were born at home. The majority of the children were third and above birth orders (50.2%), some children were second birth order (32.1%) and the first birth order was 17.6% (Table 3).

Table 3: - Socio-demographic characteristics study population in Ejere Woreda, West Shewa Zone, Ethiopia, October 2020

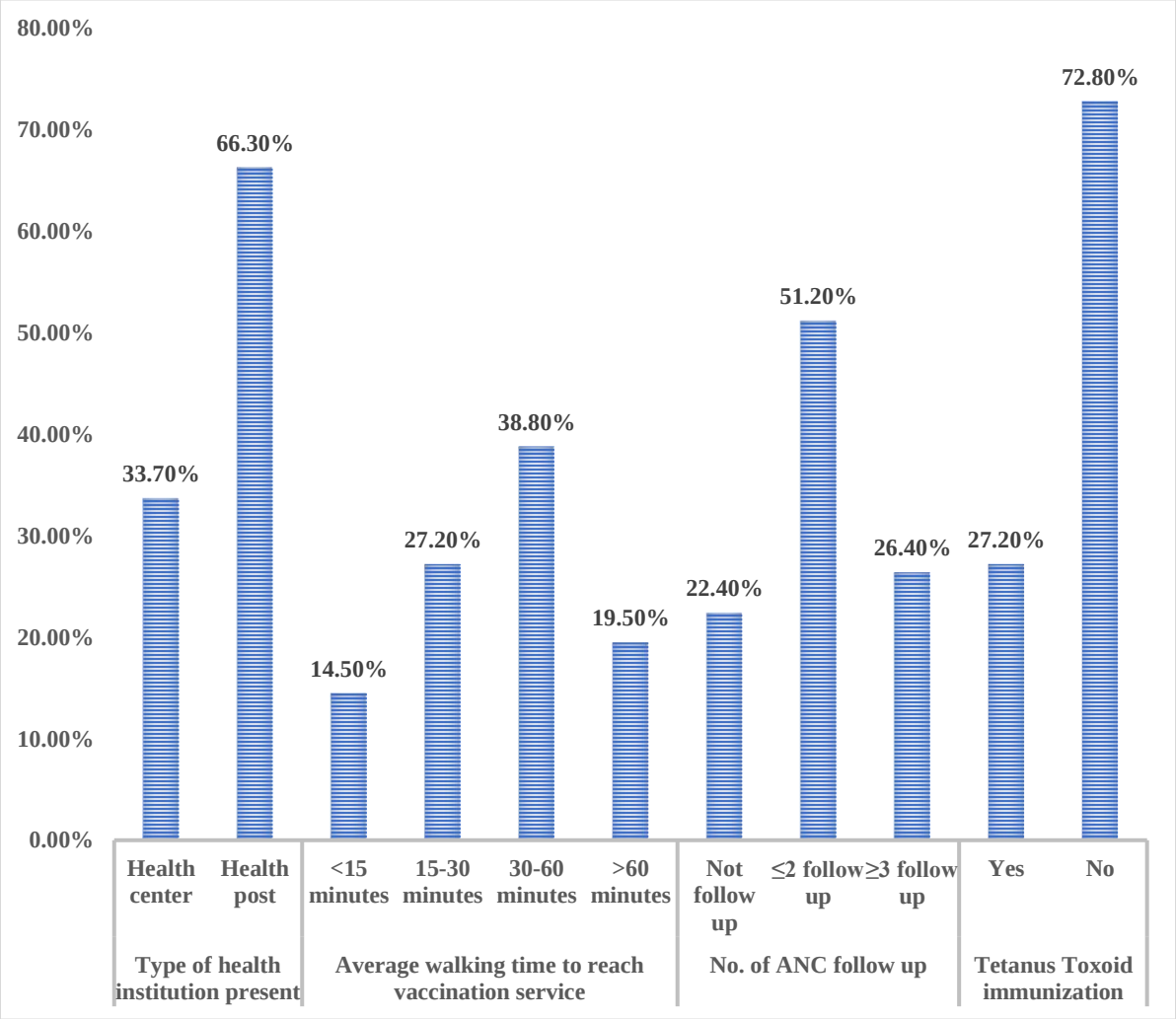
Variables		**Frequency (%)**
Residence	Rural	507(78.4)
	Urban	140(21.6)
Educational status	Illiterate	291(45.0)
	Primary	248(38.3)
	Secondary and above	108(16.7)
Occupation	House wife	109(16.8)
	Government employees	80(12.4)
	Merchant	82(12.7)
	Daily worker	90(13.9)
	Farmer	259(40.0)
	Dependent to family	27(4.2)
Ethnicity	Oromo	553(85.5)
	Amhara	68(10.5)
	Other	26(4.0)
Marital status	Unmarried	44(6.8)
	Married	528(81.6)
	Divorced	41(6.3)
	Windowed	34(5.3)
Religion	Orthodox	470(72.6)
	Protestant	73(11.3)
	Other (Wakefata etc.)	104(16.1)
Income	< 500 birrs	129(19.9)
	500-1000 birr	402(62.1)
	> 1000 birr	116(17.9)
Mothers` age	≤ 20	39(6.0)

	21-30 years	420(64.9)
	31-40 years	142(21.9)
	41-50 years	46(7.1)
Family size	≤ 2 members	127(19.6)
	3-4 members	331(51.2)
	≥5 members	189(29.2)
No. of live children	≤ 2 children	108(32.1)
	3-4 children	344(37.7)
	≥5 children	195(30.1)
Experienced child death	Yes	45(7.0)
	No	602(93.0)
Sex of children	Girl	331(51.2)
	Boy	316(48.8)
Place of delivery of children	At home	282(43.6)
	Health institution	365(56.4)
Birth order	First	114(17.6)
	Second	208(32.1)
	Third and above	325(50.2)

4.1.1.2. Availability, accessibility of vaccination service and Antenatal care follow

The availability of vaccination, accessibility of vaccination, and antenatal care service was assessed by the presence of the service, and average walking time taking to the health service centers. As the next figure (4) show that about 33.7 % of the mothers were providing their children immunization services at the health center. But the majority of the mothers (66.3 %) were more access to health posts than a health center. Regarding distance, 38.8 % of mothers` average walking time to reach health service centers were 30-60 minutes. About 58.7% of mothers had followed at least one times ANC follow during their last pregnancy and mothers who received two times or less ANC service was 51.2%. But 22.4 % of mothers were not follow up antenatal care during their last pregnancy. Also, 27.2 % of mothers took one or more doses of TT vaccine. But the majority of the mothers (72.8 %) did not take any dose of TT vaccines (Figure 4).

Figure 4: -Vaccination service availability, accessibility and Antenatal care follow up in Ejere District, West Shewa Zone, Ethiopia, October, 2020



4.1.1.3. Respondents' Knowledge of vaccination and vaccine-preventable diseases

The knowledge of mothers` on the vaccination and vaccine-preventable diseases was another factor assessed in this study. From the total respondents, about 60.6 % of them were heard about vaccination and vaccine-preventable disease from the health profession, 28.4 % of them were heard from the radio, 9.0 % of them from television, and 2.0 % of them from their friends. The majority of the respondents (47.6%) mentioned the objective immunization used for a healthy child, 21.2 % of them were explained as it used to prevent disease, 16.4 % of them told it used for another purpose (such as poverty reduction, increase life expectancy) and 14.8 % of them said did not know the objective of the immunization (Table 4).

The participants were asked the number of vaccine-preventable diseases they knew. The majority of the respondents (56.4%) said that the number of vaccine-preventable diseases was greater than or equal to 5, some of them (26.6%) said that the number of vaccine-preventable diseases was greater than or equal to 2 and 17% of them said the number of vaccine-preventable diseases was 3-4 (Table 4).

The mothers were asked to identify the correct age of children when they started the vaccination. Many of the mothers (42.3%) said the correct age of children to begin the immunization was after birth, some of them (16.1%) said the age of children to begin the immunization was at 45 days, and also, few of them (9.0 %) said the age of children to begin the immunization was at one month and 7.1% of them said at 40 days. But 25.5 % of them do not know the correct age of children to begin immunization (Table 4).

The participants also were asked to explain the correct number of doses needed for children to complete immunization coverage. The majority of the mothers **(**35.2%) said that three doses of vaccines were needed for children, some of the respondents **(**18.5%) said that one dose of vaccine was enough for children to complete immunization coverage and few of them (15.6%) said four doses of vaccines were needed for children. But the 21.8% of the mothers did not know the number of the dose of vaccines needed for children to complete immunization (Tables 4).

The information on the children's age to complete immunization coverage also another factor considered in this study. The majority of the respondents **(**32.2%) said that the age of children important to complete doses of vaccines was two years, some of the mothers **(**23.2%) explain that nine months were the age of children needed to complete correct doses of immunization, few of them (17.2%) said five years and 10.4% of the respondent said other age of children were needed to complete correct dose of vaccines. But the 10.8 % of the mothers said that did not know the correct ages of children need to complete the dose of immunization (Tables 4).

Table 4: - Respondents` Knowledge on vaccination and vaccine-preventable diseases in Ejere District, West Shewa Zone, Ethiopia, October 2020

Variables		**Frequency (%)**
Heard about vaccination and VPD from	Radio	84(28.4)
	Television	58(9.0)
	Friends	13(2.0)
	Health professionals	392(60.6)
Objective of immunization mentioned	To prevent disease	137(21.2)
	For healthy child	308(47.6)
	I don't know	96(14.8)
	Other (poverty prevent)	106(16.4)
Number vaccine-preventable disease know	≤2 vaccines	172(26.6)
	3- 4 vaccines	110(17.0)
	≥5 vaccines	365(56.4)
Response to age begin immunization	After birth	274(42.3)
	At 45 days	104(16.1)
	One months	58(9.0)
	At 40 days	46(7.1)
	I don't know	165(25.5)
Response to number of doses needed to complete immunization	One	120(18.5)
	Three	228(35.2)
	Four	101(15.6)
	Others	57(8.8)
	I don't know	182(21.8)
Age to complete immunization mentioned	Nine months	150(23.2)
	Two year	208(32.2)
	Five year	111(17.2)
	Other	67(10.4)
	I don't know	70(10.8)

4.1.1.4. Reasons given by mothers why children did not start or not the complete dose of vaccination

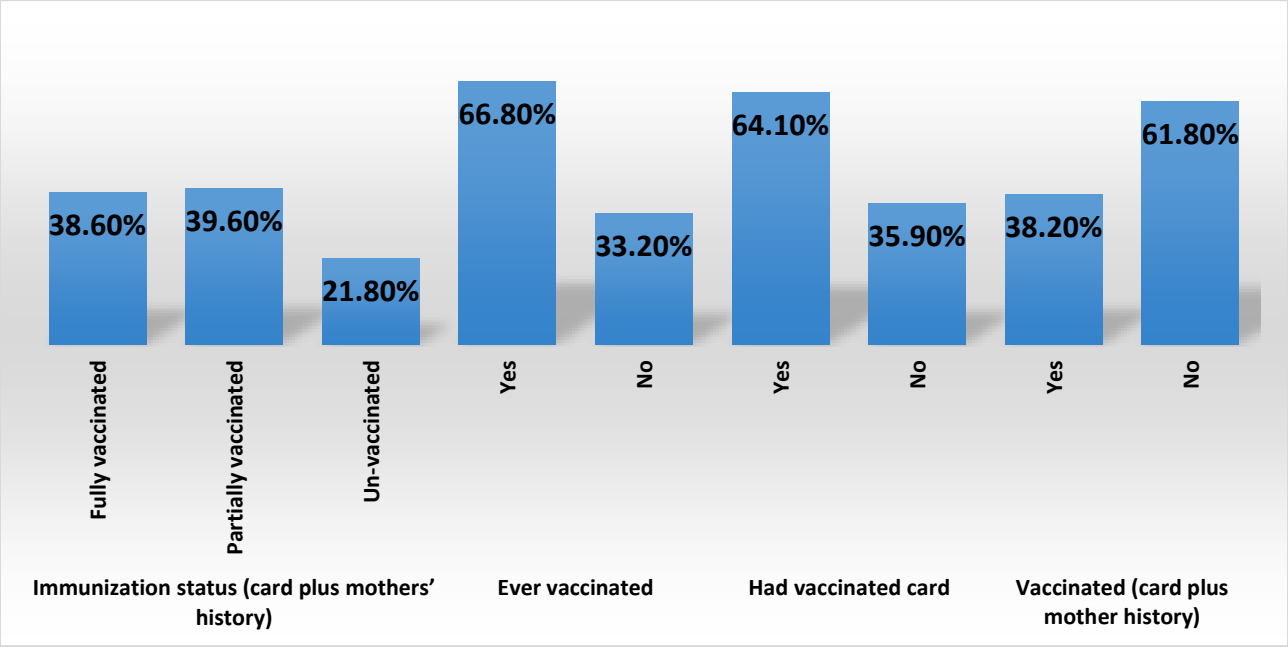
As mothers, verbal expressed the reason why the children did not start or not completely correct doses of vaccines were briefed below. Several numbers of mothers said that our children did not start or not complete the correct doses of vaccines due to the health workers did not clearly explain to us the day of vaccination administered at the health post/center. The barriers discourage mothers return (e.g. long waits health service time and long-distance) were other

reason described by respondents. The participants told us the reason why their children did not start or not complete immunization due to illness of mothers/children. And also, the few numbers of mothers explained that due to bad traditional thinking on vaccination of the children (their children become vulnerable to evil and sick when they come out from the house to immunization service centers which is very dangerous practice).

4.1.1.5. Characteristics of the immunization of the children by card plus mothers' history

As the below figure shows that from the total of 647 children aged 12-23 months, 38.6% of children were fully vaccinated (took all recommended vaccines) and 39.6% of children were partially vaccinated (took some from all recommended vaccines). But 21.8% of children did not take any vaccination recommended by WHO (unvaccinated) (Figure 6). From the total of mothers who vaccinated their children, 64.1% of them had the vaccination card of children.

Figure 6: - Characteristics of the immunization of the children aged 12-23 months by card plus mothers' history, in Ejere District, West Shewa Zone, Ethiopia, October 2020



4.1.1.6. Types of immunization coverage of children by card plus mothers` history

The children`s vaccination doses were determined by considering the vaccination card and mother's history. As the next table indicate vitamin A and measles were taken by the majority of children (56.1%) followed by BCG (46.1%). But pentavalent 3 and OPV 3 were taken by a few children (44%) and (40%) respectively. Generally, the complete immunization coverage of children indicated decrement from the first dose of vaccine to the last dose (Table 5).

Table 5: - Types of vaccines given to children aged between 12-23 months in Ejere Woreda, West Shewa Zone, Ethiopia, October 2020

Types of vaccines given to children	Frequency (%)
BCG	298(46.1)
OPV 0	389(60.1)
OPV 1	428(66.2)
OPV 2	402(62.1)
OPV 3	259(40.0)
Pentavalent1	441(68.2)
Pentavalent2	415(64.1)
Pentavalent3	285(44.0)
PCV1	441(68.2)
PCV2	402(62.1)
PCV 3	285(44.0)
Rota 1	402(62.1)
Rota 2	143(22.1)
Measles	363(56.1)
Vitamin A	363(56.1)

4.1.2. The Impacts of Factors on Immunization coverage of children

Different factors assumed to be associated with immunization coverage of the children were included in this study. The socio-demographic characteristics of the study (mothers & children), maternal health care utilization, child characteristics, and knowledge of mothers about vaccination of children, etc. were involved.

4.1.2.1. The impacts of socio-demographic characteristics on the immunization of children

In this study, the result of binary logistic regression and the impact of each explanatory variable on the response variables were discussed below.

As the next table shows the primary school complete mothers vaccinated their children were 1.11 (53%) times more than mothers` who unvaccinated their children. Also, the secondary and above school completed mothers vaccinated their children were 1.86 times greater than mothers` who unvaccinated their children. This implies that the increase in the education level of mothers' help as they had a high demand for vaccination their children. Illiterate mothers` were considered as reference variable (Table 6).

The next table indicates the married mothers vaccinated their children were 2.813 (73.7 %) times more than not married mothers and the divorced mothers vaccinated their children were 0.443 (31%) times less than mothers` who did not divorce. Also, the widowed mothers vaccinated their children were 0.350 (26%) times less than mothers` who did not window. Unmarried mothers` were considered as a reference variable (Table 6).

As the below table shows the government employment mothers vaccinated their children were 4.17 (81%) times greater than not governmental employment of mothers`, merchant mothers vaccinated their children were 2.031 times greater than not merchant mothers`, daily worker mothers vaccinated their children were 0.83 (45.4%) times less than mothers` who did not daily work and farmer mothers vaccinated their children 0.62(38.3%) times less than mothers` who unvaccinated their children. And also, dependent on family respondents who vaccinated their children were 0.354 times less than those who did not vaccine their children. Housewife mothers` were considered as reference variable (Table 6).

The following table explains the age the mothers were not determined the immunization coverage of the children (Table 6).

As the below table shows the 500 - 1000 birrs earn of mothers vaccinated their children were 1.103 times more than mothers` who get less incomes and > 1000 birrs earn mothers vaccinated their children were 1.42 times greater than mothers` who earn less salary. But the <500 birrs earn women were considered as reference variable (Table 6).

As the next table describes the rural mothers vaccinated their children were .770 times less than mothers` who live in an urban area. But the rural women were considered as a reference variable (Table 6).

From the below table the mothers who had 3-4 children vaccinated their children were .851 times less than mothers` who had two children. And also, mothers who have **≥ 5** children vaccinated their children were .376 less likely than mothers` who had few children. But the women who have ≤ 2 children were considered as reference variable (Table 6).

The outcome of logistic regression analysis indicated that the children born at home were .304 times less likely to be vaccinated children than those born at the health center (Table 6).

Generally, the ethnicity, religion, age of mothers, and sexes of the children were insignificant statistically to the model, which did not affect the outcome (Table 6).

Table 6**:** - The impacts of the socio-demographic characteristics on the immunization status of children in Ejere District, West Shewa Zone, Oromia Region, October 2020

Variables		B(SE)	Sig.	Exp(B)	95% C.I. for EXP(B)	
					Lower	Upper
Educational status	Illiterate (reference)		.043			
	Primary	.105(.258)	.044	1.111	.670	1.840
	Secondary and above	.485(.482)	.028	1.860	1.052	3.439
Marital status	Unmarried (reference)		.041			
	Married	.207(.840)	.045	2.813	.157	4.217
	Divorced	-.814(.645)	.019	.443	.125	1.569
	Windowed	-1.050(.744)	.015	.350	.081	1.505
Occupation	House wife (reference)		.030			
	Merchant	.708(.752)	.046	2.031	.465	8.862
	Government employees	1.429(.883)	.016	4.173	.740	23.539
	Daily worker	.142(.745)	.026	0.83	.596	3.042
	Farmer	.080(.771)	.044	0.62	.356	2.320
	Dependent to family	.062(.725)	.038	0.354	.124	2.263
Ethnicity	Oromo (reference)		.541			
	Amhara	.494(.569)	.386	1.639	.537	5.002
	Other	.724(.655)	.269	2.062	.571	7.444
Religion	Orthodox (reference)		.075			
	Protestant	-.616(.271)	.063	.540	.318	.918
	Other	-.574(.528)	.278	.563	.200	1.587
Mothers` age	≤ 20 (reference)		.049			
	21-30 years	-.822(.550)	.025	.440	.150	1.292
	31-40 years	-.792 (.370)	.032	.453	.219	.936
	41-50 years	-1.044(.383)	.016	.352	.166	.745
Income	< 500 birrs (reference)		.031			
	500-1000 birr	.098(.176)	.050	1.103	.641	1.281
	> 1000 birr	.331(.168)	.048	1.42	.735	2.157
Residence	Urban (reference)					
	Rural	.261(.239)	.0294	.770	.482	1.230
Family size	≤ 2 members (reference)		.024			
	3-4 members	-.161(.253)	.049	.851	.425	1.605
	≥5 members	-.978(.211)	.043	.376	.165	1.206

Experienced child death	Yes					
	No	.470(.336)	.047	1.600	.828	3.091
Sex of children	Girl (reference)					
	Boy	.202(.170)	.236	.817	.585	1.141
Place of delivery children	Health institution (reference)					
	At home	.180(.176)	.155	.304	.835	.592
Birth order	First (reference)		.0165	.044		
	Second	.192(.234)	.0.03	1.212	.766	1.918
	Third and above	.057(.192)	.007	1.058	.727	1.541
Constant		-1.084(.178)	.000	.338		

4.1.2.2. The Impact of availability and accessibility of vaccination service and Antenatal care on vaccination children

Maternal health care utilization like ANC follow up, maternal tetanus toxoid status, availability, and accessibility of vaccination service were other factors assessed in this study.

As the result indicates from the next table 15- 30 minutes took for the mothers to reach the health service center to vaccine their children were 2.34 times more than mothers who far from health service delivered area. Also, there were 30- 60 minutes took for the mothers to reach health service to be vaccinated their children were 1.167 (54%) times greater than mothers` who longer. And also, **> 60** minutes took for the mothers to get health service to immunize their children were 0.839 times less than mothers` who nearest to the health service center (Table 7). Therefore, the result indicated the long-distance (long time wait service) was affect vaccination chance of children (Table 7).

The mothers who had received ≤ 2 doses of tetanus toxoid vaccinated their children were 2.873 times more than mothers` who did not take (Table 7).

The mothers who had to follow up ≤ 2 number ANC where they vaccinated their children 1.973 (66.4 %) times greater than mothers` who did not follow up antenatal care. Also, the mothers who had followed ≥ 3 number ANC, who vaccinated their children were 2.236 (69.1 %) times more likely to mothers` who did not follow (Table 7).

Generally, bivariate logistic regression analysis showed that the mothers of children who had followed antenatal care during pregnancy their children were more likely to be vaccinated than those who did not (Table 7).

Table 7: -The association children vaccination, the availability, accessibility of vaccination service and Antenatal care) follow in Ejere District, West Shewa Zone, Ethiopia, October 2020

		B (S.E)	Wald	Sig.	Exp(B)	95% C. I. for EXP(B)	
						Lower	Upper
Average walking time to reach the nearest vaccination service	<15 minutes (reference)		1.102	.007			
	15-30 minutes	.85(.293)	1.065	.032	2.34	1.762	3.400
	30-60 minutes	.154(.255)	.365	.046	1.167	.708	1.924
	>60 minutes	-.175(.239)	.536	.048	0.839	.746	1.903
No. of ANC follow up	Not follow up (reference)		10.573	.005			
	≤ 2 follow up	.680(.270)	6.358	.012	1.973	1.163	3.347
	≥3 follow up	.805(.262)	9.415	.002	2.236	1.337	3.738
Tetanus Toxoid immunization	No (reference)		.001	.049			
	Yes	0.861(.284)	7.050	.010	2.873	2.063	4.037
Constant		21.23(.283)	.000	.000	.000		

4.1.2.3. The impact of the mothers' knowledge on vaccination of children and vaccine-preventable diseases

In this study, the relationship between mothers` knowledge and children's immunization were analyzed by using binary logistic regression. The result of binary logistic analysis also showed that mothers who did hear about vaccination from friends were vaccinated their children 1.03 times greater than mothers who did hear about vaccination. Mothers who did hear about vaccination from TV were vaccinated their children 1.265 times more than mothers who did hear about vaccination. Mothers who did hear about vaccination from health professionals have vaccinated their children 1.562 times more than mothers who did hear about vaccination. And also, the result indicated that mothers who knew the number of vaccine-preventable diseases needed for children were 2.263 times more than mothers who did not know the number of vaccine-preventable diseases. But, the knowledge of mothers about the objective of immunizing children was no impact on child vaccination (statistically insignificant) (Table 8).

Mothers who did not know the correct age of the children at begin immunization were vaccinated their children .292 timeless than those who knew the correct age. And also, the mothers who did know the correct response session needed to complete immunization vaccinated their children were 2.089 times more likely than who did not (Table 8)

Table 8: - The impact of the mothers' knowledge on vaccination of children aged 12-23 months in Ejere District, West Shewa Zone, Ethiopia, October 2020

		B (S.E)	Wald	Sig.	Exp(B)	95% C.I.for EXP(B)	
						Lower	Upper
Heard about vaccination and VPD	Radio (reference)		2.361	.051			
	Friends	.031(.251)	.015	.024	1.03	.592	1.586
	Health professionals	.446(.305)	2.144	.043	1.562	.860	2.839
	Television	.235(.652)	.130	.019	1.265	.352	4.544
Objective of vaccination mentioned	Radio		4.328	.228			
	To prevent disease						
	For healthy child	.257(.395)	.424	.015	1.293	.857	1.676
	I don't know	-.200(.367)	.296	.006	.819	.399	1.681
	Other (reduce poverty etc.)	-.524(.325)	2.602	.017	1.689	.893	3.192
Number vaccine preventable disease know	≤2 vaccines		5.331	.050			
	3- 4 vaccines	.668(.355)	3.543	.040	1.95	.956	3.028
	≥5 vaccines	.817(.302)	.003	.034	2.263	1.543	4.778
Response to age begin immunization	After birth		6.181	.016			
	At 45 days	-.501(.520)	.929	.035	.606	.219	1.678
	I don't know	-1.23(.611)	3.061	.042	.292	.088	.967
Age to complete immunization mentioned	Nine months		2.868	.0180			
	Two year	.737(.567)	1.687	.034	2.089	.687	3.350
	Five year	.167(.592)	1.680	.045	2.153	.675	3.868
	Other (one year,9 months)	-.278(.733)	.144	.044	.757	.314	1.556
	I don't know	-.852(.669)	1.263	.048	0.426	.571	1.881
Constant		-.561(.384)	2.135	.000	.570		

4.1.3. Problems and Solution Identified by Health Center and Health Extension Workers

4.1.3.1. Challenges Faced by the **Health Center and Health Extension Workers**.

Health extension and health center workers highlighted below that they faced challenges when implementing EPI program:

Shortage of Vaccines: one of the challenges for health workers to give service of children was the shortage of vaccination which was happened at 10 weeks vaccination like Rotavirus which not given for children after six months. Due to the shortage of some vaccines, the children lose some doses of vaccines.

Workload: Participants reported that inadequate numbers of health workers assigned for the success of EPI goals were reduced the accuracy of records made in the course of implementation and reduces the chances of the accuracy of records made in the course of implementation and reduces the chances of advice owner on the importance of immunizes, and also, it causes mothers/caregivers to wait in the queue for long leading to vaccinate their children. Many mothers/caregivers were hesitant to back for subsequent visits if they experience long waiting times in prior visits. The participant said that the inadequate health workers were caused by workload. This quote from a respondent explain the effects of insufficient workspace.

Refusal of Mothers with Scheduled Return Dates: The study revealed that many mothers did not obey the instructions given by nurses during EPI implementation. This result was confirmed by a respondent who said, “It feels nice as a nurse to do vaccination if mothers respect the return dates because this looks like we are not doing our work, emphasizing that mothers must respect their return dates”.

Denial might result from a poor understanding of vaccination by mothers of children who were supposed to be immunized and loss of vaccination cards which remembers the day of return for the next schedule. It is claimed that most respondents did not know which diseases was prevented by which vaccines or how many doses of each vaccine were needed, and that is the reason why they forget the scheduled dates.

Possible Solution to Relieve Faced Challenges

A respondent was put the different solution to alleviate the above challenges.

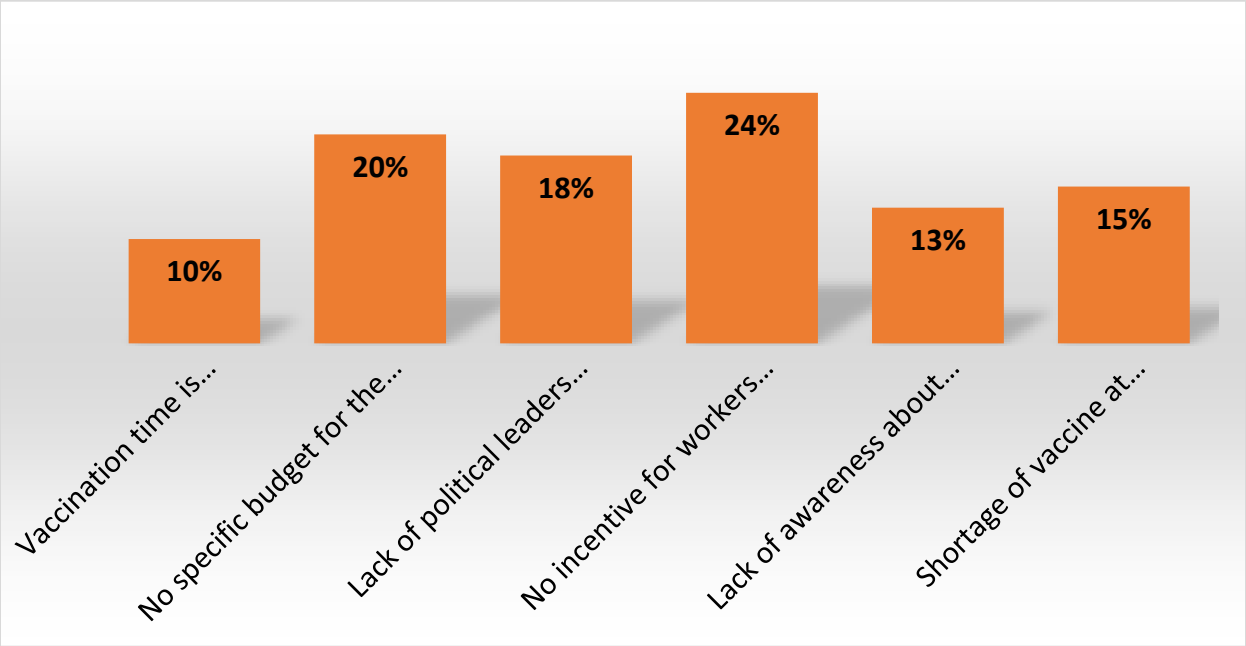
Among those:

- ✓Provide more comfortable health working.
- ✓Sufficient supply of the vaccines

✓Employing more staff

✓ Intensive health education about when to return, proper use of the cards and what immunizes was given at what age of the child and what type of disease is prevented by that specific vaccine.

Figure 7: the interviews and response of HW and HEW for the reasons not completing children vaccination, Ejere District, West Shewa Zone, Oromia Region, October 2020



As the above figure indicate that no incentive for workers of EPI was cause 24% none immunization coverage of children (Figure 7). This indicated that incentive to the workers' EPI was important for the success of EPI target at woreda level. From the above figure, no specific budget allocation for the performance EPI plan (20%) was another reason for incomplete all dose of immunization coverage for children in this Woreda. This implies that allocating enough budget was very important for the success of EPI target at woreda level (Figure 7).

The Lack of political leaders committed (18%) for the performance of EPI were the big challenges to success the target of EPI at this Woreda (Figure 7). And also, Shortage of vaccine at a health facility (15%) was the other reason for incompletion of all dose of immunization coverage children at this Woreda (Figure 7). This happens especially at the health extension service of many kebeles.

4.2. DISCUSSION

The immunization coverage of the child was assessed using the vaccination card and the mothers` history**.** Immunization had been one of the alone community health achieved of the past half-century. But, up to the recent time, the number of factors has been hindering the attainment of targets to provide complete immunization in different regions for all individuals who was in need. Thus, improving the immunization coverage level of children had become the most desirable for all nations to alleviate the undesirable health outcome of unvaccinated children. Despite observable progress in addressing immunization services globally, until today vaccination coverage was not adequate in contrast to its immense advantage. Therefore, this study tried to identify the coverage of vaccination and factors associated among children 12-23 months old residing in selected 10 kebeles of Ejere District, West Shewa Zone, Ethiopia. Factors that affect the immunization coverage of children were analyzed by using logistic regression.

In this study the descriptive analysis showed that: educational levels, place of residence, occupation, income, number of families, knowledge of mothers had on vaccination, born at health service, and follow up of antenatal care of the mothers were significant association with the immunization coverage of children. From the finding of this study the mothers who complete high school and above were more likely to immunize their children than those not complete high school. According to the analysis of this study, the urban residents and government employees of mothers were more likely to vaccinate their children. This was related to the study done in Burkina Faso (Aboubakary et al., 2009). But the religion of mothers had no impact on child immunization coverage.

Studies from other places showed that the family size was the necessary variables for determining the immunization coverage level of children. Also, in this study, there was significance differences in immunization levels of children among those who had large and small numbers of children. Studies also showed that younger and middle-aged mothers were more likely to vaccinate their children than older mothers (Kidane et al., 2008).

Based on the finding of this study, out of the total children surveyed by card plus mother history, the coverage of full immunization observed of children was 246 (38.0 %). But 62% of the children did not complete all recommended doses of immunization coverage. This result indicated that low coverage of immunization of children compared with different studies that were conducted in various countries and regional states including Mali (Ntenda et al., 2017) was

the proportion of fully immunized children 12-23 months old was 84.5%. It was lower than a survey done in Mizean Aman town the immunization coverage was 48.2% (Asrat et al., 2017).

The immunization coverage for BCG, Pentavalent, and OPV was below 80%. This was less than a result obtained in Mizean Aman Town (Asrat. et al., 2017). Also, this study was found to be better than found done in Somali land where out of total respondents only 18% of them showed vaccination card and overall coverage by card was reported to be BCG 40.9% and OPV3 9.0% (Abdi., 2014).

Regarding binary logistic regression analysis marital status, education level, occupation status, economic status, and knowledge of maternal were found to determine vaccination coverage of children. This study also identifies the mothers of children whose literate (who complete secondary and above school) were 1.86 times more likely to be fully immunized than those who complete primary school. This result was similar to a result obtained in the Oromia Region (Mohammed & Atomsa, 2013). However, it was different from the study done in Ambo Woreda, where only the occupation of the mother indicated a significant association with the immunization coverage level of children (Etena, 2012).

According to the analysis of this study there was no evidence to identify that sex of the child, religion, and ethnicity had any impact on the fully immunization coverage of children. In some communities with cultural discrimination against female children, boys had a greater chance to be vaccinated. A study done in urban Bangladesh had revealed that sex and birth order had an association with child immunization coverage level (Kabir, 2016).

By considering the health facility, the place of delivery was an important determinant factor of the decision to immunize the children. This study had revealed that the place of delivery of the children showed a significant association which was.304 times less than at health center. This result was less compared with a result obtained from Mizean Aman town where being born in hospital increased the chance of children being immunized by 2.4 (71%) percentage points (Asrat, Mesfin, &Frehiwot, 2017).

The analysis of the logistic regression result reveals that receiving the antenatal care visits was an important determinant factor of the decision to immunize children. This study revealed that children whose mothers had antenatal care follow were more fully vaccinated. This result is similar to the result obtained from Mizean Aman town (Asrat, Mesfin, & Frehiwot, 2017), Ambo district (Etana & Deressa, 2012), and Mali (Martin et al., 2009) and a finding in Kenya

(Awino, 2016).

Based on the knowledge of mothers on immunization and vaccines preventable disease, the knowledge of the participants was associated with immunization coverage of children in this study. It was identified that children whose mothers had good information (Heard about vaccination and VPD, Objective of vaccination, and Number vaccine-preventable disease) on immunization and vaccines preventable disease were more fully immunized. This study is consistent with the study done in Oromia region, Ambo District (Etana & Deressa, 2012), Shenkore woreda, Amhara region (Mekonnen et al., 2019), Mizean Teppi town (Asrat, Mesfin & Frehiwot, 2017), and Hosanna town (Ayano, 2015).

Also considering the reason why mothers not vaccinating their child, the majority of them replied that due to the busy of mothers to attend the next vaccines as the main factor. This finding was coherent with a finding obtained in Shenkore woreda, Amhara region (Mekonnen et al., 2019), Mizean Aman town (Asrat, Mesfin, &Frehiwot, 2017), and Sinana district (Legesse & Dechasa, 2015).

Generally**,** when we compare the immunization coverage of Ejere woreda with EMDHS reported, the woreda fully coverage of vaccinated children higher than the national vaccinated.7.2%, also the proportion of unvaccinated children was higher by 5% similar (EMDHS, 2019). The Ejere Woreda vaccination coverage (38.2%) higher than 2019 nationally immunization coverage survey (31 %) (EMDHS, 2019).

CHAPTER FIVE: CONCLUSION and RECOMMENDATION

5.1. CONCLUSIONS

From the analysis of this study were the following conclusion identified:

- The children vaccination coverage in the studied area was low comparing with the target EPI at woreda level.
- The reasons listed by respondents why not complete or not start all doses of vaccines were forgetting the appointment date, sickness of a child, long-distance from health service delivery and lack of awareness.
- From this result analysis, there was a shortage of knowledge of mothers on the age of their children to begin and finish the correct dose of vaccines.
- As a result of the finding showed that mothers` delivering children at health organizations (health posts & health centers) help as the children immediately gets the chance of BCG vaccines.
- The study of the result showed that no better health facility that improves EPI services such as staff motivation, regular supervision, and continuous monitoring and evaluation to detect the problems of vaccination coverage on time and right doses.
- The increasing educational level of mothers, help mothers` health-seeking culture could be increased which might be lead them to immunize their children.
- Finally, no clear budget allocation directly for EPI program implementation and no committed political leaders for the success of immunization coverage of children.

5.2. RECOMMENDATION

From the result of this study the following recommendation was identified:

- The Ejere Woreda health office management should be work on reasons listed by respondents for incompletion vaccination of children such as lack of awareness of immunization, incentive health workers work on EPI, health infrastructure, allocating sufficient budget for EPI program and the incentive of workers of EPI, etc.
- The Woreda health office should work to raise the awareness by designing proper health education targeting on the mothers help to know the correct age the child should begin and finishes all dose of immunization.
- Correct information about the dose and time of the children's immunization will be given to the mothers who come for immunizing their children.
- Immunizes should be available in the health organization giving immunization service with appropriate storage materials.
- Ministry of health should be designed a special immunization service delivering strategies for bad traditional thinking on children immunization of community.
- Generally, the woreda health office, Health Bureaus, and Federal Ministry of Health should be allocating specific budget, policy, and strategy for EPI plan performance and need to increase community awareness through health education about full vaccination coverage of children.

References

Abadi Girmay and Abel Fekadu (2019). Full Immunization Coverage and Associated Factors among children 12-23 months old in Sekota Zuria District, Amhara Region, Ethiopia: International Journal of pediatrics Vol.1, no. 8.

Abdel Karim et al. (2009). Evaluation of immunization coverage within the Expanded Program on Immunization in Kita Circle, Mali: a cross-sectional survey; BMC International Health and Human Rights, October,9.

Abdi Nur Mohamud (2014). Immunization coverage 12-23 months old children and associated factors in Jigjiga District, Somali National Regional State, Ethiopia; BMC Public Health.

Abdul Q., et al. (2010). Programmatic Aspects of Drop outs in Child vaccination in Bangladesh: Finding; From a prospective study. Asia -pacific Journal of public health;23(1):141 - 50

Abdulraheem I.S.et al. (2011). Reasons for incomplete Vaccination and factors for missed opportunities among rural Nigerian; Children Journal of Public Health and Epidemiology Vol.3(4), pp.194-203.

Abilla, WD, and Munguti, KK. (1993). A National Qualitative Study of Factors which Promote and Hinder Immunization Activities in Kenya; KEPI and REACH.

Aboubakary S., et al., (2009). Assessment of factors associated with complete immunization coverage in children 12- 23 months old: a cross-sectional study in Nouna District, Burkinafaso.

Addisie, T., et al. (2002). Expanded program for immunization module for Ethiopian health center team: Gonder University.

Agresti, A. (2002). Categorical Data Analysis (2nd Ed.); New Jersey: John Wiley & Sons, INC.

Agresti, A. (2007). An Introduction to Categorical Data Analysis, John Wiley and Sons.

Ahmad, R., et al. (2011). Availability of Expanded Programme of Immunization Services.

Andersen (1968). A Behavioral Model of Families' Use of Health Services, Research Series No. 25. Chicago: Center for Health Ad-ministration Studies, University of Chicago.

Andersen (1995). "Revisiting the behavioral model and access to medical care: does it matter?". *J Health Soc Behav*. **36** (1): 1–10.

Andersson, R., et al. (2005.Assessment of vaccine coverage following the introduction of a publicly funded pneumococcal vaccine program for the elderly in Victoria, Australia; Vaccine 23(21): 2756-61.

Animaw, W. et al. (2013). Expanded program of immunization coverage and associated factors among children age 12 – 23 months in Arba Minch town and Zuria District, Southern Ethiopia; BMC Public Health 2014, 14:464 Page 6 of 10.

Awino O. J. (2016). Determinants of immunization coverage among children aged 12-23 months in Kenya.

Ayano, B. (2015). Factors affecting fully immunization status of children aged 12–23 months in Hosanna Town, South Ethiopia; Journal of Pregnancy and Child Health, vol. 2, no. 185.

Ayaya,S., et al. (2007). Training needs for mid-level managers and immunization coverage in Western Training needs for mid-level managers and immunization coverage in Western Kenya", East Africa Medical Journal.84 (7): 342-352.

Bataringaya, K., (2010). Immunization Coverage and Factors Associated with Failure to Complete Childhood Immunization in Kawempe Division, Uganda.

Benn, CS, et al. (2008). Sex -Differential Effect on Infant Mortality of Oral Polio Vaccine Administered with BCG at Birth in Guinea -Bissau: Natural Experiment. PLOS ONE3,12:4056.

Berhane, Y. (2008). Universal Childhood Immunization: a realistic yet not achieved goal: Ethiopian Journal of Health Development,22 (2).

Berhane, Y.&Yigzaw, A. (2006). Vaccine preventable disease and Immunization program in Ethiopia; Epidemiology and Ecology of health and disease in Ethiopia; Addis Ababa: Shaman Books:354-68.

Black, RE, et al. (2003.Where and why are 10 million children dying every year? The Lancet. 361. 2226-2234.

Breslow, N. E. and Clayton, D. G. (1993). Approximate inference in generalized linear mixed Models. J. Am. Statist. Assoc.", 88, 9–25.c Springer 2008.

Callreus, T. (2010). Perceptions of vaccine safety in a global context; Acta Pediatric. 99: 166-171.70.

Central Statistical Agency (2006). Addis Ababa, Ethiopia and ORC Macro; Ethiopia Demographic and Health Survey 2005: Calverton, Maryland, USA.

Central Statistics Agency (2019). Ethiopia Mini demographic and health survey summary report.

Chema S, Chumo RS, Dolan TT, et al: Clinical trial of thioquinone lactate for the treatment of East Coast fever in Kenya. Vet Rec 1987; 121: 575–577

Christopher, E. (1995). Qualitative Data Analysis (QDA) (Pope & Mays; BMJ; 311:42-45).

Commenges, D. and Jacqmin, H. (1994). The intra-class correlation coefficient Distribution frees definition and test: Biometrics, 50, 517-526.

Demeke T., Assessment of magnitude and factors associated with full immunization coverage in children Aged 12-23 months in Addis Ketema sub-city, Addis Ababa, Ethiopia.2014.

Diddy, A. (2009). Inequitable childhood immunization uptake in Nigeria; Multilevel analysis of individual and contextual determinants BMC infection disease: 9(181).

Ejere Woreda Health Office (2020).Unpublished plan report.

Etana, B. (2011). Factors Affecting Immunization status of children Aged 12-23 Months in Ambo Woreda: West Shewa Zone; Oromia Region.

Etana, B., Deressa, W. (2012). Factors associated with complete immunization coverage in children aged 12-23 months in Ambo Woreda, Central Ethiopia; BMC Public Health;12(1):566.

Ethiopia National Expanded Programme on Immunization (2015). Comprehensive multi-year plan 2016 – 2020; Federal Ministry of Health (FMoH), Addis Ababa, Ethiopia.

Federal Ministry of Health (2015). Ethiopia National Expanded Program on Immunization, Comprehensive Multi-Year Plan 2016-2020.

Funmilayo Adebiyi, (2013). Determinants of Full Child Immunization among 12-23 Months Old in Nigeria.

Gentile (2010). Pediatric disease burden and vaccination recommendations: understanding local differences; International Journal of Infectious Diseases, vol. 30, pp.1019–1029.

Girma, S.& Teklemariyam, S. (1997). MPH missed opportunities for immunization in jimma hospital.

Grossman, M., (1972). *The demand for health: A theoretical and empirical investigation*.

Grossman, M., (April 1999). The Human Capital Model of the Demand for Health). NBER Working Paper No. w7078, Available at SSRN:

Ibnouf A, Van den Borne H, Maarse, J. (2007) Factors influencing immunization coverage among children under five years of age in Khartoum State; Sudan SA Fam Pract.

Kabir, S.M.S. (2016). Basic Guidelines for Research: An Introductory Approach for All Disciplines. Book Zone Publication, ISBN: 978-984-33-9565-8, Chittagong-4203, Bangladesh.

Kidane T, et.al. (2006). National EPI coverage survey report Ethiopian Journal of Health Development, 2008;22(2):148-57.

Kidane T, Tekei M. (2003). Factors influencing child immunization coverage in rural district of Ethiopia; Ethiopian Journal of Health Development; 17(2):105-10.

Lakew Y, Bekele A, Biadgilign S. Factors influencing full immunization coverage among 12–23 months of age children in Ethiopia: evidence from the national demographic and health survey in 2011. BMC public health. 2015 Dec; 15(1):728.

Legesse E, Dechasa,W. (2015). An assessment of child immunization coverage and its determinants in Sinana District, Southeast Ethiopia, BMC Pediatrics.; 15(1):31.

Lulsegad S, Mekasha,A, & Berhane Y. (2006). Common childhood disease. In: Berhane Y, Haile Mariam D, Helmut K, editors. Epidemiology and Ecology of health and disease in Ethiopia, Addis Ababa: Shama Books: p. 329.

Lwanga, S. K. and Lemeshow, S. (1991). Epidemiological and Statistical Methodology World Health Organization Geneva.

Mohammed, M. and Atomsa A., (2013). Assessment of child immunization coverage and associated factors in Oromia regional state, Science, Technology and Arts Research Journal, vol. 2, no. 1, pp. 36–41.

Martin K, et.al. (2011). Childhood vaccination in informal urban settlements in Nairobi, Kenya, who gets vaccinated? BMC public Health:11.

Mekonnen et al. (20190). Immunization coverage of 12–23 months old children and its associated factors in Minjar-Shenkora district, Ethiopia.

Meleko, A, et al. (2017). Assessment of Child Immunization Coverage and Associated Factors with Full vaccination of Children 12-23 months old at Mizean Aman Town, Bench Maji Zone, Southwest Ethiopia: Hindawi International Journal of Pediatrics Vo, no.11.

Meyers, L. S., Gamst, G., & Guarino, A. J. (2006). Applied multivariate research: design and interpretation. Thousand Oaks, CA, Sage Publications, Inc.

Ntenda PAM, et al. (2017) Analysis of the effects of individual and community level factors on childhood immunization in Malawi, Vaccine; 35(15):1907–1917.

Olumuyiwa, O. et al. (2008). Determinants of vaccination coverage in rural Nigeria, BMC Public Health, vol. 8, pp. 381–388.

Sebahat D. &NadiBakırc (2006). Vaccination coverage and reasons for non-vaccination in a district of Istanbul, BMC Public Health; 6(125).

Shankar, Rama, Khursheed M., Shailendra K.,and Singh J. "Immunization status of children up to 3 years in rural block, Muzaffarnagar." Indian Journal of Community Health 27 (2015): 438-442.

Soberanis, JL. (2009). Evidence-based discussion increases childhood vaccination uptake: a random cluster-controlled trial of knowledge translation in Pakistan, BMC International Health & Human Rights, 9 (Suppl 1): S8.

T. K. Ryman, V. Dietz, and K. L. Cairns (2008). Too little but not too late: results of a literature review to improve routine immunization programs in developing countries, BMC Health Services Research, vol. 8, pp. 134–148.

Tamirat KS, Sisay MM. Full immunization coverage and its associated factors among children aged 12–23 months in Ethiopia: further analysis from the 2016 Ethiopia demographic and health survey. BMC public health. 2019 Dec 1;19(1):1019.

Udessa G1, Sena L2 and Berhanu S2** 1Department of Guji Zone Health, Guji, Oromia Ethiopia: Department of Epidemiology, Jimma University, Ethiopia Vaccination Status and Factors Associated with It among Children Aged 12-23 Months in Wadera District, South East Ethiopia;2018.

UNICEF (2019). World's estimation of immunization coverage children.

WHO (2012). Global Vaccine Action Plan 2011–2020: Geneva.

WHO (2013). Global elimination of measles; Geneva: world health organization:16 April.

WHO (2015). House hold cluster survey mothed modified.

WHO, UNICEF &World Bank (2009). states of the world's vaccines and immunization. 3rd ed., Geneva: world health organization.

WHO/UNICEF (2016). Coverage estimates and estimation of number of children vaccinated or not vaccinated.

Wolfson, F. et al. (2006). Estimating the costs of achieving the WHO–UNICEF global immunization vision and strategy, 2006–2015," World Health Organization (WHO), Weekly Epidemiological Record, vol. 81, no. 9, pp. 189–196.

World health organization (2007). Children and the millennium development goal progress towards a world fit for children.

World Health Organization (2009). Progress towards measles control in WHO's African region, 2001–2008.Weekly Epidemiological Record, vol. 39, no. 84, pp. 397–404.

World Health Organization (2015). Immunization coverage cluster survey reference revised manual.

World Health Organization (2018a). the estimation of Immunization coverage.

World Health Organization (WHO) (2018b). The RED Strategy of program.

Yemesrach A, et al., (2018). Predictors and Barriers to Full Vaccination among Children in Ethiopia.

Young, J. (1981). Medical choice in a Mexican village. New Brunswick, NJ: Rutgers University Press.

Young, James C. & Garro, Linda Young (1982). "Variation in the choice of treatment in two Mexican communities," Social Science & Medicine, Elsevier, vol. 16(16), pages 1453-1465, January.

ANNEX I- INFORMATION SHEET AND CONSENT FORM

Information sheet

Hello! My name is _____. We are working to assess factors affecting immunization status of children in this woreda. This study tries to identify which factors are contributed to immunization status of your child and if the child not immunized why your child does not immunized.

I am one of the data collectors and asking you some questions about your child's immunization status. Would you please cooperate in responding the following questions? Your participation indirectly contributed in improving the problem of immunization in your communities and your children.

Your response never be exposed to any party without your consent and it is possible not tell your name and the interview take only 20 minutes. There is no obligation to participate in the study. You have full right to refuse participation, refrain during interview and decline from answering to some or more of the question if you don't like to answer them.

Yes_____ No _____

Consent form

I have been briefly informed about the study and clearly understood the objective of the study. So, I here approve my consent with my signature to take part in the study.

Signature _____ Date _____

ANNEX II- QUESTIONNAIRES IN ENGLISH VERSION

Please circled the one your choice

Child birth date day month year/ Or Age of child in months_____

Sex of the child 1) male 2) female

Number of children's older siblings_____

Family size_____

Mother's age _____

Mother's marital status

single 2) married 3) separated 4) divorced 5) widowed

Mothers educational status

illiterate 2) grade 1-8 3) grade 9-12 and above

Number of children ever born by the mother_____

Number of children alive _____

What is occupation of the mother?

1) House wife 2) government employee 3) merchant 4) daily laborer

Ethnicity: 1) Oromo 2) Amhara 3) Others

What is your religion?

Orthodox 2) Protestant3) Catholic 4) Muslim 5) Other, specify_____

What is your family monthly income per month? _____

Have you attended antenatal care during your last pregnancy? 1) Yes 2) No

If yes, how many times did you attend? _____

Have you received tetanus vaccination during your last pregnancy? 1)Yes 2) No

If yes, how many injections did you received? _____

Where did you deliver your last baby?1) At home 2) at health institution 3) Other_____

To vaccination service

Is there any health facility which vaccination service near to you? 1) Yes 2) No

If yes to above question which health facility is near to you?

health center B) hospital C) health post D) private clinic

How does it take you to reach there in minutes?

Less than 15 minutes B) 15-30 minutes C) 30-1hour minute D)> 1 hour

Questions on immunization

Did you hear about vaccination and vaccine preventable disease? 1) Yes2) No

If yes to above question, from where do you heard about the vaccination and vaccine preventable disease? Radio 2) Television 3) from friends 4) from school 5) Health personnel

6) Other, specify _____

Do you mention the objective of vaccinating a child?

To prevent the disease 2) for specific disease 3) for child health 4) don't know 5) Other, specify-

From listed below which vaccine preventable diseases do you know? _____

Measles a) Tetanus b) Pertussis c) Tuberculosis d) Diphtheria e) Polio f) Hepatitis b

g) Homophiles influenza b h) all

How many vaccination sessions are needed for a child to be fully protected?

One 3= repeated 4= five 5= I don't know

Do you tell me the age at which the child begins immunization? 1) Just after birth 2) one month after a birth 3) Any time 4) After one year 5) I don' know 6) Other specify_____

At what age the child should complete immunization? _____

Do you think vaccination will make your child sick? 1) Yes 2) No 3) don't know

Do you bring a sick child for vaccination? 1) Yes 2) No

Does your child take any vaccination? 1) Yes 2) No

Do you have a card where vaccinations are written down?1) Yes 2) No

Copy the immunization data from the card.

Vaccine taken	Day	Month	Year
BCG			
OPV0			
OPV1			
OPV2			
OPV3			
Pentavalent1			
Pentavalent2			
Pentavalent3			
Measles			

Has a child any vaccinations that are not recorded on this card, including vaccinations given in a national immunization day campaign? 1) Yes 2) No

If question above question is no, did a child ever have any vaccinations to prevent him/her from getting diseases, including vaccinations received in a national immunization day campaign? 1) Yes 2) No 3) don't know

Please tell me if the child had any of the following vaccinations

BCG vaccination against tuberculosis that is an injection in the arm or shoulders that usually causes a scar? 1) Yes 2) No

Polio vaccine, that is, drops in the mouth? 1) Yes 2) No

Was the first polio vaccine given in the first two weeks after birth or later? 1) Yes 2) No

How many times was the polio vaccine given _____?

A pentavalent vaccination, that is, an injection given in the thigh or buttocks? 1) Yes 2) No

How many times Pentavalent vaccination is given? _____

A measles injection that is, a shot in the arm at the age of 9 months or older – to prevent him/her from getting measles? 1) Yes 2) No

Does the child have a BCG scare on his/her upper left arm? 1) Yes 2) No

If the child does not receive any vaccination ask the following

What are the reasons for the not receiving any vaccine?

If the child has not received any vaccine yet

Absence of health facility in the locality

Health workers did not come and give vaccine at our village

Vaccination is of no use

Vaccination hurts children

Religion and culture refute vaccination

Lack of awareness about vaccination

Fear of side effect. Others ----------

Vaccination site is far-away

Vaccination time is inconvenient

Lack of awareness on the importance of vaccination

Not knowing vaccination time and site

Not knowing whether to come back for second and third vaccination. Others -------

ANNEX IV: Oddeeffannoo Guca fi Waligaltee

Ibsaa qo'anna

Akkam jirtu? Maqaan koo _____jedham. Aanaa kana keessatti wantootni talaalli daa'imma wajjin waal qabatan maal akka ta'e addan baasuuf qo'aannaa adeemsisaa jira. Qo'annan kun maaltu akka haalaa talaalli ijoolle keessani wajjin wal qabatu qorachuu fi yoo mucaan keessan kan hin talaalchifamne ta'e/taate immo maalif akka mucaan keessan hin talalsifamin addan baasuuf.

Ani warra daataa funaan keessa tokkodha. Gaaffilee tokko tokko waa'ee keessani fi waa'ee talaalli mucaan keessan isin gaafachuufan dhufe. Hirmaachu keessanif jecha midhan isin irratti dhufu tokkolle hin jiru, deebii isin kenitaniif jecha fayyidan isin irra hir'atus hin jiru. Garuu, hirmaanan keessan rakko talaalli ijoolle fi hawwaasa keessanii foyyeessuuf waan nu gargaruuf, deebiin keessan baay'ee barbachisaadha. Deebiin isin kennitan fedhii keessanin ala eeynumattu dabarfamee hin himamu, akkasumas, maqaa keessan himuun isin hin barbachisu. Itti dabalatanis qo'nna kana irratti hirmaachuun dirqama miti, gaaffi barbaaddan debisuu dhisuu ni danda'ama. Irratti hirmachuf fedhii qabduu?

Eeyyee_____ Lakki _____

Unka walii galtee

Waa'een qo'anna kana sirritti na galeeraa, kayo isaas hubadheeraa. Kanaaf irratti hirmaadhee deebii kennu koo mallatto koo tin mirkaneessera.

Mallatoo _____ Guuyyaa _____

Gaaffi yoo qabatan teessoo kanaan wal qunnamuu dandeessu.

Katamaa Buqqurii

Mob. +251-0913159812

E-mail. Katamabuq25@gmail.com

Hub: Ragaan sassabamuu hanga Eebila 30, 2020(2012 L.E) qofa.

Annex V: Questionnaires/gaaffiilee Afan Oromo qopha`annii

Ganda _____ Guyya _____

Universitii Finffinnetti,

Kolleejjii Misooma

Departimentii Qo`annoo Uummataa

Gaaffiiwwan kun wantoota talaalli da'imanii Gandoota Aanaa Ejeree fi magalaa Ejeree keessa jiratanii, umurii isaanii ji'a 12-23 jiddu jiraan irratti dhiibbaa fidan qo'achuuf qopha'ee.

Bitootessa, 2020

Ibsaa qo'anna

Akkam jirtu? Maqaan koo _____. Aanaa kana keessatti wantootni talaalli daa'imma wajjin waal qabatan maal akka ta'e addan baasuuf qo'aannaa adeemsisaa jirra. Qo'annan kun maaltu akka haalaa talaalli ijoolle keessani wajjin wal qabatu qorachuu fi yoo mucaan keessan kan hin talaalchifamne ta'e/taate immo maalif akka mucaan keessan hin talalsifamin addan baasuuf adeemsisaa jirra.

Ani warra daataa funaan keessa tokkodha. Gaaffilee tokko tokko waa'ee keessani fi waa'ee talaalli mucaan keessan isin gaafachuufan dhufe. Hirmaachu keessanif jecha midhan isin irratti dhufu tokkolle hin jiru, deebii isin kenitaniif jecha fayyidan isin irra hir'atus hin jiru. Garuu,hirmaanan keessan rakko talaalli ijoolle fi hawwaasa keessanii fooyyeessuf waan nu gargaruuf, deebiin keessan baay'ee barbachisaadha. Deebiin isin kennitan fedhii keessanin ala eeynumattu dabarfamee hin himamu, akkasumas, maqaa keessan himuun isin hin barbachisu. Itti dabalatanis qo'nna kana irratti hirmaachuun dirqama miti, gaaffi barbaaddan debisuu dhisuu ni danda'ama. Irratti hirmachuf fedhii qabduu? Eeyyee_____ Lakki _____

Unka walii galtee

Waa'een qo'anna kana sirritti na galeeraa, kayo isaas hubadheeraa. Kanaaf irratti hirmaadhee deebii kennu koo mallatto koo tin mirkaneessera.

Mallatoo _____ Guuyyaa _____

Gaaffi yoo qabatan teessoo kanaan wal qunnamuu dandeessu.

Katamaa Buqqurii

Mob: +251-0913159812

E-mail: Katamabuq25@gmail.com

Hub: Ragaan sassabamuu hanga Eebila 30, 2020(2012 L.E) qofa.

Kutaa 1ffa: Odeefanno walii galaa

1.	Guyyaan dhaloota mucaa yoomi?	Guyya____, ji'a____ bara_____/ Umurii ji'aan_____
2.	Saalli mucaa maali?	Dhiira 2) Dhala
3.	Mucaa kana dura ijoolle meeqatu dhalate?	_____
4.	Baay'inni maatii keessani meeqa?	_____
5.	Umuriin haadhaa meeqa?	_____
6.	Halaa fudhaafi heerumaa hadhaa?	Kan hin heerumin Kan herumtee Kan wal hiikan Kan irra du'e
7.	Sadarkaan barnoota haadhaa hagami?	Hin baranne Dubbisuu fi bareessuu Kutaa 1-8 Kutaa 9-12 Koollejji/ Universitii
8.	Haati mucaa ijjoolle hangam deesse?	_____
9.	Isaan keessa hangamtu jira?	_____
10.	Hoojiin idilee haadhaa maalii?	Haadha mana Hojattu moottumma Daldala Hooji guyya Qotee bulaa Kan biroo, ibsi, _____
11.	Galii ji'an giddu gallessa(qarshiidhaan) hangami?	_____
12.	Sabumma	Oromoo Amaaraa Kan biroo, ibsi, _____
13.	Amantii	Ortodosii Proteestantii Katolikii Musliimaa Kan bira ibsi_____

14.	Bakka jireenyaa	Baadiyya Magaalaa
Kutaa 2ffa Gaaffi tajajila fayyaa ilaallatu		
15.	Ulfaa kee isa booda kana irratti tajaajila hordoffi ulfaan duraa fudhatetta?	**1)** Eeyyee 2) Lakki
16.	Gaaffi 15ffa Eeyyee yoo jette si'a meeqa debitee tajaajila fudhatte?	_____
17.	Haatii mucaa talaallii dhukuba tetaanusii fudhateetti?	Eeyyee Lakki
18.	Gaaffi 17ffa Eeyyee yoo jette, si'a meeqa fudhatte	_____
19.	Mucaa kee isa/ishee dhuma eessatti deesse?	Manatti Mana yaalaatti Kan biraa ibsi _____
20.	Dhaabbanni fayyaa tajajila talaallii kennuu naannoo keessan jira?	Eeyyee Lakki
21.	Gaaffii 20ffa Eeyyee yoo jette, isaa kamtu sitti dhi'ata	Buufata fayyaa Hospitaala Keella fayyaa Kiliinika dhunfaa Kan biraa, ibsi _____
22.	Bakka tajajila fayyaa talaalli kennani ga'uuf milaan hangam sitti fudhata?	Daqiiqaa 15 gad Daqiiqaa15-30 Daqiqaa 30-sa'aatii tokko sa'aatii 1 ol
Kutaa 3ffa Gaaffii talaallii ilaallatu		
23.	Waa'ee talaalli da'immanii dhageessee beektaa?	Eeyyee Lakkii
24.	Yoo gaaffii 23ffa Eeyyee jette, eessaa dhageesse	Raadiyoorra Televiziyoona Hiriyyoota koo irra Mana barnootaati Ogeessa fayyaa irra Kan bira, ibsi_____
25.	Fayyidaan talaallii maliidha jette yaadda?	Dhukkuba ittisuuf Daa'imaa fayyaadhaaf Hin beeku fayidaa hin qabu Kan bira, ibsi_____

26.	Dhukuba talaallin ittifaman meeqa beekta?	_____
27.	Dhukkuba talaallin ittifamu kamfaa beekta?	Gifira Tetanusii Dipteriyaa Dhukkuba somba Tiktikii Poliyoo Hepatitsii b Infulu'enzaa
28.	Da'imni tokko umurii meeqatti talaalli egaluu qaba/di?	_____
29.	Da'imni tokko gutummatti talaalfamuuf si'a meeqaa talaalsifamuu qaba/di?	_____
30.	Yeeroo umurin saa/she hangam ta'e daa'iimni tokko talaalfamee/te xumuruu qaba/qabdi?	_____
31.	Talaalfamuun mucaa kee ni dhukubsachiisaa?	Eeyyee Lakki hin beeku
32.	Mucaa dhukube talaalchisuuf fiddaa?	Eeyyee Lakki
33.	Mucaan kee kun talaalsifameeraa?	Eeyyee Lakki 39 →
34.	Yoo gaaffii 33ffa Eyye jette kaardii irratti talaallin mucaa barreefamu qabda?	Eeyyee Lakki 37 →
35.	Yoo kaardii qabaatte daataa wa'ee talaalli kardii irra galmeessi	

Talaalli fudhatame	Guyya fudhatame	Ji'a	Bara
BCG			
OPV0			
OPV1			
OPV2			
OPV3			
Pentavalent1			
Pentavalent2			
Pentavalent3			
Measles			

36.	Mucaan kun talaalli kardii kana irratti hin galmeeffamin kan bira fudhateeraa/tti?	Eeyyee Lakki
37.	Yoo gaaffii 34ffa Lakki jette mucaan kun talaalli dhukuba irraa isa/ishee ittisu fudhatee beekaa/ti, duulaa talaalli biyyoleessa dabalatee?	Eeyyee Lakki Hin beekuu
38.	Yoo kaardii talaalli hin qaban ta'e, Talaalli mucaan fudhate/tte halaa armaan gadiitin gaafadhu.	
	BCG talaalli dhukuba sombaa irra ittisuu, kan irre irra gar oli waraannamu, yeroo bay'ee godannisa ijjoollee irratti basuu fudhateeraa/tetti?	Eeyyee Lakki
	Talaallin BCG hangamittii kennameef	_____
	Talaalli poliyoo, isa afaanitti cobsamu?	Eeyyee Lakki
	Talaallin poliyoo dhalatee/tte torban lam kessatti moo isa booda kennameefi?	_____
	Talaallin poliyoo si'a meeqa kennameefi?	_____
	Talaalli "pentavaleentii" kan tafa gubba waraannamu fudhateera/tti?	Eeyyee Lakki
	Talaalli "pentavaleentii" si'a meeqa fudhate/tte?	_____
	Talaalli dhukuba Gifiraa, kan ji'a salgaffa fi isaa olitti kennamu, kan irre gubaa waraannamu?	Eeyyee Lakki
	Godaannisa BCG mucaa irra ilaali	Jira Hin jiru
Yoo mucaan talaalfamuu baate/tte ykn addaan kute/tte gaaffi armaan gadii gaafaadhu		

39.	Mucaan maliif osoo hin talaasfamiin hafe?	Tajaajjilli fayya taalaalii kennu hin jiru Hojjatotni fayyaa dhufaanii talaalli hin kennine Daa'iima talaalchisuun hin barbachisuu Talaallin ijoolle irratti midhaa waan fiduuf Amantii fi adaan keenya talaalli ni dhorka Wa'ee talaalli hin dhageenye/hin beekuu. Talaallin midhaa waan fiduf kan biraa ibsa_____
40.	Mucaan maaliif talaalli addan kute	bakki talaallin itti kennamu fagoodha yeroon talaallin kennamu mijataa miti warrii talaalli kennan hin jirani babachsumma talaalli hin beekuu bakka fi yeroo talaallin itti kennamu hin beeku akkan debi'ee dhufuu qabu hin beekne Kan biraa, ibsaa_____