



QUALITY OF EXPANDED PROGRAM OF IMMUNIZATION AND
ASSOCIATED FACTORS WITH CLIENT SATISFACTION IN
SHASHEMENE WOREDA, REGION, SOUTH ETHIOPIA

BY: DESSALEGNE DAMETIE (BSc)

EFETP RESIDENT

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Quality of expanded program of immunization and associated factors with client satisfaction in Shashemene woreda, Oromia region, South Ethiopia:

By: Dessalegne Dametie (BSc)

EFETP Resident

Email: dessudametie@gmail.com

Advisors:

1. Mr. Lamessa Dube (MPHE, Associated professor)
2. Mr. Muktar Beshir (MPHE)

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Jimma, Ethiopia

Abstract

Background: Immunization is the most cost-effective and lifesaving public health interventions that can be used to protect children from vaccine-preventable diseases. Quality of health care determines the successful implementation of health programs including immunization given a priority to improve health care services. Therefore; it is relevant to conduct quality related studies on immunization service delivery in the study area.

Objective: To Assess Quality of Expanded Program of Immunization service and factors associated with client satisfaction among Public Health Centers in Shashemene Woreda, Oromia region, South Ethiopia, 2017.

Methods: Facility based cross-sectional study was employed from March, 01-30/ 2017. A total of 398 mothers/caretakers who came to public health centers with child less than 1year of age were randomly selected and included in this study. The sample size was calculated using single population proportion formula. Data were collected using structured questionnaire, entered in to Epi data and analyzed by SPSS. Predictor variables with P-value less than 0.05 with their corresponding 95% confidence interval and adjusted odds ratios were considered significant for maternal satisfaction.

Result: Structural assessment of the immunization room and waiting area were found less than 20m² in all health centers. Regarding process dimension vaccine wastage rate was monitored only in one health center. Health providers explained about the importance of immunization for 42 (60%) and gave advice about side effects for 45 (64%). The overall satisfaction of clients toward immunization service was 63.5% in the woreda.

Conclusion: Immunization waiting area in all health centers and vaccination room of most health centers was below the minimum standard. Vaccine wastage rate monitoring was weak in health facilities. Information given to the mother/care taker on importance of vaccine and its side effect were inadequate.

Recommendation: The woreda health office and health facilities should improve the vaccination rooms and waiting areas. Health providers working in EPI unit should transmit messages to all mothers/care takers those attending the service and routinely monitor the vaccine wastage rate to improve quality of immunization services in the woreda.

Keywords: *Quality, Immunization, Shashemene.*

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Acronyms and Abbreviations

AD: Auto Disabled

AEFI: Adverse Event Following Immunization

AFRO: African Regional Office

AIDS: Acquired Immune Deficiency Syndrome

CC: Community Conversation

CDC: Centre for Disease Control and Prevention

CMYP: Comprehensive Multi Year Plan

EPI: Expanded Program on Immunization

EDHS: Ethiopian Demographic and Health Survey

FMHACA: Food Medicine Health Administration Control Authority

FMOH: Federal Ministry of Health

GAVI: Global Alliance for Vaccines and Immunization

HCWM: Health Care Waste Management

HCWs: Health Care Wastes

HEWs: Health Extension Workers

Heb: Hepatitis type b vaccine

HFs: Health Facilities

Hib: Haemophilus influenza type b

HMIS: Health Management Information System

HPV: Human Papilloma Virus Vaccine

IEC: Information Education Communication

IMNCI: Integrated Management of Neonatal and Childhood illness

IPC: Interpersonal Communication

IPV: Inactivated Polio Virus

KABP: Knowledge, Attitude, Behavior and Practice

MenA: Meningococcal Meningitis sero type A vaccine

MDVP: Multi-Dose Vial Policy

FMOH: Federal Ministry of Health

NGO: Non- Governmental Organization

OPV: Oral Polio Vaccine

ORHB: Oromia Regional Health Bureau

PCV: Pneumococcal Conjugate Vaccine

RED: Reach Every Woreda

RIIP: Routine immunization improvement plan

SNNPR: Southern Nation, Nationalities, & People Region

SRC: Stock Record Card

TT: Tetanus Toxoid

UNICEF: United Nations Children Funds

VPDs: Vaccine Preventable Diseases

VVM: Vaccine Vial Monitor

WHO: World Health Organization

1. Introduction

1.1. Background

Expanded program on immunization (EPI) was launched by World Health Organization (WHO) in 1974 during which fewer than 5% of the world's children had been vaccinated against the six target diseases: diphtheria, Pertussis (whooping cough), tetanus, measles, polio and tuberculosis (1). Recently additional four vaccination program for pneumonia, Rota virus, Hepatitis B, H. influenza type b (Hib) are launched. Childhood immunization is considered to be among the most effective preventive services that a mother can make use of it when satisfied with the service and help her children protected from common childhood illness (2). Vaccines stimulate the body's own immune system to protect the person against subsequent infection or disease (3).

In Ethiopia, routine immunization was launched in 1980 with the six traditional antigens provided for children below two years of age. The schedule was revised in 1986 to include only infants (under one year) in line with the global target. The program at its inception aimed to increase the third dose of Diphtheria, Pertussis & Tetanus vaccine (DPT-3) coverage by 10% every year achieving 100% by the year 1990. However between 2003 and 2010, DPT-3 coverage increased from 52% to 80 % .Limited access and poor quality vaccination service were also identified as the main factors that limit vaccination coverage nationally (4,5).

Quality can refer to the technical quality of care to the non-technical aspect of service delivery such as clients' waiting time and staff attitudes, and to programmatic elements such as policies, infrastructures, access, and management. Quality of health care is defined as having at least three dimensions. Which include structure, process and outcome (6). Assessment of quality depends on a conceptual and operationalized definition of what is intended to imply in that particular study. The presence of many possible dimensions and criteria for evaluation of quality will have a profound influence on the methods and approaches one employs for assessment of medical care (7, 8). But the structure-process-outcome approach is used extensively in health services researches in evaluating quality (9). The quality of health care has been defined (WHO 1988) as "Proper performance (according to standards) of interventions that we know to be safe, that are affordable to the society and that have the ability to produce an impact on the mortality,

morbidity, disability and malnutrition in humans”(2).

Adequacy of human resource although higher technology or a more pleasant environment may be conducive to better-quality care, the evidence indicates only a weak link between such structural elements and better health outcomes (10). Many evaluations have revealed shortages in medical staff, medications and other important supplies, and facilities, but material measures of structure, perhaps surprisingly, are not causally related to better health outcomes (11).

Increasing the quality of immunization services is one of the strategies to reach at objective of EPI in Ethiopia. According to national guide line on EPI ,improving the availability of quality services with regard to provision of adequate and safe vaccines; provision and maintenance of adequate cold chain, injection equipment and ensure reliable vaccine stock control; Introducing and using quality assurance methods to improve the efficiency and quality of immunization activities at each health service level and collaboration of the National Regulatory Authority with EPI to ensure the quality of vaccines (7). In this study, attempt was made to measure the dimensions of quality of service outcome; input and the process (12).

1.2. Statement of the problem

WHO estimates 29% of deaths among children 1–59 months of age are vaccine-preventable (10). According to 2013 WHO and UNICEF estimates, 22 % (4.3million) unvaccinated children globally are located in four countries of the African region (Nigeria, Ethiopia, Democratic Republic of Congo and South Africa) (7). Children in Ethiopia suffer from poor health. Of every 100 children in Ethiopia, 6 will not live to celebrate their fifth birthday. Of those, about 4 will not see their first birthday and two will not live beyond their first month of life (9). This gap is due largely to systems weaknesses (quality related factors) in immunization programs that can be improved (10).

The quality of immunization data in many African countries is questionable. Various external evaluations have identified many inconsistencies in reported data suggesting that immunization data monitoring remains weak in most African countries (11–13). There exist wide inter- and intra-country differences, with large numbers of African children remaining unreached, unvaccinated, under-vaccinated, and still dying from VPDs (14). Poor quality of health care is considered as key

obstacle to the successful implementation of health programs. The ability of health system to deliver service such as immunization is often constrained by lack of financial and political commitment, severe shortage of human resource, inadequate physical infrastructure and equipment, weak monitoring and information system, lack of management skill, weak social mobilization, and previous experience of unmet demand(1). Another barrier to complete immunization service provision is difficulty in delivering vaccines through an infrastructure that is over loaded, fragile or non- existence health service, difficult geographical terrain, logistical support and lack of understanding of importance of vaccines among the poorest population (3). The recently conducted national immunization survey indicated that, out of the non-functioning refrigerators and freezers, 60.1% were due to poor maintenance (15).

For immunization to be effective in the long run as a major global disease control intervention it is important to provide good quality vaccination services. Studies carried out in three countries in Asia (Bangladesh, India, and the Philippines) and two countries in Africa (Ethiopia and Malawi), and reported on in this article, document the fact that parents are willing to invest considerable effort in having their children vaccinated; however, there are a number of serious shortcomings in the quality of the routine vaccination services and strains are apparent at the interface between the vaccination providers and the users. These shortcomings are detracting from the sustainability of routine vaccination programmes and are promoting the growth of pools of non immunized and partially immunized children. To safeguard the continued operation and to enhance the coverage of routine vaccination programmes it is crucial that these difficulties be addressed (15, 16).

Even if the national immunization actual coverage for 2014 was 87% but still deaths from VPDs are high and leading causes of morbidity in under five age children in Ethiopia as well as in Oromia (6). Hence the quality of the service needs to be assessed as there is paucity of research evidences on the quality of EPI in Shashemene Woreda.

1.3. Significance of the study

The study provides important information for managers and EPI providers for improvement of quality immunization services. The study may give information on factors associated with client's satisfaction. Apart from, these increase the concern of policy makers, health planners,

managers and health professionals about the importance of quality immunization services which comprises vaccine cold chain quality, stock management, satisfaction of clients, and immunization safety practices for the delivery of good quality EPI service. Overall it may be used for EPI program improvement by identifying and reporting the area of weakness and service quality gaps.

2. Literature Review

2.1. Over view of EPI and quality

Quality of health care includes at least three dimensions of structure, process and outcome (4). In recent years developing countries, influenced heavily by findings in developed countries, have become increasingly interested in assessing the quality of their health care. Outcomes have received special emphasis as a measure of quality. Assessing outcomes has merit both as an indicator of the effectiveness of different interventions and as part of a monitoring system directed to improving quality of care as well as detecting its deterioration (1, 2).

Immunization service is the most powerful of all preventive health measures for children and it is central to human rights and poverty alleviation (16). The ultimate goal of immunization programs is to reduce the incidence of vaccine preventable diseases (VPD) among children through attaining high levels of coverage with potent vaccines administered at the appropriate ages in the right intervals between doses for multiple dose vaccines. Due to EPI, lives of millions of children have been saved; millions have got the chance of a longer healthier life. Every immunization program should strive to provide quality services that are accessible, convenient, reliable, friendly, affordable and acceptable (17).

2.2. Structural Quality related factors

Structural quality is the attribute of setting where care is delivered including facility, equipment, supply and training (6). To improve immunization service, essential sets of program input like trained staffs, equipments, supplies, and vaccines are required to enable the health team to reliably deliver good quality of immunization service (24). And vaccine supply chain including the cold chain is a key component of health infra-structure (25).

A review of the epidemiology of unimmunized child in developing countries by 'IMMUNIZATION basics project' which is found in United States of America (USA), showed that among the key factors associated with non-immunization of children in developing countries are lack of supply, equipment's, uncomfortable waiting area and untidy vaccination areas (26).

A study done in Indonesia showed that there is excellent infrastructure and well maintained room, however there was stock out of different vaccines at the worda level in some areas, method to

calculate wastage rate and vaccines consumption was not always well understood at field level. Thirty two percent of fridges were not in use, 24% of provinces don't have both cold chain and vaccines which were the problems of dropout and missed opportunities (27).

Most of the health center and health posts had a defaulter tracing mechanism which is available primarily through register review. Almost all health centers and one-third of health posts had at least one refrigerator for EPI activities. However, in 32% of health centers and 71% of health posts, their refrigerators were not functional at the time of the survey mainly due to either unavailability of energy/fuel 20% or that the refrigerator was not installed 19%. Of facilities which had functional refrigerators, the temperature reading was out of the recommended range of 2-8°C in 46% of health posts and 23% of health centers (4). Another study conducted in Jijiga zone showed that sufficient amount of AD syringe was available in all facility but were not recapped it and all vaccine types /antigens were available; however, BCG was commonly the missing vaccine in health facilities. Eleven point one percent of health facilities were found to store vaccine in wrong position. In 22.2% of health facilities BCG and measles, diluted before six hour were found (24).

2.3. Service process related factors

It is one of the dimensions of quality of care including the service offered and its technical quality, counseling, interpersonal relation, supervision, access, safety and performance assessment (6). Immunization safety which includes vaccines' injection safety and waste disposal are also a critical component of the trust placed by clients in immunization services process. Vaccine quality must be maintained at every stage of continuum between manufacturer & administration (28, 29). A study in African region of five countries including Ethiopia, to evaluate their Reaching Every Woreda (RED) approach to strengthen routine immunization also showed that vaccine wastage rate were not routinely calculated (30). Another cross-sectional survey study done in Mali showed that one of the reasons for high dropout is due to lack of information in 63.3% of respondents (31). Study conducted in different zones of Ethiopia shows high dropout rate ranging from 3% in Yem to 43% in Zone 3 of Afar region. Likewise, the overall dropout rate for Penta1 to measles was 9%, ranging from 0.6% in North Western Tigery to 23% in Zone 3 of Afar region.

Supervision and follow up of the program in regular manner, availability of health workers supported by training is essential to strengthen the quality of the service. A multiple case study design in three regions of Ethiopia by ARISE showed that study facilities were supervised regularly at least once in a quarter in all the three regions but, no training was given for health workers in only Oromia region (25). Another study conducted in different zones of Ethiopia in 2012 indicated that about 70% of health facilities received integrated or specific EPI supervision visits. Moreover, slightly more than 50% of facilities received written feedback that mentioned EPI within the last three months. However, about 18% and 31% of facilities had never received any supervisory visit related to EPI or written feedback that mentioned EPI, respectively (4).

A study done in 2015 on Quality of Expanded Program of Immunization Service Delivery in Primary Health Care Institutions of Jijiga Zone of Ethio-Somalia Region showed that 50% of the health facilities had vaccination monitoring chart and were filled correctly, 33.3% of the health facility monitored the dropout rate monthly, and had vaccine wastage monitoring. Around 89% of the service providers check the immunization status of the children daily. Seventy seven point eight percent of the health institutions had been supervised in the last quarter; out of them, 64.3% got feedback. 83.3% EPI service providers were recorded the refrigerators' temperature twice a day including weekends; out of recorded 94.4% were between +2⁰C to +8⁰C (24).

A study done on assessment of child immunization coverage and its determinants in Sinana Woreda, Oromia Region showed that 20.7% of mothers were turned back to home without getting their children vaccinated. From this, 58% were due to the unavailability of the service providers, and 52.1% were due to lack of vaccine (32). There is also another community based cross-sectional study conducted in Ambo Woreda of Oromia region on knowledge of mothers about vaccination and vaccine preventable diseases show that 61.3% heard about immunization from Health workers, and reason for not completing immunization is inconveniency of the time for 25.2%, and 17.9% were not aware of the need to return (33). But on another study done in Ethio-Somali region 91.7% of mothers reported that the service was convenient for them; the reasons were 62.9% due to opening hours, and 27.8% due to distance travelled (24).

2.4. Service outcome related factors

Outcomes are the most important indicators of quality because improving patient health status is

the primary goal of health care. It indicates the impact of care on health status in combination with the effect of input and process including client satisfaction and their perception towards the quality of the service. Effective health care is determined by consumers' satisfaction from the service they get. It is one of the desired outcomes of care expressed by the judgment of clients on the quality of care. A satisfied client is more likely to comply with medical treatment or the service they are provided (16). It is an integral component of health service and one of the quality indicators of health care (34).

Client satisfaction with pediatric care is an indicator of provider quality that has been relatively unexplored in relation to childhood immunization (35). Some studies found that consumers' satisfaction with health care services in Africa is one of the most important factors determining the utilization of services (36, 37, 38, and 39). Study conducted in Tanzania showed that determinants of perceptions of quality of services include; perceived time spent at the facility, availability of immunizations, availability of child health services and the staff strength of the health facilities (40). The inconvenience of clinic hours dates of immunization clinics and locations of clinics were reported by 75% of the parents (41).

According to the study done in Egypt, 57.3% of mothers evaluated childhood immunization services as good while 2.1% evaluated it as inappropriate. Maternal satisfaction about staff attitude was 66.7%, satisfaction about waiting place was 62.9%, satisfaction about information giving was 61% (2). A cross-sectional study in Mali showed one of the reasons for low satisfaction of care takers toward immunization service is unwelcoming reception and overly long waiting time of the service (31). A cross sectional study in rural Pakistan showed that the reason for high level of satisfaction was availability of facilities for immunization of their children (42). The study conducted in rural Bangladesh showed that the most powerful predictor for client satisfaction was provider behaviour, especially respect, politeness and reduction in waiting time (43). The study in Egypt show that there was no statistically significant relation between maternal satisfaction with childhood immunization services and knowledge score (2).

A study done in Jijiga Zone of Ethio-Somali Region showed that almost the service were accessible to the care takers, most of the institutions visited have adequate logistics and supplies. The overall satisfaction in this study was 53.3%. Ninety six percent of the mothers/care takers

were satisfied with the reception of the health workers (24).

As a summary, literatures assessed indicate that quality of health care is a global issue especially in resource limited countries. Studying the quality of health service delivery systems at all level can be taken as one of the strategy to know what types of inputs are available and lacking for service delivery process which determine whether the services are in acceptable bound or not.

Conceptual framework

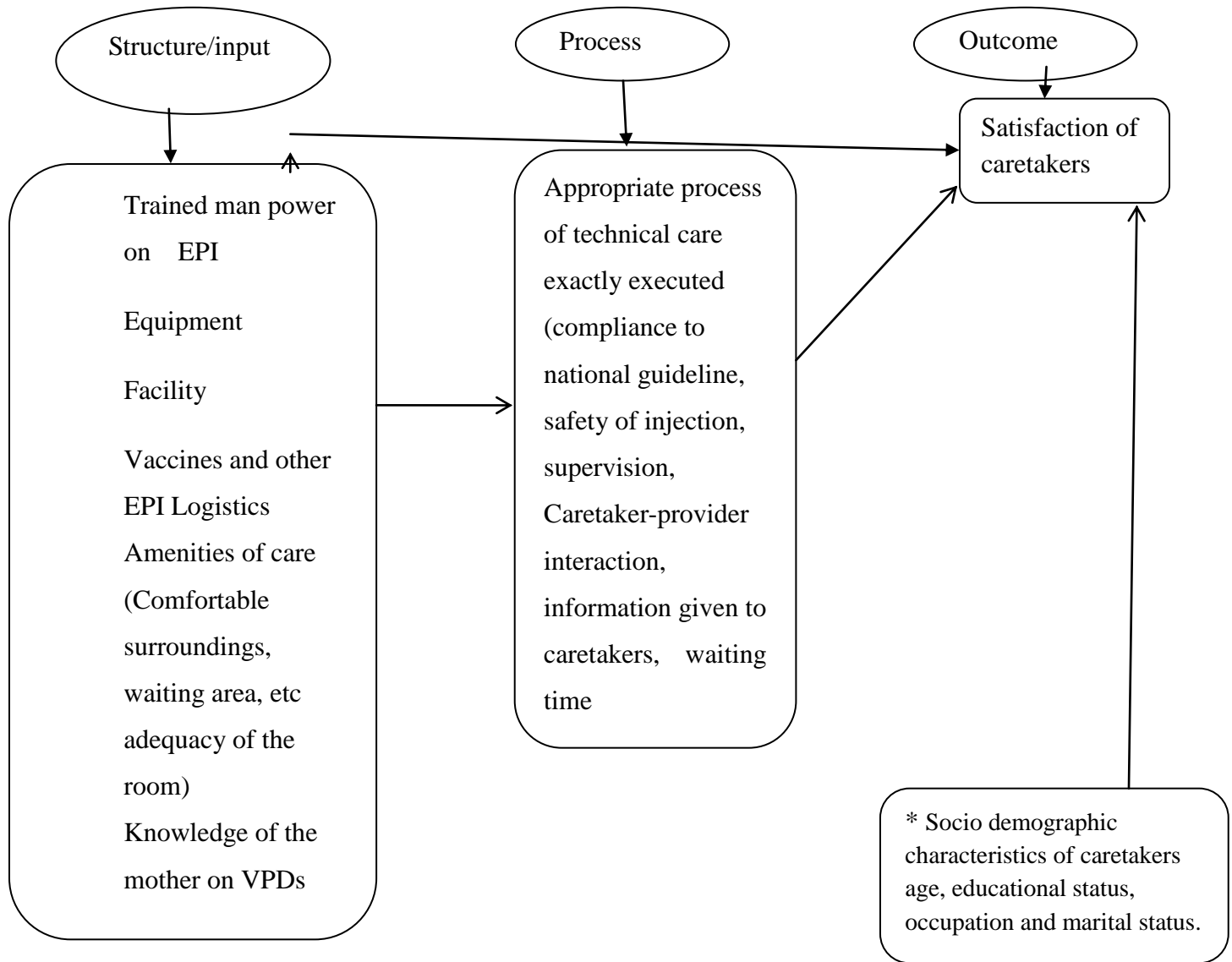


Figure 1: Conceptual framework for assessment of Quality and associated factor of EPI services in Shashemene woreda, Oromia region, South Ethiopia, 2017.

(Adapted from A. Donabedian, an Introduction to Quality Assurance in Health Care, 2003)

3. Objectives

3.1. General objective

- To Assess Quality of Expanded Program on Immunization service and factors associated with mothers/caretaker's satisfaction among Public Health Centers in Shashemene Woreda, West Arsi Zone, Oromia region, Ethiopia 2017.

3.2. Specific objectives

- To determine availability of inputs (structure) in EPI service in Shashemene Woreda, 2017.
- To assess the process (health worker practice) of EPI service delivery in Shashemene Woreda, 2017.
- To examine satisfaction level of mothers/caretakers in EPI service provision in Shashemene Woreda, 2017.
- To identify factors associated with caretaker's satisfaction in EPI service Provision in Shashemene Woreda, 2017.

4. Method and Materials

4.1. Study area and period

The study was conducted in Shashemene woreda, west Arsi zone of Oromia Region, From March 01-30/2017. Shashemene woreda is one of 15 woredas of West Arsi zone, which is found at Southern part of the region. Shashemene is a capital city and a separate woreda in West Arsi Zone, Oromia Region, Ethiopia. The town lies on the Trans-African Highway 4 Cairo-Cape Town, about 150 miles (240 km) from the capital of Addis Ababa. It has latitude of 7° 12' north and a longitude of 38° 36' east. Shashemene woreda is bordered on the south by Wondo woreda and the SNNP region, on the north by Arsi Negelle woreda, on the East by Cofele woreda, and on the west by Shalla woreda. Based on the 2007 census projection, this woreda has a total population of 251425 in 2016, of whom 125587 (49.95%) are men and 125838(50.05%) are female. The number of <1 year, <5 year, child bearing age population and estimated pregnancies/births were 8724(3.47%), 41309 (16.4%), 55596 (22.1%) and 8724 (3.47%) respectively. The woreda has 37 kebeles and seven public health centers.

4.2. Study design

Facility based cross-sectional study was conducted.

4.3. Population

4.3.1. Source population

For quantitative study

- Clients coming to the public health centers EPI unit in Shashemene Woreda with child less than 1 year of age.

For Qualitative study

- Health professionals working in the EPI unit of health centers of Shashemene woreda.

4.3.2. Study population

For quantitative study

- Selected clients who came to public health centers with child less than 1 year age at EPI unit during data collection period.

For Qualitative study

- Selected Health Professionals involved in vaccination and cold chain management during data collection period.

4.3.3. Inclusion and Exclusion criteria

Inclusion criteria for quantitative

- ✓ All caretakers age greater than or equal to 18 and came for EPI with child less than 1 year of age.

Inclusion criteria for qualitative

- ✓ Health care workers working in EPI unit and cold chain management for greater than or equal to 6 month.

4.4. Sample size and sampling technique

4.4.1. Sample size determination

The sample size was calculated using single population proportion formula to estimate number of EPI caretakers who have under one year children to be interviewed. Number of caretakers who visited the study health facilities was estimated by taking previous year immunization report (July, 2015 to July, 2016) which was 7153, and since it is below ten thousand finite population correction formula was used to calculate the sample size for client exit interview.

In computing the sample size to achieve adequate precision, the sampling error/precision of the study was taken as 5% and 95% confidence level. The proportion of variable under study (client satisfaction level) (P) taken as 53.3% from similar study done in Jijiga Zone of Ethio-Somali Region (24). $p=53.3\% = 0.53$ $p+q = 100\%$ $q=47\%$ $q=0.47$.

CI=95%, $d=5\%$, $Z_{\alpha/2} = 1.96$

$$n = Z_{(\alpha/2)}^2 * p(1-p) / d^2 = (1.96)^2 * 0.53 * 0.47 / (0.05)^2 = 382$$

To know sample size, first the average numbers of under one year children who had visit at EPI clinic daily was estimated by referring registration book/yearly report of immunization.

$$n_f = n_i / (1 + (n_i / N))$$

Where: n_f =final sample size, n_i =initial sample size and N =population size

$$n_f = 382 / (1 + 382 / 7153) , n = 362$$

By adding 10% possible non- response rate (i.e. 36), the final sample size obtained was 398 study participants.

4.4.2 Sampling technique

All mothers/caretakers coming to the public health centers with under one year child were included in the study. Selected mothers/caretakers who came to public health centers with child less than 1 year age at EPI unit during data collection period were the study unit. Then the calculated sample size was distributed to the health centers using proportional to size based on the number of children received vaccination services/penta-3 a year before data collection.

All caretakers who fulfill the inclusion criteria was selected systematically using systematic random sampling technique taking number of children immunized monthly and divided for 20 working days to find daily flow of clients for each health center. And to find K sample size were divided for the daily number of client flow for each health centers. K^{th} interval (2) was used to interview caretakers until the required sample size was reached. By taking their yearly report from Shashemene woreda health centers the number of caretakers for each health center was determined. Proportional allocation was done by (total previous year report of health center *calculated sample size)/total number of children immunized in the previous year in the woreda.

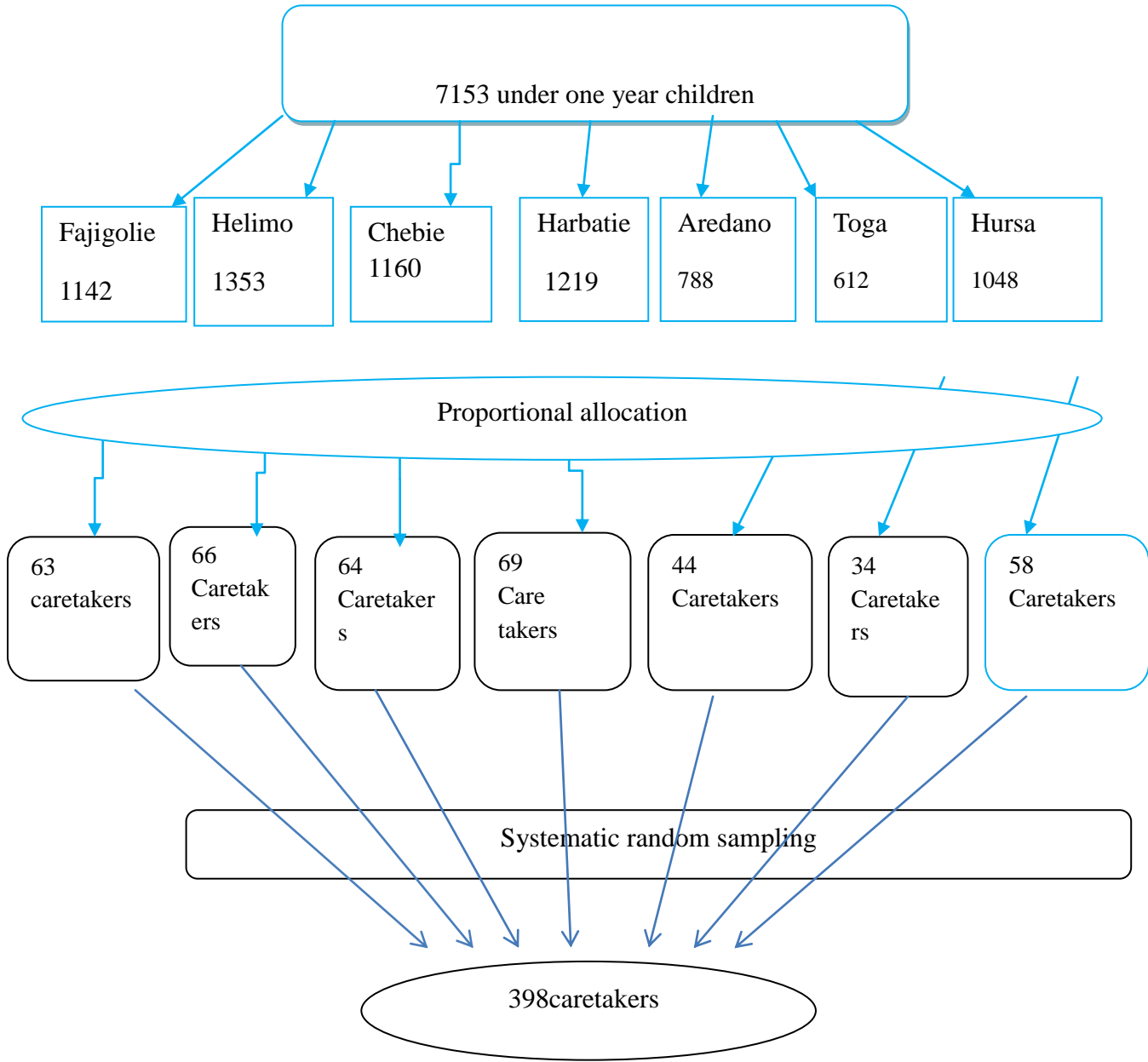


Figure 2 Schematic presentation of the sampling procedure for client exit interview in Shashemene woreda, Oromia region, South Ethiopia, 2017.

Sampling technique for in-depth interview of health professionals and observations:

Seven health professionals working in EPI and cold chain from seven HC were selected purposively for the reason that they give adequate and relevant information for in-depth interview.

4.5. Study variable

4.5.1. Dependent variable: Satisfaction of care takers.

4.5.2. Independent variables

- Structural (input) related: Trained manpower on EPI, Knowledge of the mother/care taker on VPDs, Availability of supplies and equipment's (cold chain), waiting area, Facility (room, electric supply/kerosene, and incinerator).
- Process related: Supervision, Cold chain management system, Safe injection practices of health professionals, Dropout rate and wastage rate calculation system, Health worker compliance to national guideline and Provider - Clients' interaction.
- Outcome related: Information from provider, Courtesy of health professional and Waiting time.

4.6. Data collection procedure

4.6.1. Data collection tools

Structured questionnaire

The questionnaire was adapted from Federal Ministry of Health (FMOH) EPI manual for measurement of quality of service (44). The contents of the questionnaire include Socio-demographic data about the mother/caretaker, caretaker satisfaction about EPI service, recommended immunization schedule, knowledge of the mother/caretaker on VPDs, and information given for care takers.

Observation checklist: The instrument was adopted from WHO/AFRO (2015) prepared for the EPI managers for supportive supervision of health facilities (45).

The contents of observation checklist includes health centers observation for (cold chain management, inventory of supplies and equipment, facility disposal system of injection materials) and health providers observation for health worker practice (client-provider interaction and injection safety practice) and compliance to the immunization guide line and Supervision documents. Findings of health facility were measured against National Standard guideline.

Data collection tool for in-depth interview:

Expert interview guide: The contents of the interview guide includes information about trained staff on EPI who are currently working on EPI, the availability of vaccines and injection materials if in case there is no health centers record that show vaccines and injection materials stock out in the last six months. It is important to triangulate quantitative study.

4.6.2. Data quality control

To check consistency of data the questioner was translated to Afan Oromo and back to English before data collection. Training for data collectors and supervisor was given. Pre-test was conducted at similar health facility from Shalla Woreda, Aje health center. It is to test reactions of the respondents to assessment procedures so that it determines the acceptability of methods used, question, and willingness of respondents. All data collection tools was pre-tested to take care of whether it can collect the required information, logical sequencing of questions and unambiguity of wording of questions. Data collection tools were modified according to the pretest findings. Daily supervision and checking the completeness of the questionnaires after each interview was done on daily basis by supervisor and data collectors. After data collection, each questionnaire was checked for completeness and cleanliness during data entry by principal investigator.

4.6.3. Personnel

Six diploma nurses having experience about EPI for data collection of client exit interview from clients, document review and inventory of health facility. And three BSc nurses for supervisor were recruited from other woreda and two days training was given on topics.

4.7. Data management and analysis

Quantitative data was coded and entered in to Epi data version 3.1. then exported to SPSS version 20 for analysis. Association was computed by using bivariate and multivariate logistic analysis techniques. Significance of the associations was presented by p-values and with the 95% confidence interval of the adjusted odds ratios (AOR). Qualitative data was transcribed, translated to English then summarized and analyzed through thematic areas. And findings of all

result were presented by frequency tables, pie charts, and text narrations. The goodness of model fitness was checked using Hosmer and Lemeshow tests.

4.8. Ethical consideration

Before field work ethical clearance for this study was obtained first from the Institutional Review Board of Jimma University institute of Health. Then official letter that obtained from Institutional Review Board and Department of Epidemiology was given to West Arsi Zonal Health Department of Oromia region and Shashemene Woreda Health Office. Then the letter of permission was obtained from Oromia region, Zonal Health Department, Woreda health office and all health centers. Informed verbal consent was also obtained from each participant before the start of data collection.

4.9. Operational definition

Quality of immunization- was measured by the three dimensions of quality in terms of input, process, and outcome. Quality of the service was measured separately for structural quality, process (health professionals practice) and the outcome or satisfaction of clients.

- Structure/Input- structural aspect of the service quality includes facility which had vaccination room, regular electric supply(kerosene) and incinerator, health workers with training, required supplies and equipment's in the cold chain system and related materials in cold chain management. Input was measured by using 27 items of inventory check list that each important for quality measurement.
- Process –process quality dimension of the immunization service were series of activities in the vaccination service provision including access (waiting time, service hour, waiting area comfortability and cleanliness), perceived technical skill, interpersonal relation/reception, information exchange/communication between mothers/caretakers and provider, provider compliance to the national guideline, safety injection /injection precaution was measured by observation checklist and document review with 1 yes and 2 no. Process was measured using 23 items of observations checklist. Practice were considered satisfactory the score value 60% or more and unsatisfactory if less than 60 % (46).

Courtesy of health provider – is the respect and politeness of health providers while giving appropriate service explained by perception of mothers/care takers.

Update immunization monitoring chart - is to mean displayed monitoring chart on the wall which filled regularly and correctly to shows 2016/2017 performance of EPI and good if at least filled up to 1 month prior to data collection period.

Acceptable range of vaccine wastage rate - refers to vaccine wastage rate not exceeding 30% for BCG, 25% for measles, 10% for PCV, OPV, TT and 5% for Pentavalent (DPT-HepB-Hib) vaccines and Rota vaccine (47).

It was calculated by subtracting 100% minus vaccine usage rate which was obtained by dividing dose given to dose opened (7).

Dropout rate -the number of children immunized for Penta1 but not immunized for Penta3 and measles. Acceptable if less than 10%, low if 10 to 15%, medium if 15 to20% and high if greater than20% measured by document review based on National Immunization Guideline (7).

Knowledge of the caretaker on VPD - Mother/caretakers mention greater than or equal to five from 10 diseases (Pneumonia Measles. Diarrhea, Hepatitis, Polio, Influenza, Tetanus, Diphtheria, Pertussis, Tuberculosis) prevented by vaccination correctly (33).

Recommended minimum interval - for vaccines given more than one time; Pentavalent, OPV, PCV and Rota vaccination is four weeks apart for consecutive doses (7).

Outcome –were measured by satisfaction of clients which was taken as an indicator of quality of immunization service, patients' value judgments and reaction to the stimuli they perceive in the health care environment. It was measured by 11 items having five point Likert scales. Finally the level of overall satisfaction was measured by taking the mean score as cut of point. The overall satisfaction of mothers/caretakers was computed by adding response of each satisfaction items. Then total mean score of the two categories of each item was calculated and then categorized into satisfy and not satisfied. Satisfactory if score greater than the mean 69% (46).

Satisfied mothers: That respondent who answers above the mean score to specific satisfaction question about the service provided.

4.10. Dissemination plan

The major purpose of conducting this research is for partial fulfillment of the graduation of masters. Incorporation of all relevant comments will be done after the defense. After the approval of the thesis, hard copies of study report will be submitted to Jimma University, West Arsi zone health department and Shashemene woreda health office subsequently. Attempts will be made to present it with feedback to concerned bodies in the area. The publication of the study will be considered for the sake of contributing to knowledge for academic purposes and improvement of similar quality of EPI.

5. Result

A total of 392 mothers /caretakers from seven health centers were enrolled in the interview yielding a response rate of 98.5%. Seventy observation sessions were conducted to see provider care taker interaction. Seven in-depth interviews for provider were conducted.

5.1. Socio demographic characteristics

Among the total mothers/caretakers 164(41.8%) were within the age group of 25-29 years and the median age of mothers was 25. The highest proportion of mothers/care takers 373(95.2%) were lived in rural area. Regarding the educational status of the mothers 218(55.6%) was unable to read and write (Table 1)

Table 1: Socio Demographic characteristics of mothers/caretakers at Shashemene woreda, Oromia region, South Ethiopia, March- 2017 (N=392).

Variable		Frequency	Percent
Age of respondents	18-24	154	39.3
	25-29	164	41.8
	30-34	53	13.5
	35-39	15	3.8
	>=40	6	1.5
Ethnicity	Oromo	347	88.5
	Amhara	21	5.4
	Gurage	5	1.3
	Tigre	5	1.3
	Other*	14	3.6
Religion	Orthodox	43	11.0
	Protestant	23	5.9

	Muslim.	326	83.2
Marital status	Married	369	94.1
	Never married	11	2.8
	Divorced	12	3.1
Educational status	Able to read and write	174	44.4
	not read and write	218	55.6
Place of residence	Urban	19	4.8
	Rural	373	95.2
Occupation	House wife	368	93.9
	Other*	24	6.1

Key of table

* Other ethnicity: Wolayita, Sidama.

* Other occupation: Merchant, daily laborer.

5.2. Structure(Input) dimension

Input assessment in the study revealed that six of the study facilities had isolated immunization room and it was clean. Out of six health centers which had separate room for EPI, only two of the health centers had adequate size of vaccination service room which was 20m². All waiting areas in the study facilities were below 20m². Six of health center had electric power supply. Only four of the health centers have adequate vaccines for monthly bases and all of the health centers have stock out of vaccines for at least one week in the last six months. (Table 2)

Table 2: Health facility inventory report in Shashemene woreda, Oromia region, South Ethiopia, 2017.

Question	Name of health center													
	Fajigolie		Chebie		Harbatie		Toga		Hursa		Aredano		Helimo	
	Yes	no	Yes	no	Yes	No	Yes	no	Yes	no	Yes	no	Yes	no
Has the facility isolated room for immunization service	√		√		√		√			√	√		√	
Is adequate(20m square)	√			√	√			√				√		√
Has the vaccination room waiting area?	√		√		√		√			√	√		√	
Is the room adequate?(20m square)		√		√		√		√				√		√
Is the waiting area clean/physically pleasant to see?	√		√		√		√				√		√	
Is waiting area comfortable to seat for clients?	√		√		√			√			√			√
Is the facility had electric power supply	√		√		√		√		√			√	√	
Is there adequate Logistic and supply for EPI	√		√		√		√		√		√		√	
Is there adequate vaccine carrier and ice packs	√		√		√		√		√		√		√	
Is the facility had functional refrigerator	√		√		√		√		√			√	√	
Is the facility had cold box	√		√		√		√		√		√		√	
Is there adequate vaccine for monthly consumption		√	√		√		√			√		√	√	
Is there spare parts for refrigerator (wickers, glasses)		√		√		√		√		√		√		√

All health providers working in EPI room were clinical nurses and only one health center assign two trained health providers, five health centers have one trained health provider and one health center has no trained health provider for EPI and cold chain management.

5.3. Process Quality dimension

Out of 70 observations of health worker practices in the study revealed that providers greeted the client warmly and offer a seat for 58(83%), but only 10(14%) of providers were encouraging clients to ask questions for ambiguity or unclear issues. Five of the health centers displayed vaccine monitoring chart. Only five health center monitored the dropout rate monthly and one HC were had vaccine wastage monitoring. It was BCG 16%, Measles 13%, PCV 2.5%, Polio 1.5%, and Rota 1.2%.

Regarding injection safety all the observed health providers in EPI service delivery were use one mixing syringe for one vial for diluting vaccines and one needle for one child for one dose only. All the service providers didn't reuse needle and syringe, also did not recap needles after use and dispose immediately after use on safety box.

In all health centers BCG and Measles were diluted with correct (from the same batch number and same manufacturer) diluent and single mixing syringe for one vial only. Among the seven health centers over filled (filled more than recommended i.e. 3/4) safety box was observed in one health center only. Six of health centers were written reconstitution time on reconstitutes vaccine vials. Five health centers had incinerator and all of them were properly utilized. (Table 3)

Table 3: Health provider practice on immunization service delivery among public health centers in Shashemene woreda, Oromia region, South Ethiopia, March-2017.

Questions	Observations	
	Yes (%)	No (%)
Health provider greeting the client and offer to seat	58(83%)	12(17%)
Treat client friendly with respect in socially acceptable way	58(83%)	12(17%)
Encourage client to ask question for ambiguity	10(14%)	60(86%)
Contraindications were explained and assessed	43(61%)	27(39%)
Is child immunization status assessed	70(100%)	0
Does health provider explain importance of vaccine	42(60%)	28(40%)
Does health provider transfer message about side effect and what to do	45(64%)	25(36%)
Does health provider transfer message on immunization schedule	51(73%)	19(27%)
Does health provider transfer message about next appointment day	65(93%)	5(7%)

Does health provider administer appropriate dose	70(100%)	0
Does health provider administer vaccine through appropriate route	70(100%)	0
Does safety box ready for immunization session	70(100%)	0
Does the provider dispose syringe immediately after use	70(100%)	0

Out of 392 care takers interviewed 362(91.8%) had immunization card at hand. Regarding cold chain monitoring, refrigerators' temperature was monitored and recorded properly twice daily including weekends in five of the six health centers that have electric power and the range was between +2⁰c to +8⁰c. All of health centers having functional refrigerator stored vaccines and diluent in their proper compartments. Among observed health centers three of health centers have defaulters tracing mechanism.

Dropout rate of February 2017 was found from document review Penta1 to measles was range from 9% to 21% and Penta 1 to Penta 3 ranges from 4% to 17% on health center level. Over all dropout rate of the woreda was 11% for Penta and 15% for measles. From document review vaccine wastage rate of all health center ranges from 20-35% for BCG, 18-34% for measles, 4-12% for polio, 1-2.5% for Pentavalent and 1-3.4% for PCV and rota vaccines. Regarding supervision all Health centers were supervised once in the last three months by woreda health office and one health center supervised by zonal health department and woreda health office.

Table 4: Immunizations dropout rates in Shashemene woreda, Oromia region, South Ethiopia, March-2017.

Vaccines	Health facilities						
	Fajigolie	Chebie	Harbatie	Toga	Hursa	Aredano	Helimo
Peta1 to Measles	14%	13%	21%	16%	15%	11%	9%
Peta1 to Penta3	5%	12%	15%	13%	9%	4%	17%

Among respondents interviewed 342(87.2%) of mothers said the health service was convenient for them to vaccinate their child. More than half 239 (61%) of the clients raised that they waited for less than 30minutes to get vaccination services.

5.4: Outcome dimension

The overall satisfaction level of the mother/caretakers was categorized in two (satisfied and not satisfied) by the mean score of satisfaction. From the total mothers/care takers 249(63.5%) were satisfied towards the immunization service.

Table 5: Caretaker satisfaction related with variables in EPI service from Shashemene woreda, Oromia region, South Ethiopia, March- 2017.

Variables	Level of satisfaction				
	Strongly dissatisfied N ₀ (%)	Dissatisfied N ₀ (%)	Neutral N ₀ (%)	Satisfied N ₀ (%)	Strongly satisfied N ₀ (%)
Waiting time	4 (1)	64 (16.3)	67(17.1)	228(58.2%)	29 (7.4)
Cleanness of vaccination room	4 (1)	44 (11.2)	171(43.6)	166(42.3)	10(2.6)
Comfortability of facility waiting area	1(.3%)	33(8.4)	178(45.4)	168(42.6)	12(3.1)
Vaccination room opening time	-	58(14.8)	164(41.8)	158(40.3)	12(3.1)
Availability of health provider in vaccination room during service hour	-	44(11.2)	160(40.8)	179(45.7)	9(2.3)
Reception of health providers to caretakers	1(0.3)	23(5.9)	152(38.8)	197(50.3)	19(4.8)
Advice given on side effect and what to do	54(13.8)	60 (15.5)	42(17.7)	218(55.6)	18(4.6)

courtesy of health provider	3(0.8)	14(3.6)	63(16.1)	293(74.7)	19 (4.8)
from client perspective					
Information given on service provided to the baby	58(14.8)	51(13)	37(9.4)	233(59.4)	13(3.3)
Information given to you	6(1.5)	27(6.9)	53(13.5)	260(66.3)	46(11.7)
Next appointment day					
How satisfied are you with your child previous visit	2(0.5)	62(15.8)	48(42.2)	245(62.5)	35(8.9)

Mothers/caretakers were asked about previous BCG vaccination history of their children in the past and presence of scar was confirmed by observation on the site of injection to assess scar rate of BCG. Of 392 children, 106 were new for BCG vaccination, 286 were previously vaccinated for BCG but, only 235 were developed a scar yielding BCG scar rate of 82.2%. Out of 286, whose child vaccinated previously 62(21.7%) were manifest minor side effects.

6.5. Factors associated with client satisfaction

Educational status, waiting time, knowledge of the mother on vaccine preventable disease, information given to the mother on immunization schedule by health provider, information given to the mother on importance of vaccine, side effect, appointed date by health provider were candidate variables with ($P \leq 0.25$). (Table 6)

Table 6: Bivariate analysis for independent variables in Shashemene woreda, Oromia region, South Ethiopia, March- 2017

Variables	Maternal satisfaction		P-value	Crude OR 95%CI
	Satisfied	Not satisfied		
Respondent age				
18-24	99(64.3%)	55(35.7%)	0.769	.933(.588, 1.480)
25-29	108(65.9%)	56(34.1%)	0.452	1.277 (.675,2.418)
30-34	31(58.5%)	22(41.5%)	0.404	1.575(.542, 4.576)
35-39	8(53.3%)	7(46.7%)	0.481	1.800(.351, 9.223)

≥40	3(50.0%)	3(50.0%)		1
Residence of caretaker				
Urban	13(68.4%)	6(31.6%)		1
Rural	236(63.3%)	137(36.7%)	0.650	1.258(.467, 3.385)
Educational status of care taker				
Able to read and write	120(69%)	54(31%)		1
Unable to read and write	129(59.2%)	89(40.8%)	0.046*	1.533(1.008,2.333)
Occupation of caretaker				
House wife	235(63.9%)	133 (36.1%)		1
Other	14(58.3%)	10(41.7%)	0.587	1.262(.545, 2.920)
Knowledge of the mother				
Good	158(68.7%)	72(31.3%)	0.012*	1.712(1.128,2.598)
Poor	91(56.2%)	71(43.8%)		1
Waiting time				
<30minut	164(68.6%)	75(31.4%)	0.009*	1.749(1.149,2.662)
≥30minute	85(55.6%)	68(44.4%)		1
Information about side effect				
Yes	182(66.7%)	91(33.3%)	0.051	1.552(.999, 2.413)
No	67(56.3%)	52(43.7%)		1
Information given on importance of immunization for the mother				
Yes	183(67%)	90(33%)	0.029*	1.633(1.051,2.537)
No	66(55.5%)	53(44.5%)		1
Information given to the mother on immunization schedule				
Yes	198(67.1%)	97(32.9%)	0.010*	1.841(1.154,2.936)

No	51(52.6%)	46(47.4%)		1
Information given to the mother on next date				
Yes	218(65.7%)	114(34.3%)	0.040*	1.789(1.027,3.115)
No	31(51.7%)	29(48.3%)		1
Convenience of facility				
Yes	208(65.4%)	110(34.6%)		1
Some what	31(58.5%)	22(41.5%)	0.331	1.342(.741, 2.429)
I do not have other choice	10(47.6%)	11(52.4%)	0.106*	2.080(.857, 5.050)

Key of table

1 Reference category

*Shows statistically significant association

Multiple logistic regression analysis was used to see the relationship between Mother/caretaker satisfaction with Socio-demographic characteristics of clients, waiting time to get the service, information provided by health professional, knowledge of the mother on VPDs. Educational status of the mother, waiting time, knowledge of the mother on VPDs, information given to the mother on immunization schedule, next appointed date, information given to the mother on importance of vaccine, and Convenience of facility were show significant association at p value less than 0.25 on bivariate logistic analysis.

However, multivariate analysis showed that significant associations were found between overall satisfactions of clients with knowledge of the mother about VPD, information given to the mother about immunization schedule by health providers and waiting time to get the service with (p<0.05).(table 7)

Table 7: Factors associated with maternal satisfaction in Shashemene woreda, Oromia region, South Ethiopia, 2017.

Variables	Maternal satisfaction		P-value	Adjusted OR 95%CI
	Satisfied	Not satisfied		

Waiting time				
<30minute	164(68.6%)	75(31.4%)	0.016*	1.693(1.104,2.595)
≥30minute	85(55.6%)	68(44.4%)		1
Knowledge of the mother				
Good	158(68.7%)	72(31.3%)	0.011*	1.741(1.138,2.663)
Poor	91(56.2%)	71(43.8%)		1
Information given to the mother on immunization schedule				
Yes	198(67.1%)	97(32.9%)	0.012*	1.840(1.143,2.963)
no	51(52.6%)	46(47.4%)		1

1 Reference category

*Shows statistically significant association

Model adequacy was checked by Hosmer-Lemeshow goodness of fit. Those clients who have good knowledge about vaccine preventable diseases were 1.74 times more likely satisfied when compared to clients who have poor knowledge about VPDs (AOR=1.741, 95%CI: (1.138, 2.663) .Clients who get information about immunization schedule from health providers were 1.84 times more likely satisfied when compared to clients who were not gate information on immunization schedule from health provider (AOR=1.840, 95%CI (1.143,2.963)).Clients who spend less than 30 minute waiting for vaccination service were 1.69 times more likely satisfied than clients who wait for greater than or equal to 30 minute (AOR=1.693, 95%CI (1.104, 2.595)).

In-depth interview Results

A total of seven respondent's working in the immunization department with the age ranges from 25-33 years were participated. Respondent's educational status were diploma nurses. Health provider interviewed from one health center said that *"the health center had refrigerator but due to lack of electric power supply provide EPI service by collecting vaccines from other HC by using vaccine carrier on daily bases"* 30 years old female nurse.

Regarding training one 26 years old female health providers say that *"Two health providers were trained from their health center but due to the turnover of provider's untrained health provider assigned in EPI room for both cold chain management and EPI focal"*. All health provider interviewed responds that *"the training given was not adequate to perform all EPI services"*.

Health providers interviewed from health centers which had not displayed monitoring chart two female respondents said that *"they believe that displaying monitoring chart was necessary but due to lack of motivation and work load they did not fill the monitoring chart"*. Six of the health providers responded that *"injection safety practice perceived as safe in their health center"*, but only one female respondent say that *"injection safety practice in her health center was not safe because they use open field burn to dispose safety boxes so it was difficult to say it was safe"* 28 year female nurse. Two of Health provider interviewed responds that *"supervision was conducted by woreda health office, but it was fault finding and not supportive"*. Answers replied repeatedly and it became saturated on respondents and stopped to avoid repetition of ideas.

6. Discussion

This study revealed that only two health centers had adequate vaccination service room which was 20m². Similarly, the waiting areas for EPI service were below 20m² in all visited health centers. This was almost comparable with the study finding done in developing countries by ‘immunization basics project’ found in united states of America which showed uncomfortable and overcrowded waiting areas were found to be the major factors for children to be unimmunized (26). But incomparable with a cross-sectional study conducted in Indonesia which showed that there is excellent infrastructure & well maintained and comfortable rooms which lead clients to good compliance to the immunization service (27). It was not meet the minimum requirement of FMHACA 20m² for both EPI service room and waiting area. This difference might be due to the socioeconomic difference between the countries.

Regarding availability of trained health provider six of health facilities have trained EPI service provider. The national EPI guideline recommends that one well trained and experienced health worker should be assigned to run the program at facility level (28). This was inconsistent with the finding of study done in Ethio-Somale Region Jigjiga zone in which only 72.2% of providers were trained (24).

Regarding logistic and supplies all health centers had adequate AD syringe, registration book, safety boxes but only one health center had no tally sheet, national EPI guide line, revise registration book. Only four health centers had adequate vaccine for monthly basis during data collection. This study was consistent with cross-sectional study done in Ethio-Somale region in which all health facilities had adequate EPI logistics except for vaccine antigens (24) and consistent a study finding in Indonesia which showed availability of AD syringes in all study facilities (27). But inconsistent with the guideline which recommend availability of vaccine antigens and all logistics in EPI service for monthly base (7). This may be due to shortage of supply from woreda health office and most of the health center not use stock balance log book appropriately. Immunization coverage survey conducted in different zones of Ethiopia those showed shortage of supplies including vaccines and AD syringe were found and caused to client dissatisfaction and increase defaulters respectively (4).

From the study health centers five of the health centers displayed vaccine monitoring chart on

the wall and were filled correctly including name of the health facility, target population, and the year. This was inconsistent with study done in Ethio-Somale region only 50% of the health facilities display monitoring chart and filled correctly (24). This may be due to the training was given recently in this study area. But the chart was not used properly because only one health center monitor vaccine wastage rate and only 5 monitored the dropout rate monthly. This was consistent with study done in African region of five countries including Ethiopia, to evaluate their Reaching Every Woreda (RED) approach to strengthen routine immunization which showed that vaccine wastage rate were not routinely calculated (30).

The result in the study area showed that health workers greet and offer a seat for majority (83%) of clients. This indicates there was unwelcoming reception in 25% of clients which was comparable with the findings of the study in Mali that revealed unwelcoming reception of clients during service provision lead to decreased compliance and lower satisfaction of clients toward immunization service which could cause high defaulter rate (31).

This study revealed that health providers explained about the importance of immunization and vaccine preventable disease 60%, advice about side effects occur and how to treat for 64%, about immunization schedule for vaccination 73% sessions. But this was below the expected level of immunization guideline and could cause increase defaulters due to lack of awareness of mothers and it was in agreement with the finding in many studies in developing countries like Ethiopia: Ambo, Sinana and Mali showed lack of awareness of mothers about immunization found the main cause to increase defaulters (4,31,32& 33).

In the study there were some BCG and measles vials of the reconstitution time not recorded, which is not in agreement with national EPI guideline in which for all MDV vials time of reconstitution should be written (28).

Review of documents revealed that dropout rate was found from document review pentavalent measles was range from 9% to 21% and Penta 1 to Penta 3 ranges from 4% to 17%. Over all dropout rate of the woreda was 11% for Penta and 15% for measles. This was higher than the national guideline which was acceptable only if less than 10% (7). It was not consistent with

study done by Arise in different zones of Ethiopia in which 10.4% for penta1 to penta3 and 9.3 for penta1 to measles (4).

In the study, BCG scar rate which is one of the indicators of immunization service quality was assessed by taking the history of immunization status of children in the past and observation of injection site for presence of a scar. The study revealed that out of 286 children immunized for BCG in the past, only 235 developed a scar resulted in a BCG scar rate of 82.2% which is almost comparable with study done by Arise in different zones of Ethiopia in which revealed BCG scar rate of 81% (4).

The overall satisfaction level in this study found to be 63.5% which was relatively high comparing with finding done in Ethio-Somale region of Ethiopia (53.3%) (24). This may be due to difference in availability of transport in the study area and due to difference in Socio cultural characteristics between study areas.

Multiple logistic regression analysis results showed that overall satisfaction of clients was significantly associated with waiting time, knowledge of the mother about VPD and Information given on immunization schedule for the mother. Clients waited for less than to 30 minute were 1.69 times more likely satisfied as compared to those who waited for greater than or equal to 30 minutes. This finding was comparable with the study done in Ethio-Somale region which showed clients waited greater than or equal to 30 minute were more dissatisfied than those waited for less than 30 minute (24).

Caretakers or Mothers who get information on immunization schedule from health Providers were almost two (1.84) times more likely satisfied as compared to caretakers who did not get information on immunization Schedule. This was in line with study done in Ethio-Somale region which shows that clients who discuss with the health Providers about immunization were more likely satisfied than clients who did not discuss with the health providers about immunization (24).

Clients who did know VPD were almost two (1.74) times more likely satisfied than as compared to who did not knows VPD. This was inconsistent with the study conducted in Egypt; there was no statistically significant relation between maternal satisfaction with childhood immunization

services and knowledge (2). It could be due to the fact that those mothers who know VPD were satisfied because they know that their children were protected from those diseases.

7. Limitation of the study

- Presence of data collector due to observation can influence situation to be measured called 'Hawthorne effect' due to the reason that health worker may bring a behavioral change of improved performance due to the presence of observer.
- Clients who were not satisfied in the previous sessions/contacts might not appear during the study period. This may increase the satisfaction level.
- The status of cold chain assessment was carried out only at the vaccine storage but vaccines can be exposed to either cold or heat during transportation.

8. Conclusion

The structural quality dimension of immunization service delivery was found adequate in training of health professions in most health Centers. Waiting area of all health centers and vaccination room of most health centers was inadequate and below the minimum standard.

The management of vaccine wastage rate was very weak in health facilities of the woreda and recording of vaccine opening time, information given to mothers/care takers by health workers about the service provided were inadequate. Vaccine dropout rate of the woreda was high.

Regarding Outcome quality dimension of immunization service delivery the study concludes that the client satisfaction with services has been shown to be good. The satisfaction of clients was significantly associated with short waiting time to get the service, good knowledge, and information given about the schedule of immunization, so to improve the quality of immunization program transmission of message is important.

9. Recommendation

- ❖ The woreda administrative bodies and health office, management bodies of all health centers and different NGO working in EPI should improve the vaccination rooms and waiting areas at least to fulfill the minimum requirements which are considered as a basis to health care compliance and satisfaction of clients to stay in the program.
- ❖ EPI focal person of the health centers should display EPI monitoring chart, calculate vaccine dropout rate timely and trace defaulters with HEWs, monitor wastage rates of all supplies monthly and the heads of health center should follow closely.
- ❖ All health center staffs have to strive to make waiting time for immunization service short which make caretakers more satisfied.
- ❖ All health providers working in EPI unit should transmit important messages to all mothers/caretakers, conduct community meeting on immunization at least once in a quarter.
- ❖ The time of vaccine opening for BCG and Measles vaccines should be recorded on vials

by service providers.

- ❖ Researchers should be conduct community based study to get unsatisfied mothers at community level.

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Annex 1: Exit interview questionnaire

Introduction

Good morning/afternoon. I am _____

This interview is aimed to getting pertinent information concerning EPI service delivery at public health centers in Shashemene woreda. I would like to help the improvement of quality of the services provided by this health centers. I would like to ask you some questions about EPI services and would be very grateful if you could spend some time answering these questions. I will not write down your name and everything you tell me will be kept strictly confidential and any time you can leave the interview if you want. May I proceed? Yes_____ (continue), No_____ (thanks the client and go for other client)

Name of interviewer_____ Date of interview_____ code_____

S.N	Questions	Response	Code
1	What is the age of the child that comes with you?	-----in months(m) or weeks(wk)	
2	Sex of the child		
3	Age of respondent in years	_____years	
4	Relation to the child	1 mother 2 father 5 other specify____ 3 sister 4 grandmother	
5	Place of residence	1 Urban 2 Rural	
6	Marital status of the caretaker/mother	1. Married 2. Never married 3. Divorced 4. Widowed	
7	Religion of the child mother	1. Orthodox 4. catholic 2. Protestant 5. other specify 3. Muslim.	

8	Ethnicity of the child mother	1. Oromo 2. Amhara 3. Tigrie 4. Gurage 5. other (specify)	
9	Educational status of the child mother	1. unable to read and write 2. Only read and write 3. Primary Education (1-8) 4 secondary education (9-12) 5 diploma and above	
10	Occupation of the child's mother	1. House wife 2. Government employee 3. Merchant 4.daily laborer 5. Other (specify) _____	
11	Total number of family members.	_____peoples	
12	For how many times did you bring your child to this HC for immunization	1. For the first time 2 .for second time 3. for three times or more	
13	Do you know any childhood diseases which are preventable by vaccination?	If yes mention 1. Pneumonia 2. Measles 5. Polio 3. Diarrhea 6. influenza 4. Hepatitis 7. tetanus 8. Diphtheria 9. Pertussis 10. Tuberculosis	Circle on the answer's
14	Is this health unit convenient place for you to bring your child for vaccination?	1. Yes 2. some what 3. I don't have other choice 4. No	
15	What means of transport did you use to come to this health unit today	1. On foot 2. Taxi (Bajaj) 3. Private car 4. Animal cart 5. Other, specify	
16	Who in the family make the decision to take the child for immunization?	1. Mother 2. Father 3. Both together 4. Other, specify	
17	Have you received messages about vaccines from a health	1. Yes 2. No	

	professional today?		
18	If the answer is yes, do the contents include (probing	1. Importance of the vaccines 2. Side effects 3. Immunization schedule 4. Date of next immunization 5. other (specify)_____	1. Yes 2.No 1 Yes 2.No 1 Yes 2.No 1 Yes 2 No
19	What is the average time you have stayed to get the vaccination services today?	1 less than 30 minute 2 30 minute to 1 hour 3 1 to 2 hour 4 Greater than 2 hour 5 I do not know	1 yes 2. No 1 yes 2. No 1 yes 2. No 1 yes 2. No 1 yes 2. No

Use clients rating of satisfaction (1 for very dissatisfactory, 2 for dissatisfactory 3 for neutral, 4 for satisfactory and 5 for very satisfactory to complete the table below. Tick under each level for response of the client .

		1 (very dissatisfied)	2 (dissatisfied)	3 (neutral)	4(satisfied)	5 (very satisfied)
20	How satisfied are you with waiting time to get the service?					
21	How satisfied are you with cleanness of vaccination room?					
22	How satisfied are you With the facility's waiting area is clean / pleasant to see.					
23	How satisfied are you with vaccination Service room opening time for service while you come to the institution					
24	How satisfied are you with health workers availability while you come to the facility for immunization service					
25	How satisfied are you with reception of service provider and respect given for you/greeting, kindness, politeness?					
26	How satisfied are you with Health worker advice/inform on side effect/complication and what to do?					
27	How satisfied are you with courtesy of the service provider while giving EPI service?					

28	How satisfied are you with the information given to you regarding the given services?					
29	How satisfied are you with the Information given to you when next vaccination date or the date to finish your child immunization					
30	How satisfied are you with your child previous condition (for caretakers come for more than one time)					
31	Considering health condition of your child does your child manifest (become ill) due to side effect of vaccination before today?	1 yes 2 no 3 not applicable				
32	Did your child vaccinated before at the right upper arm	1-yes 2-No 3. Not remember				
33	If yes for Q 33, is he/she developed a scar (you can observe)?	1-yes 2-No				
	Card review					
34	Does the child care taker have vaccination card at hand?	1. Yes 2. No				
35	If the answer is No, what was the reason that the child does not have immunization card?	1. card is lost/damaged 2. card is at home 3. was not provided 4. other (specify				

36	Is the child eligible for the following doses today? (check the card)		
	1. Penta1	1. Yes 2. No	
	2. Penta2	1. Yes 2. No	
	3. Penta3	1. Yes 2. No	
	4. PCV1	1. Yes 2.No	
	5. PCV2	1. Yes 2.No	
	6. PCV3	1. Yes 2.No	
	7. OPV1	1. Yes 2.No	
	8. OPV2	1. Yes 2.No	
	9. OPV3	1. Yes 2.No	
	10. Measles	1. Yes 2.No	
	11 Rota	1. yes 2 no	
	12 BCG	1. yes 2 no	
37	If the answer for Q 37 is yes, which dose was not given to the child today? (check the card)	Specify_____	
38	If the child is eligible but he/she has not been provided with vaccination today, what is the reason?	1. The child is sick 2. Vaccine not available 3. No injection materials 4. other (specify)_____	
39	If the reason was child's sickness, which symptom was he/she came with?(can have more than one option)	1. fever 2. diarrhea 3. cough 4. other(specify)_____	
40	Is there any of the following vaccine dose provided to the child before 28 days of minimum interval? (check the card)	OPV 1. Yes 2. No Pentavalent 1. Yes 2. No PCV 1. Yes 2 No Rota 1 yes 2 no	

41	If the answer for Q 40 is yes, which dose was provided before the recommended interval?		
	OPV2	1. Yes 2. No	
	OPV3	1 Yes 2. No	
	Penta2	1. Yes 2. No	
	Penta3	1. Yes 2. No	
	PCV2	1. Yes 2. No	
	PCV3	1. Yes 2. No	
	Rota 2	1 yes 2. No	
42	Do you know when you should come for next vaccination ?(only for children who have remaining doses)	1. Yes 2. No	

Thank you very much for answering all the questions carefully

Annex 2: Observation check list/ direct observation

This tool consists of two sections: structured observation checklist for healthcare provider and health facility.

Name of Health Facility _____ Name of observer _____ Date of observation _____

Section one: a 'structure observation of health facility and inventory checklist

S. NO	Questions	Response		Remark
		yes	no	
1	Is there functional temperature-reading equipment (thermometer) in the refrigerator			
2	Is temperature recorded twice per day including weekends? (a. yes, with including weekends, b. yes, but without			Under yes put a or b

	including weekends) and No if not recorded			
3	The temperature reading at the time of data collection is _____ °c			
4	How many vials and ampules of each vaccine are there in the refrigerator? BCG____, Penta1____, Penta2____, Penta3____, OPV0____OPV1____, OPV2____, OPV3____, PCV1____, PCV2____, PCV3____, Measles_____ Rota1____ Rota 2_____			
5	Is there any of the following vaccine in the refrigerator with VVM changes at discard or beyond discard point?			
	Pentavalent (DPT-HepB+Hib) vaccine			
	Pneumococcal conjugated vaccine (PCV)			
	Oral polio vaccine (OPV)			
	Measles			
	BCG			
	TT			
	Rota			
6	Is there any of the following vaccine found expired in the refrigerator			
	Pentavalent (DPT-HepB+Hib) vaccine			
	Pneumococcal conjugated vaccine (PCV)			
	Oral polio vaccine (OPV)			
	Measles			
	BCG			
	TT			
	Rota			
7	Is there anything else in the refrigerator other than vaccines? If yes, write what is found inside (food, drink, drugs _____)			
8	Are the following recording and documentation supplies available in the facility?			
	Revised Immunization cards			

	Revised EPI registration book			
	Adequate SRC/BC/vaccine balance sheet			
	Revised EPI tally sheets			
	National EPI guideline			
	Revised EPI reporting forms			
	Updated temperature recording sheet			
9	Is there monitoring chart displayed?			
10	If yes to Q 9, does it show the current (up to April 2017)			
	Penta3 coverage			
	Measles coverage			
	Dropout rate of penta1 to penta3			
	Dropout rate of penta1 to measles			
11	Is wastage rate for the following vaccines monitored? (see for the month of April 2017 on EPI monitoring chart or/and other document)			
	BCG			
	Measles			
	TT			
	OPV			
	Pentavalent vaccine			
	PCV			
12	What is the wastage rate for the following vaccines (see for the month of April 2017 on EPI monitoring chart or/and other document and record below)			
	BCG =			
	Measles =			
	TT =			
	OPV =			
	Pentavalent vaccine =			
	PCV =			
13	Which methods are in use to dispose sharp injecting materials?			

	Disposal pit			
	Incinerator			
	Others specify_____			

Cold chain

1. Availability of cold chain equipment

1.1 Is there an inventory of cold chain equipment? 1. Yes 2. No

1.2. Record the current quantity of each item based on its status of functionality on the

Space provided below.

1.3 If the data is taken from inventory, record, from inventory“ under remarks”

1.4 If there is no inventory document, do physical count and write „physical count“ under remarks”.

S.NO	Item	unit	Functional	Non functional	Remark
1.	Refrigerator				
2.	Cold box				
3.	Vaccine carrier				
4.	Ice pack				
5.	Dial thermometer				

2. Temperature record review

Get the temperature records of the last 1 month prior to data collection i.e. record of April 2017.

If you cannot get a record at all, write, document is not available“ in remark column)

S.NO	No. of days temperature was recorded					Remark
	b/n +2 ^{0c} &+8 ^{0c}	below +2 ^{0c}	above +8 ^{0c}	Min Temperature	Max Temperature	

II. Vaccine and injection materials stock status in the last 6 month prior to data collection

S.No	Item	unit	No. of days of Stock- outs	Remarks
1	DPT-HepB+Hib (Penta)	vial		
2	OPV vaccine	vial		
3	BCG	amp		
4	PCV	vial		
5	Measles	amp		
6	A-D syringe	piece		
7	Safety box	piece		
8	ROTA vaccine	vial		

Supervision document

4.2 Was there supportive supervision conducted on EPI by the following organizations?

1. Shashemene woreda health office 1.yes 2. No

2. Zone health department 1.yes 2. No

3. ORHB 1.yes 2. No

4. WHO 1.yes 2. No

4.2 If there is supervision conducted, how many times in the last six months?

1. One time 2.two times 3. More than two times

4.3 If there was supervision conducted, how many written feed backs documented?

1. None 2. Onetime 3.Two times 4. More than two times

Section two: A ‘structured observation of health worker working on EPI room and

Cold chain

S.NO	Question	yes	no	Remark	
1	Do the health care providers transfer messages (health education) about vaccines to the caretaker in-group or individually?				
2	If yes to Q1 did the content include				
	Importance of vaccination				
	Major side effects of vaccines				
	Immunization schedule				
	Next appointment date				
3	Contraindication assessed				
4	Generally, client-provider interaction is: circle one of the options (1. Good/friendly, 2. Bad/not friendly)				
5	Does the health worker use A-D syringe to vaccinate the child?				
6	Does the health worker recap the needle after injection?				
7	Is safety box ready for used syringes and needles at immunization session?				
8	If yes to Q 6 does it placed at arm reach?				
9	If the safety box is ready does the health worker dispose used syringe in the safety box immediately after each injection?				
10	Is there any safety box that is overfilled with used syringes? (If above 3/4th of the safety box is filled)				
11	Are the following lyophilized vaccines reconstituted with correct diluents?				
	BCG with BCG diluents only				
	Measles with measles diluents only				
12	Is reconstitution time written on reconstituted vaccines				
	BCG				
	Measles				
13	Are the above vaccines (Q 11) discarded after 6 hrs of reconstitution				
	BCG				
	Measles				
14	Does provider reconstitute measles and BCG vaccines appropriately?(flick vial, shake smoothly, push diluents slowly)				
15	Does the service provider administer appropriate dose?(look leakage and amount)				

16	Does the service provider administer vaccines through appropriate route?(observe route, sign, bleeding, not rubbing)				
17	Does the service provider use one syringe & needle for one child only one dose?				
18	Does provider using single mixing syringe for one vial (BCG and measles)?				

Annex 3: Semi structured expert in-depth interview guide

A. For health professionals at health center

Direction 1

Introduce yourself to the respondent. Then, explain the objective of the study Explore the respondent’s opinion and take a note. You should assure the respondent that all information is analyzed and narrated without mentioning names. You need to have his/her verbal consent.

Name of HF _____

Profession of the interviewee _____ responsibility _____

Name of Interviewer _____ Date of interview _____

1. Could you tell me your catchment population? _____

2 Do you know how many under- one child are targeted for vaccination in your catchment area for the year 2016/2017 or 2009 EC budget year? 1. Yes, it is _____ 2. No

2. In what base immunization service is provided at the static site?(probe the respondent about daily or other base)_____

3. Could you tell me how many health workers are assigned in EPI unit? _____

4. Could you tell me how many of the health professional in EPI unit received training on EPI?

Was the training adequate _____

5. What is your opinion about the availability and adequacy of logistics for vaccination service?

5.1. Cold chain equipment (probing: Refrigerator, Vaccine carrier, Cold box, ice packs, dial thermometer)

5.2. Cold chain spare parts (wick, burner, glass) _____

5.3. Was there any vaccine shortage or stock out during the last six months?

5.4. Was there any shortage or stock out of injection materials during the last six months? (A-D syringes, safety box, mixing syringes and needles)

5.5 was there any supervision conducted if _____yes in your opinion is it supportive.(Probing: discuss on gaps identified, update on new information, action plan to improve for the future, follow up)_____

6. In your opinion, do you think that injection practices are safe in your facility?

(Probing: use of AD syringe, avoiding of recapping needles, use of safety box, waste disposal system)

7. Are there any conditions at which children return home without being vaccinated in your facility? (Probing: sicknesses such as diarrhea, fever, cough etc or shortage of vaccines, injection materials)

8 Are there defaulter tracing mechanisms in your health center to find children not fully vaccinated in your catchment?(Probing through health extension workers , home to home visit or HAD)_____

9. If immunization monitoring chart is not used in your facility, could you mention some major reasons? (Probing: no one able to plot the graph, lack of stationery, work load) N.B if there is immunization monitoring chart used in the health facility it is already mentioned under observation checklist

10. Is there community discussion regarding EPI service? _____

11 What are the overall problems related to EPI problem in your facility?

12. What is your suggestion to improve this problems related to EPI in your facility?

Thank you

Annex 4: inventory check list

Check list for inventory

Inventory should be completed by observing the facilities; supplies equipment's monitoring tools of cold chain/cold chain management with the person in charge of vaccination service on the day of the visit. In all cases you should verify that the items exist by actually observing/counting them. Remember that the objective is to identify the equipment, supplies and facilities that currently exist for the service and not to evaluate the performance of the staff or the facility.

Thank You!

Code of health institution _____ date of visit _____

	Question	Possible answer	Skip
01	Has the facility isolated room for immunization service? -	1 -Yes 2- No -----	Q3
02	If yes for Q V01, is it adequate?(20m square	1 yes 2 No	
03.	Has the vaccination room waiting area?	1 yes 2 No -----	Q5
04.	If yes for Q V03, is it adequate?(20m square)	1 yes 2 No	
05	Is the waiting area clean/physically pleasant to see?	1 yes 2 No	
06	Is waiting area comfortable to seat for clients?(its easiness to move to them)	1 yes 2 No	
07	Have the vaccination room freezer and or refrigerator? (any size)	1 yes 2 No-----	Q 9
08	If yes to Q 07, is it functional?	1 yes 2 No	
09	Has the vaccination room Cold box? (any size)	1 yes 2 No	
10	Is there extra Vaccine carriers (including outreach, static sites, and sample transfer)?	1 yes 2 No	
11	Are there sufficient Icepaks? (in the refrigerator and for available cold box and v/carriers)	1 yes 2 No	
12	Is Log book used for balance of supplies?	1 yes 2 No	
13	Are there adequate immunization card?(count on monthly consumption average of a quarter)	1 yes 2 No	
14	Are there adequate Tally sheets? (count on monthly consumption average of a quarter)	1 yes 2 No	

24	Is monitoring chart used?	1 yes 2 No----- -	Q 26
25	If yes for Q V25, does monitoring chart contain the following information:	1 yes 2 No	
	Name of health facility?	1-Yes 2-No	
	Annual target population?	1-Yes 2-No	
	The year?	1-Yes 2-No	
	What is monitored?	1-Yes 2-No	
26	Is dropout rate monitored monthly on the chart?	1 yes 2 No-----	Q 28
27	If yes for Q V27, what is the current dropout rate of; Pentavalent-1 - Pentavalent-3: -----% Pentavalent- 1 - Measles : -----%		
28	Is vaccine wastage rate monitored?	1 yes 2 No-----	Q30
29	If yes for Q V29, what is the current dropout rate of vaccines? BCG----- % Pentavalent vaccines ----- % Measles ----- % polio vaccine -----% PCV ----- % Rota -----%		
30	Is AD syringe wastage rate monitored?	1 yes 2 No	
31	If yes for Q V31, what is the current wastage rate of AD syringes? -----%		

Annex Translated questioners to Afaan Oromo

Unka waliigaltee

Akkam bultan/oltan. Maqaan koo _____

Gaaffii fi deebin isiin wajjiin taasisu odeeffannoo tajaajila talaallii dhaabata fayyaa kana keessatti kennamu argachuuf nagargaara. Fooya'insa tajaajila askeessatti kennamuufis nifayada. Haala tajaajila argatan ilaalchisee gaaffii muraasa akkanisin gaafadhuuf yeroo akka naaflaattan kabajanan isingaafadha. Maqaan keessan hingalmeessamu, Odeeffannoon isinirraa argamus iccittidhaan eegama. Gaaffii deebisuu hinbarbaanne deebisuu dhiisuu dandeessu yoo isinitti hintoles gaaffii fi deebi keenya addan kutuu dandeessu. Ittifufuu nan danda'a?

Eeyyee _____ lakkii (Eeyyeen yoo ta'e itti fufi, lakkii yoo ta'e galateefadhuu gara maamila biraati cee'i)

Maqaa raga funaana/tu _____ Guyyaa _____ Koodii buufata fayyaa. -----

1. Umuriin daa'ima isin waliin jirtuu/jiru meeqa? Ji'a _____ Guyyaa dhalootaa _____
2. Saala da.iimma kessani maalii _____
3. Umuriin keessan hoo meeqa? Wagga _____
4. Walitti dhufeenyi daa'imatana/kan waliin qabdan
 - a. Haadha
 - b. Abbaa
 - c. obboleettii
 - d. Akaakayyuu
 - e. Kanbiraa (ibsi)
5. Iddoon jireenyaa keessane essa? Godina _____ Aanaa _____ Ganda _____
6. Haala fuudhaaf heeruma Haadha daa'imma.
 - a. Kan hin fuudhin/Kanhin heerumin
 - b. Kanfuudhe/kanheerumte
 - c. Kan walhiike/hiikte
 - d. Kanirraadu'e/jalaaduute
7. Amantaan Haadha daa'imma maali?
 - A. Ortodooksii
 - b. Islaama
 - c. Pirotistaantii/phenxee
 - d. kanbiraa (ibsi) _____
8. Sabni haadha daa'imma maali?
 - a. Oromoo
 - b. Amaaraa
 - c. Tigree
 - d. Gurage
 - e. Kanbirroo (ibsi)
9. Haala baruumsaa haadha daa'imma
 - a. Kan hinbarane, Dubbisuufi barreessuu kan hindandeenye
 - b. Kan hin barane, garuu dubbisuu fi barreessuu kan danda'u
 - c. Kan barate/barate yoota'e kutaan dhumaah ordofte/hordofe _____
- D. dipiloma fi isaaola kan qabdu
10. Haala hojii/dalagaa haadha daa'imma maalii?

a. Haadha warraa b.Qotee bulaa c. Hojataa mootummaa d.Daldaaltu/daldaalaa e. Kanbiro (ibsi) _

11. Maattin keessan waligalatti meeqa? _____

12. Dhibbeewwan talaalliin ittisuu dandeenyu naaf himuu dandeessuu?

Yoo debiin keessan eyyee ta'eenaa ibsii 1. Gifira, 2.Poliyoo (qaama lamashesa), 3. dhahinsa somba,4. Qaakee,5garaakasaa ,6. dhibee tiruu ,7. Dhibee sombaa ,8.infulenza (qufaa),9. tetanosi.

10. Tikitiki

13. Dhaabatni fayyaa kun daa'ima keessan talaalchisuuf mija'adha

a. Eeyyee b.Badaa miti c. Filannoo biraa wantan hinqabneef d. Miti

14. Gara dhaabata fayyaa kana attamiin dhuftan?

a. Miilaan b. Taaksiidhaan c.Konkolaataa manaatiin d. Gaariidhaan (fardaanykn gangedhaan)

e. Kanbiro (ibsi)_____

15. Mana keessan keessati daa'imti akka talaalamtu eenyutu murtoo kenna?

a. Haadha b. Abbaa c. Abbaa fi haati waliinta'uun d. Kanbiro (ibsi)

16. Waa'ee talaallii iirrati ibsi ogeessa fayyaatiin isiniif taasifame jiraa? a. Eeyyee b. lakkii

17. Gaaffii 17 tiifdeebbiin keessane eyyeen yoota'e qabiiyyeen ibsi chaamaal faayi?

a. Fayyidaa talaallii laatamee

b. wanta hinbarbadamne kantalaaliin walqabatee dhufu (jijjiirama qaama daa'ima iirrati mul'atu)

c. Daa'imti talaallii yoom akkafudhachuu qabdu

d. Guyyaa daa'imti talaalii ttaanuf dhuftu

e. Kan biro (ibsi)

18. Tajaajila talaallii argachuuf yerooammamiii sinitti fudhate?

a. Daqiiqaa sodoma b. Daqiiqaa sodoma hanga sa'atokkoo c. Sa'atokkoo

hanga lamaa d. Sa'alamaa oli e. Hinbeeku

T.L	Gaafiilee	Baayy'ee itti gadde	Itti hin gamadne	Giddugaleessa	Itti gamad eera	Baayy'een itti gamade
19	Hara tajaajila talaallii argachuuf turtiin taasiftan itti hangam gammadan?					
20	Qulqulina kuutaa tallalii itti keenammu iirrati hangam gammadan?					

21	Qulaulina naanno itti taa'anii tajaajila egatan irratti hangam gammadan?					
22	Yeroo tajaajiilaafa dhuftan haalaitti kutaan talalii banamu (tajaajila egaalammu) irratti hangam gammadan?					
23	Yeroo tajaajiilaafa dhuftan haala hojjatonii kutaa tallali argamana irratti hangam gammadan?					
24	Haala keessumeessuu fi kabaja ogeessa fayyaisiniif godhe hangam isin gammachiise?					
25	Gorsa ykn barumsa oggesi fayaa isiinif keenee/kennitte hangam isin gammachiise? (yootarii daa'immini dhukubsate maalagochu akka qabdaan)					
26	Obsa ogeessa fayyaa tajaajila kan laachuu irratti qabu hangam isin gammachiise?					
27	Ibsi tajaajila hara'aisinii flaatame irratti ogeessa fayyaatiin isiniif laatamee hangam isin gammachiise?					
28	Ibsa tajaajila talaallii yoom da'immini kessan fixuu ykn bellamni kessan itti aanuu yoom akka ta'ee ogeessa fayyaatiin isiniif laatamee hangam isin gammachiise?					
29	Haali da'imma kessani Yeroo darbe erga tallali fudhate booda hangam					

	isiin gammachiise (warra Yeroo lammafafi isaa ola dhufan qofaaf)					
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30. fayya da'imma kessani ilaalachise da'immini kessan erga tallali fudhate booda rakko tallali faana wal qabte isaa / ishee muddate beekaa?

a. Eeyyee b. Lakkii c. hinyadadhu

31. da'immini kessan kanaan dura harka isaa mirgaa(ciqile isaa olliti) talalli fudhate beekaa?

a.Eeyyee b.Lakkii c. hin yadadhu

332. yoo deebiin keesaan gaaffii 30 eeyee ta'ee godanisa godhataraa? (ilaalu dandesa)

a.Eeyyee b.Lakkii

33. Kaardii talaalii qabduu? a. Eeyyee b.Lakkii

34. Yoo gaffii 34ffaatiif deebiin lakkii ta'e maaliif?

a. Kaardiin badeera b. Kaardiinmanajira c. Kaardiin naaf hin laatamne

d. Kanbiro (ibsi) _____

35. Daa'imti talaalii armaan gadii keessaa Guyyaa har'ati isaan kamiif geese/ga'e? (Kaardii iaalii)

Tallalii dhibee sombaa BCG

A Talaalii farra dhibee shanii 1ffaa	G. Talaalii Poliyoo 1ffaa
B Talaalii farra dhibee shanii 2ffaa	H. Talaalii Poliyoo 2ffaa
C Talaalii farra dhibee shanii 3ffaa	I. Talaalii Poliyoo 3ffaa
D Talaalii nimookokaalii 1ffaa	J Talaalii rotta vayirasii 1 ffaa
E Talaalii nimookokaalii 2ffaa	K Talaalii rotta vayirasii 2 ffaa
F Talaalii nimookokaalii 3ffaa	L . Talaalii gifiraa

36. Talaalii armaan olitti ibsaman (gaaffii36) kan daa'imti geessef keessaa isaan kam hin fudhatin? Kaardi iilaalii Ibsii _____

37. Talaalii lakkoofsa 36 jalati ibsaman keessaa daa'imti talaalliif ga'a taatee kan hin fudhatne

yoo jiraate maaliif hin fudhatin?

- a. Da'imti waan dhukubsate b. Qorichi talaallii waan hin jiref
- c. Marfeen ittiin talaalan waan hin jireef
- d. Kan biro ibsii_____

38. Yoo sababiin taalaaliin hin laatamin daa'imti dhukubsattee ta'e mallatton dhibee ishii/isaa maali?

- a. A ho'iinsa qaamaa b. garaa kaasaa c. qufa d. Kan biro ibsii_____

39. Addaan fageenya Guyyaa 28 (ji'atokkoon) dura talaalliinl aatameefa jiraa?(Kaardi iirra ilaali)a. Eeyyeen b. Lakkii

40. Gaaffii 40 ffaa tiif deebiin eeyyeen yoo ta'e, isaan kamtu laatame kardi iilaalii

- a. Talaallii farra dhibee shanii 2ffaa d. Talaallii nimookokaalii 3ffaa
- b. Talaallii farra dhibee shanii 3ffaa e. Talaallii Poliyoo 2ffaa
- c. Talaallii nimookokaalii 2ffaa f. Talaallii Poliyoo 3ffaa
- g. Talaallii rota 2 ffaa

41. Talaallii hafeef yoom akka deebitanii dhuftan beektuu? (warra talaaliin hafeefa qofa)

42. Yeroo meqaafatiif da'iimma kee tallali fidee A.! ffaa B. 2 ffaa C. 3ffaa fi isaa ola

Gaaffii kiyya xumureera heedduu galatoomaa.