QUALITY OF IMMUNIZATION SERVICES IN PRIMARY HEALTH CARE FACILITIES OF WOLAITA ZONE, SOUTH ETHIOPIA

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A thesis submitted to the Department of health planning and health service management, School of Graduate studies, Jimma University; in Partial Fulfillment for the Requirement for Masters of Public Health (MPH)

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ABSTRACT

Background: Increasing the quality of immunization services is one of the strategies to reach at objective of EPI in Ethiopia. Infant and childhood mortality in Ethiopia are still among the highest in the world. Each year more than one-third of a million children die from infectious disease where the prevention and control measures are available.

Objective: Objective of this study was to assess the quality of EPI service in primary health care facilities.

Methods: The study used facility based cross sectional study design. Both quantitative and qualitative data was collected by using different data collection methods. Source population: mothers who utilize EPI service in the selected health facilities and total primary health care facilities of Wolaita zone.

Result: Majority of health facilities found to have adequate supplies and equipments but difference was seen between health centers and health posts. About one third of health posts lack refrigerators. One third (33.3%) of the observed health centers were found with temperature in the fridge below or above recommended range. All health centers used AD syringes for injection but only 3 of 36 (8.34%) observed procedures were sterile. Three hundred forty nine (86.2%) the responded mothers were satisfied by EPI service and technical competence of the provider, consultation, confidentiality, waiting time, explanation about immunization and waiting area structure of EPI service were found to be important predictors of client satisfaction. Two hundred forty eight (61.2%) of clients were knowledgeable about immunization.

Conclusion: Majority of health facilities rated as adequate in terms of equipment and supply necessary for EPI services. But majority of health posts lack refrigerators. Below or above normal temperature in the fridge and inappropriate arrangement of vaccines in the fridge were found to be the key constraints concerning vaccine handling and cold chain management. Factors related with service provider were found to be important determinants of client satisfaction. Although it has been argued that clients do not know what the technically acceptable level of care is, it is agreed that dissatisfaction is an indication that services delivered are lacking in some aspects of provider related factors.

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ABBREVIATIONS

AD – auto disable

AEFIs -Adverse Effects Following Immunization

BCG - Bacilli Calmette-Gue´rin

DPT- Diphtheria, Pertusis and Tetanus

EDHS- Ethiopian Demographic and Health Survey

EPI- Expanded Program on Immunization

HC- Health Center

HepB- Hepatitis B

HP- Health Post

HSDP- Health Sector Development Program

MDVP- Multi Dose Vial Policy

OPV- Oral Polio Vaccine

SNNP- Southern Nations, Nationalities and Peoples

SPSS- Statistical Package for Social Sciences

TT- Tetanus Toxoid

U5- Under Five

UCI -Universal Childhood Immunization Initiative

VVM- Vaccine Vial Monitor

WHO- World Health Organization

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND

To save lives of millions of infants and young children dying from vaccine preventable diseases, namely tuberculosis, tetanus, whooping cough, diphtheria, poliomyelitis and measles, the Expanded Program on Immunization(EPI) was launched by WHO in 1974. [1]

Vaccines -which protect against disease by inducing immunity - are widely and routinely administered around the world based on the common-sense principle that it is better to keep people from falling ill than to treat them once they are ill. Vaccination is considered to be one of the most cost-effective health interventions. Through vaccination one dreaded disease, Smallpox was eradicated and poliomyelitis has been eliminated from most countries in the world. Vaccination have an advantage in that they can be delivered with very high coverage even in the most underserved areas, thereby preventing disease, disability and death in these marginalized populations. [1]

All countries have national immunization programs, and in most developing countries, children under five years old are immunized with the standard WHO-recommended vaccines that protect against eight diseases – tuberculosis, diphtheria, tetanus (including neonatal tetanus through immunization of mothers), pertusis, polio, measles, hepatitis B, and Hib. These vaccines are preventing more than 2.5 million child deaths each year. This estimate is based on assumptions of no immunization and current incidence and mortality rates in children not immunized. Although other factors contribute to reductions in infant and child mortality rates, immunization is believed to play a key role. [2]

Appropriate policies and strong immunization systems are needed to ensure that potent vaccines are provided safely to every person who needs them. The main components of a well functioning immunization system include: service delivery; capacity to maintain vaccines at the right temperature (cold chain) and distribute them through the system in a timely manner (logistics); monitoring and surveillance; trained health workers; and program planning and management. [3]

Despite great strides forward in vaccination development and administration throughout parts of the world, many countries, usually the poorest, struggle with vaccinating their children. This gap

in immunization coverage, results from many compounding problems, such as low political commitment on behalf of national and local governments, weak health service delivery systems, civil unrest, and underfunding and poor management. These problems are further compounded by relatively low levels of research and development of new vaccines to combat the predominant diseases in the developing world. [4]

Increasing the quality of immunization services is one of the strategies to reach at general objective of EPI in Ethiopia. According to policy guideline 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. [5]

Infant and childhood mortality in Ethiopia are still among the highest in the world. Each year more than one-third of a million children die from infectious disease where the prevention and control measures are available. [6]

The Expanded Program on Immunization (EPI) was launched in Ethiopia in 1980 with the goal of achieving universal child immunization by 1990. However, that goal remained unmet to date. The WHO African regional office estimated that about five million children were un-immunized for DPT3 in 2007. Thus, the challenge of meeting the EPI goal is not only limited to a few countries, many countries in Africa are struggling to meet the immunization targets. [7]

Today, national immunization programs in developing countries are responsible for improving access to the traditional EPI antigens and introducing new vaccines. In 2002, the EPI introduced the Reaching Every District (RED) strategy, which focused on achieving an 80 percent coverage rate of DTP3 in 80 percent of districts and using immunization contacts to deliver other high-priority child health interventions. In addition to delivering vaccinations, national immunization programs are concerned with the quality and safety of immunization through the adoption of safe injection technologies (auto disable syringes, storage boxes, and incinerators) and proper cold chain and vaccine stock maintenance. [8]

Over the last 40 years, the use of smallpox, measles, diphtheria, tetanus, pertusis, and polio myelitis vaccines have eradicated smallpox and eliminated disease in those populations that have achieved and sustained programs with high implementation rates. [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 [10].

1.2 STATEMENT OF THE PROBLEM

Though the program aimed to reach all children of the world, around three million children still die each year from vaccine preventable diseases. These deaths mostly occur in developing countries where health systems may be weak and less able to cope with an overwhelming set of health problem. Moreover, in the previous time much of the attention was given to increase the EPI coverage, but now the expanded program on immunization is placing emphasis on the quality of the service. [11, 12]

In most woredas of Ethiopia the important weakness that impede immunization program to achieve expected goals are found to be insufficient outreach services, poor staff motivation, infrequent in-service training and inadequate supervision, insufficient communication between health staff and community members, inadequate monitoring systems at all levels and lack of community participation due to lack of awareness and absence of social mobilization [13, 14]

The Ethiopian immunization program has significant problems; crippled by limited resources and minimal capacity, poor injection safety, and a deficient cold chain. The future economic cost to the country resulting from inadequate and unsafe vaccinations could potentially far outweigh the level of investment required to address these issues**.** [14]

CHAPTER 2: LITERATURE REVIEW

Quality means optimizing material inputs and practitioner skill to produce health. As the Institute of medicine defines it, quality is the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge**.** [15]

ELEMENTS OF HEALTH CARE QUALITY

STRUCTURAL QUALITY

Refers to stable, material characteristics (infrastructure, tools, technology) and the resources of the organizations that provide care and the financing of care (levels of funding, staffing, payment schemes, and incentives) Structural measures are the easiest to obtain and most commonly used in studies of quality in developing countries. 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. 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 [15].

PROCESS QUALITY

Process is the interaction between caregivers and patients during which structural inputs from the health care system are transformed into health outcomes. It includes the patient's activities in seeking care and carrying it out as well as the practitioner's activities in making a diagnosis and recommending or implementing treatment. [15]

OUTCOME QUALITY

Outcomes can be measured in terms of health status, deaths, or disability-adjusted life years (a measure that encompasses the morbidity and mortality of patients or groups of patients) improvements in patient's knowledge. Outcomes also include patient satisfaction or patient reaction to the health care system. [15]

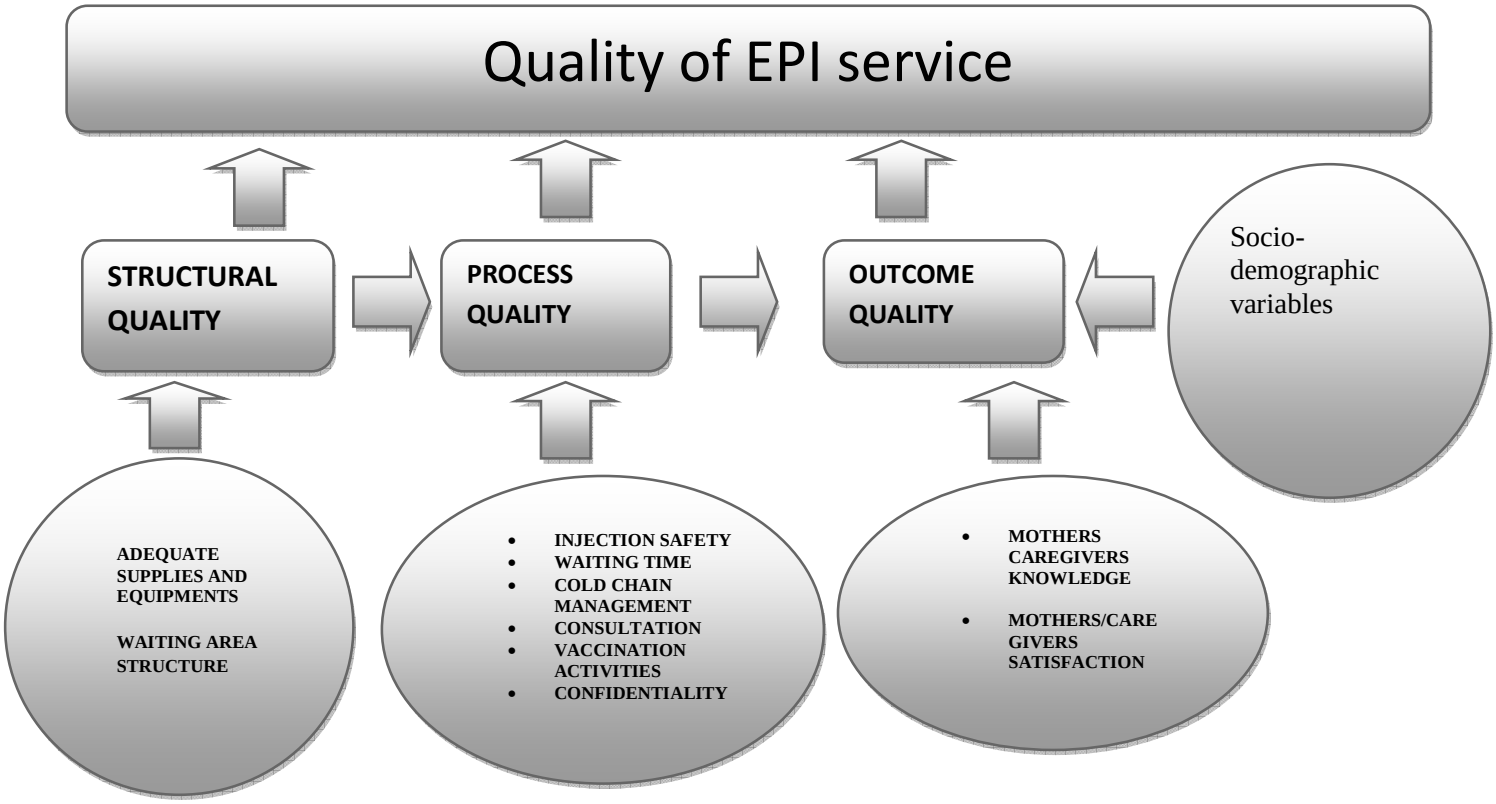


FIGURE 1: CONCEPTUAL FRAMEWORK

Before we attempt to measure the quality of care, either in general terms or in any particular site or situation, it is necessary to come to an agreement on what the elements that constitute it are. [16] The measurement of quality should be based on a systemic approach that recognizes criteria of structure, process and outcomes. In spite of different interpretations of health service quality, key components are effectiveness, efficiency, accessibility, scientific and technical development and the match between the availability of services and needs of the population. [17]

The three part approach to quality assessment (structure, process and outcome) is possible only because good structure increases the likelihood of good process, and good process quality increases the likelihood of a good out-come quality. It is necessary, therefore, to have established such a relationship before any particular component of structure, process, or outcome can be used to assess quality. [16]

Another way in which attributes of quality can be seen in health care is accessibility, coordination and continuity, comprehensiveness, patient-centeredness, effectiveness and efficiency. [18]

The analysis of quality in primary care quarrels that the definition and assessment of quality must reach beyond target setting and address complexities such as the impact of socio-economic and cultural differences and perspectives of patient groups as well as healthcare professionals, politicians and policy makers. [19]

Quality assessment studies usually measure one of three types of outcomes: medical outcomes, costs, and client satisfaction. For the last mentioned, clients are asked to assess not their own health status after receiving care but their satisfaction with the services delivered. [10] Client satisfaction may not necessarily mean that quality is good; it may only indicate that expectations are low. One woman in Bangladesh explained that, even though the providers behaved badly, she has to be content. She said that they are lucky if they can get the free medicines that are provided at the clinic. Clients may also say that they are satisfied with care because they want to please the interviewer, worry that care may be withheld in the future, or have some cultural or other reason to fear complaining. Many clients have limited options and have never experienced any other standards of care. Further, educational and class differences between clients and providers often limit clients' ability to assess services. [20]

One assessment of EPI services in an urban area of Guinea identified as key quality problems the lack of knowledge among mothers about how many immunizations their child should receive and by what age, long waiting times, high fees for vaccinations, missed opportunities for immunization, poor rapport with health workers and occurrence of abscesses after vaccination. And another study in Bangladesh, Daka city indicated that only one out of 46 clients didn't know when to return to the next immunization [14]

Research from many countries indicates that people will use immunization services at least once if they know what services are offered and where and when they are available. They will return if they know when to come back, they have been treated respectfully; they have confidence that they will receive the vaccinations that they come for. [21]

According to one study in Ethiopia only 66% of the cold chain equipment was found functional at the time of the inventory. Excluding 3% of the equipment for which no record was available, 31% of the equipment was therefore not available to support immunization activities. [22]

In general the country data showed that mothers assessed the technical competence of vaccinators positively. Technical competence was viewed negatively if pain was inflicted, if bleeding, swelling or abscesses occurred, or if vaccinators broke needles or used old ones. Personal characteristics of the vaccinators, such as age, long years of reliable service, caste, social class, physical appearance and moral behavior, were sometimes also important criteria. Mothers in Ethiopia expressed dissatisfaction with health workers who spent only short periods in outreach centers. These workers were considered by the mothers to be uninterested in their work. [23]

As one study showed in Bangladesh a significant proportion of users (34.2%) were not satisfied with the length of time that the facilities were open to the public. About one third (28.2%) of all users were not satisfied with the time they waited to receive care. The average waiting time for these users was 57.1 + 4.2 min compared with 21.4 + 1.6 min for those who were satisfied. Moreover, patients presenting for maternal care were significantly more dissatisfied (37.6%) than clients presenting for other types of services. [10]

A comprehensive assessment of the quality of immunization services in one major area of Dhaka city, Bangladesh asked why mothers vaccinate their child. 35% of mothers responded as to prevent measles, 30% to prevent TB, 25% to prevent tetanus, 19% to prevent polio and 16% to prevent diphtheria [14]

In Ethiopia, field reports continue to indicate serious gaps in terms of distribution of injection materials and the bundling process, use of re-sterilize able injection materials with little capacity to ensure quality sterilization process, inadequate reporting and follow-up of adverse effects following immunization (AEFIs) and disposal of used injection materials. [22]

One survey in Ethiopia, concluded the following regarding the injection safety particularly immunization: The results of the survey indicated that there is an urgent need for an injection safety policy in Ethiopia to reduce the re-use of non sterile equipment, improve sharps waste collection, and manage sharps waste appropriately. This policy should be based upon a regular supply of auto-disabled syringes for immunization and disposable syringes for therapeutic injections, communication activities to increase awareness in the community and among providers, and an efficient sharps waste management strategy. [22]

A health facility survey of child health services conducted in SNNPR in 2001 found that 79% of health centers had all the necessary EPI equipment and supplies and of the 88% of health centers with a functioning refrigerator, only 59% reported safe vaccine temperatures (2-8^{0}C). All vaccines were present in 89% of facilities and 6-month stock-outs were as follows: BCG 16%, OPV 7%, DPT 14%, Measles 9%, and TT 5%. Outreach was conducted by 98% of facilities, for an average of 7.6times/month to 8.4 communities. [24]

By 2003, it is expected that all countries will use AD syringes. The increasing demand for this device has considerably decreased its cost. WHO and UNICEF encourage all partners involved in immunization activities – bilateral agencies, technical institutions, EPI managers – to "bundle" the auto-disable syringes with quality vaccines and safety boxes for collection of the used equipment, to promote a proper disposal of wastes through incineration, and to develop appropriate training, supervision and sensitization activities. Increasing use of AD syringes is making an important contribution to injection safety, and all countries will have shifted to AD syringes by 2003. This trend has gained momentum from lower costs brought about by increasing demand and an increasing number of manufacturers. Around 50–60% of developing countries planned to introduce auto-disable syringes in routine immunization in 2001 (80–90% of developing countries use them in mass campaigns); it is expected that all developing countries will use these syringes by 2003. [25]

As in many developing countries, considerable attention is needed to improve injection safety in Ethiopia. The results of the assessment suggest that Ethiopia is facing big challenges in the area of injection safety. For instance, one third of the injections observed during a survey were about to be given with non-sterile equipment before a careful intervention of the field investigator. It

was also noted that waste disposal is deficient in the health facilities. The field investigators observed that in 30% of the health facilities visited, the sharps used were dumped in an unsupervised area. [25]

Study done on determinants of satisfaction with primary health care setting and services showed that waiting area structure, explanation and consultation were important determinants of client satisfaction in primary health care facilities. [28]

Study done on cold chain status at immunization centers in Ethiopia showed that vaccine storage in the refrigerator was observed to be improper in 47 (74%) of the health centers [29] and the study done in Canada showed that 13% of vaccines were exposed to freezing during distribution and storage [30], similarly the study done in two rural and one urban administrative area in Canada indicated that there were area weakness in cold chain system in Ethiopia which could compromise the potency of the vaccines and general quality of immunization service.

CHAPTER 3: SIGNIFICANCE OF THE STUDY

Persistently excessive morbidity and mortality rates in developing countries served by primary health care systems suggest that the quality of services is inadequate. The importance of service quality in healthcare has received some attention for over three decades now and quality assessment has been considered as one element of quality assurance. [22] Hence understanding EPI service quality in structural, process and outcome dimensions will put good baseline data to use in health service quality improvements in primary health care facility level. Efforts to monitor and strengthen the quality of EPI activities will facilitate further decline in the numbers of deaths and illnesses from vaccine-preventable diseases.

This survey assessed service quality of EPI using Donavedian components of service quality in primary health care facilities of Wolaita zone. In addition EPI quality assessments have never been studied in this zone and this study was the first to study quality of EPI in this zone. Therefore, the study will contribute to improve quality of EPI by extracting major program difficulty within the zone.

CHAPTER 4: OBJECTIVES

4.1 GENERAL OBJECTIVE

To assess the quality of EPI service in primary health care facilities in terms of structure, process and outcome in Wolaita zone, south Ethiopia

4.2 SPECIFIC OBJECTIVES

1. To determine availability of logistics for the EPI services in PHC facilities.
2. To assess the status of cold chain management in PHC facilities
3. To observe injection safety of EPI services in PHC facilities
4. To measure mothers/caregivers satisfaction on EPI services.
5. To assess knowledge on immunization among mothers/caregivers come for EPI service.

CHAPTER 5: METHODOLOGY

5.1 STUDY AREA AND PERIOD

The Southern Nations, Nationalities and Peoples' Region has an area of 118,000 sq km. and 15.7 million people, constituting 20% of the nation's total. It has 13 zones, eight special woredas, 133 woredas, 22 town administrations and 3,553 rural kebeles. Close 93% live in rural areas.

The Region's potential health service coverage has grown from 28 % in 1993 (E.C.) to 74% in June, 2008 through services provided in 13 government, four NGO, and two private hospitals, 161 health centers, 194 developing health centers, and 2,541 health posts.

Wolaita zone is one of 13 zones in the SNNP regional state. The major town of Wolaita zone, Sodo is found 337 kilometers south to Addis Ababa. According to the 2007 census report, the zone has total population of 1,527,908, women of reproductive age group with a population of 355,426 and U5 children with a population of 201,602. Wolaita zone health department reported that Wolaita zone has 39 health centers and 333 health posts and with eligible children with a population of 64,924, pregnant women of 64,289 and non pregnant of 277, 032. This study was conducted in Wolaita zone selected primary health care facilities from March to April in 2010.

5.2 STUDY DESIGN

- Facility based cross sectional study design was used.

5.3 POPULATION

5.3.1 SOURCE POPULATION

- Mothers who utilize EPI service in the primary health care facilities in Wolaita zone.
- Primary health care facilities in Wolaita zone

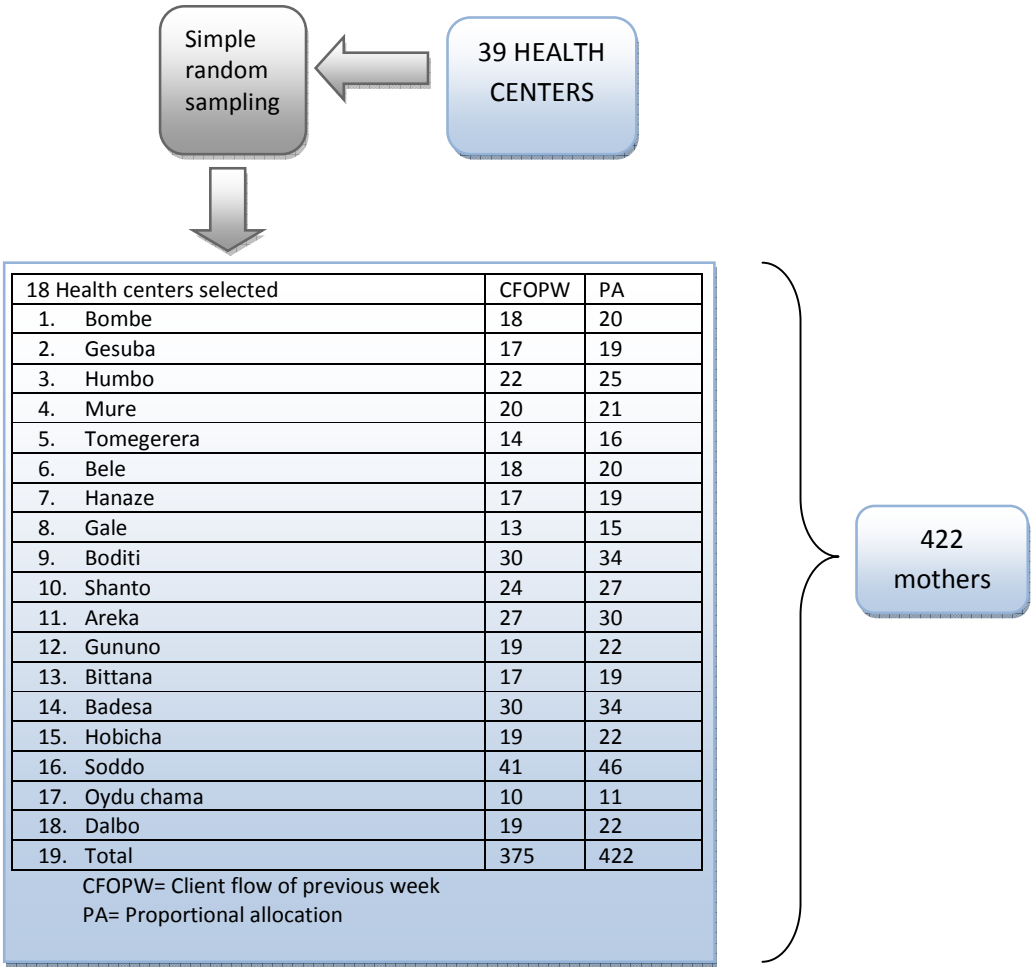
5.3.2 STUDY POPULATION

Study population was the selected mothers/ care givers who come to the selected primary health facilities during study period.

Selected PHC facilities in Wolaita zone

5.4 SAMPLE SIZE AND SAMPLING TECHNIQUE

First, the list of total number of health centers and health posts was obtained from zonal health department. Accordingly there are 36 functional health centers and 333 health posts in the zone. Health centers and health posts become functional in the last two months back from data collection period and under construction were excluded. Simple random sampling was drawn to include 50% (18 health centers) of total 39 health centers and 31 health posts were selected to include 2 health posts from each health center. Eighteen health centers were decided to be taken based on the rule of thumb in sampling for quality of care study, which states, if the number of facilities are very large (500-1000) take a 10% sample, if it is medium size (100-500), take a 20-30% sample and if it is very small (less than 50), take a 30-50% sample. [29] The total sample size was allocated to 18 health centers based on client flow of previous week. And every n^{th} client was interviewed. N was determined from the average daily attendance of mothers who come to EPI service which is 4. The first mother to be interviewed was determined by drawing one number from four consecutive numbers (1, 2, 3, and 4).



18 Health centers selected	CFOPW	PA
1. Bombe	18	20
2. Gesuba	17	19
3. Humbo	22	25
4. Mure	20	21
5. Tomegerera	14	16
6. Bele	18	20
7. Hanaze	17	19
8. Gale	13	15
9. Boditi	30	34
10. Shanto	24	27
11. Areka	27	30
12. Gununo	19	22
13. Bittana	17	19
14. Badesa	30	34
15. Hobicha	19	22
16. Soddo	41	46
17. Oydu chama	10	11
18. Dalbo	19	22
19. Total	375	422

CFOPW= Client flow of previous week
PA= Proportional allocation

Figure 2 Schematic representation of sampling procedure

Sample size of mothers/ care givers exit interview was determined by using the following procedure.

- Significance level 95%
- Degree of error 5%
- Client satisfaction level 50% (because no previous similar study in the area)

Sample size determination formula

$$n = \frac{(Z\ \alpha/2)^2 * P\ (1-P)}{d^2}$$

$$n = \frac{(1.96)^2\ (0.5)\ (0.5)}{(0.05)2} = 384$$

With 10% contingency for non-response the total sample size was 422.

5.5 DATA COLLECTION AND MANAGEMNT

5.5.1 DATA COLLECTION INSTRUMENTS

Data collection instruments were:-

- Structured questionnaire for exit interview of mothers or caregivers.
- Checklist for resource inventory
- Checklist to assess cold chain management & vaccine stock/supply management.
- Checklist to observe injection safety during service delivery
- Interview guide for district EPI coordinators

All data collection instruments were adapted from different types of literatures which are consistent with this study.

5.5.2 DATA COLLECTORS

Data collectors were 12th grade complete students for exit interview and health officers and nurses for health workers interview and observations. There were 10 data collectors for exit interview and 5 data collectors for health workers interview and observations; a total of 15 data collectors.

In summary:

- Exit interview with 405 mothers/caregivers using structured questionnaire
- Observation to assess injection safety and cold chain management

- In-depth interview with one EPI coordinator per district using interview guide/checklists

Table 1-Summary for all the methods used

Method	Sample size	Instruments	Unit of analysis
Observation			
1. Injection safety	36	Observation	Procedures
2. Vaccine temperature monitoring	18	checklist	Health centers
In-depth interview for EPI coordinators	7	Interview guideline	-
Resource inventory			
1. Health centers	18	Checklist	Health centers
2. Health posts	31	Checklist	Health posts
Exit interview	405	Questionnaire	Individuals

5.6 STUDY VARIABLES

Dependent variable – Quality of EPI services in terms of

- Outcome (Client satisfaction)

Independent variables

- Socio-demographic variables (Mother age, Mother education, Husband education, Residence , Occupation, Religion, Income ,and Marital status)
- Availability of equipments and supplies
- Vaccine temperature monitoring
- Safe injection practices
- Technical competence
- Confidentiality
- Consultation
- Waiting area structure
- Waiting time
- Mother knowledge

5.7 ANALYSIS

5.7.1 ANALYSIS OF QUANTITATIVE DATA

The quantitative data arising from the study was cleaned, coded and feed to Statistical package for social sciences (SPSS) version 16.0. Simple frequencies were used to see the overall distribution of the study subject with the variables under study. Odds ratio and 95% CI was used to measure the strength of association. Univariate statistics was used to assess patterns of responses to the questionnaire items. Chi-square ($\chi 2$) tests were used to assess differences between categories, P-values of less than 0.05 was considered significant. Multiple logistic regressions were done for variables found to be significant in chi-square tests and binary logistic regressions.

5.7.2 ANALYSIS OF QUALITATIVE DATA

Qualitative data obtained from observation and in-depth interviews were identified based on their themes, coded as to their units of meaning, and reformulated in more theoretical words.

5.8 DATA QUALITY CONTROL

The questionnaire was prepared in English and translated to Amharic language and retranslated to English by other person who is blind to the original questionnaire to check its consistency. Prior to the data collection, the questionnaire was pre tested in one of the health centre which was not included in the study, and then necessary modifications were done accordingly. Two day training was given to data collectors to ensure that they understood the data collection instruments well so that to have quality data. There were 2 supervisors throughout the entire data collection period so that follow the progress of data collection procedures and any other difficulties face during data collection was solved timely and easily.

5.9 OPERATIONAL DEFINITIONS

Waiting time: The time gap between the client's arrival at the health facility and the time the client received service.

Vaccine e sufficient until next supply: stock contained vaccines enough for 2- 4 weeks.

Ventilated: If the room has a minimum of one window and one door.

Necessary EPI equipments: Refrigerator, vaccine carrier, cold box, thermometer and EPI manual.

Client satisfaction: clients said to be satisfied by the service when score of questions under satisfaction is greater than mean score

Adequacy of equipments and supplies: equipment or supply was assessed to be inadequate if available in less than 60% of health facilities. It was considered fairly adequate if available in 60-70% of the facilities and adequate if available in more than 70% of the facilities.

5.10 ETHICAL CONSIDERATIONS

A formal letter was written from ethical review committee of Jimma University College of medical sciences and public health. The Wolaita zone health department wrote a formal letter to the selected district health offices to make it possible to collect all necessary data.

Verbal and written consent was secured before conducting the interview and observation. For this, a one page consent letter was attached to the cover page of each questionnaire and observation checklist stating about the general purpose of the study and issues of confidentiality to be discussed by interviewers before proceeding with the interview. Additionally, participants were informed that they have a full right to refuse or discontinue participating.

5.11 DESSEMINATION PLAN OF THE STUDY FINDINGS

The findings of this study will be disseminated and presented to the College of Public Health and Medical Science, Jimma University. And it will be presented and submitted to, SNNP Region Health Bureau, and Wolaita Zone Health Department as to necessary. The findings will be also disseminated to organizations that will have a contribution to improve the status of the quality of immunization services in the region.

CHAPTER 6: RESULT

6.1 SOCIO-DEMOGRAPHIC CHARACTERISTICS

Four hundred five mothers/caregivers with non response rate 4% were enrolled in this survey. Majority 291 (72%) of respondent's age was between 21 and 35. Mean age of the respondents' is 25years with (SD ±5). And 181 (44.7%) were from 7-12 grade in their education. Majority of the respondents 386 (95.3%) were married. Three fourth of the respondents (75.1%) were Wolaita by ethnicity and 65% were protestant by religion. More than sixty four percent of the respondents were housewives and 12.1 % were government employee. (Table 2)

Table 2–Socio-demographic characteristics of mothers/caretakers with babies under 1 year in Wolaita zone, March, 2010

Variable	Frequency	Percent
Age of mothers or caregivers in years		
21-35	291	71.9
15-20	104	25.7
36-45	10	2.5
Total	405	100
Educational status		
Illiterate	63	15.6
Literacy education	4	1
1 – 6 grade	114	28.1
7 –12 grade	181	44.7
> 12 grade	43	10.6
Total	405	100
Marital status		
Married	386	95.3
Single	17	4.2
Widowed	2	0.5
Total	405	100
Ethnicity		
Wolaita	304	75.1
Amhara	60	14.8
Gofa	18	4.4
Others	23	5.7
Total	405	100
Occupation		
House wives	260	64.2
Government employee	49	12.1
Students	46	11.4
Merchants	38	9.4
Others	12	3.0
Total	405	100

Religion		
Orthodox	119	29.4
Protestant	263	64.9
Muslim	19	4.7
Catholic	4	1
Total	405	100
Residence		
Urban	338	83.5
Rural	67	16.5
Total	405	100
Income		
>500	322	79.5
<=500	83	20.5
Total	405	100.0

*Ethnicity others include Oromo, Tigre, Dawuro, Sidama and Gamo.
*Occupation others include NGO employee and house maids

6.2 STRUCTURAL QUALITY ASSESSMENT

6.2.1 GENERAL CONDITION OF COLD CHAIN ROOMS

All 18 health centers were observed to assess general condition cold chain rooms. As the table shows below 12 health centers have separate cold chain rooms, cool and ventilated rooms while the rest were found to be no separate cold chain room, cool and ventilated rooms. Some EPI coordinators explained that they share one room for vaccination and storage of vaccines due to lack of rooms. (Table 3)

Table 3 – General condition of cold chain rooms in primary health care facilities in Wolaita zone, 2010

Questions		Number	%
Does the facility have separate cold chain room?			
	Yes	12	66.7
	No	6	33.3
	Total	18	100
Ventilated room			
	Yes	12	66.7
	No	6	33.3
	Total	18	100

6.2.1 VACCINE AVAILABILITY

As one indicator of structural quality, availability of vaccines was assessed. The result showed that 2 health centers faced polio vaccine out of stock; 3 health centers faced DPT+HepB+Hi and TT vaccines out of stock during observation. While measles and BCG with diluents were available within all 18 health centers observed for vaccine availability. One third (35.5%) assessed health posts had no polio vaccines and 5(16.1%) of the health posts had no Penta

vaccines. Seven (22.6%) of the health posts had no measles vaccine and nine health posts (29%) had no BCG vaccine. Around two third (63.58%) of health posts had all types vaccines. (Table 4)

Table 4-Vaccine availability in primary health care facilities in Wolaita zone, 2010

Types of vaccine	Health centers		Health posts	
	Number	**%**	**Number**	**%**
Polio vaccine				
Available	16	88.8	20	64.58
Not available	2	11.2	11	35.5
Total	18	100	31	100.0
BCG with diluents				
Available	18	100	24	77.4
Not available	0	0	7	22.6
Total	18	100	31	100.0
Measles with diluents				
Available	18	100	22	71.0
Not available	0	0	9	29.0
Total	18	100	31	100
DPT+HepB+Hi vaccine				
Available	15	83.3	26	83.9
Not available	3	16.7	5	16.1
Total	18	100	31	100.0
TT vaccine				
Available	15	83.3	25	80.6
Not available	3	16.7	6	19.4
Total	18	100	31	100.0

6.2.2 VACCINE CONTAINERS

Concerning vaccine containers (Refrigerator and vaccine carrier) of health institutions; all 18 health centers were equipped with small vaccine carriers and functional electricity refrigerators. Three health centers have plastic ice bags and fifteen have not. Eleven out of 31 health posts were equipped with Kerosene refrigerators and majority of the health posts had small vaccine carriers 25 (80.6%) and ice packs 26 (83.9%) during observation.

Table 5-Availability of vaccine containers and transporting materials in PHCs facilities in Wolaita zone, 2010

Vaccine containers and transporting materials	Health centers		Health posts	
	Number	%	Number	%
Small vaccine carriers				
Available	18	100	25	80.6
Not available	0	0	6	19.4
Total	18	100	31	100.0
Ice packs				
Available	14	77.8	26	83.9
Not available	4	22.2	5	16.1
Total	18	100	31	100.0
Refrigerators				
Available	18	100	11	35.5
Not available	0	0	20	64.5
Total	18	100	31	100.0

Some district EPI coordinators explained that because of the shortages in capital and running costs there was no budget for training, maintenance of cold chain equipments especially refrigerators One EPI coordinator from a district reported: *"We do not have problem regarding number of refrigerators but the main problem is no trained man power to maintain the refrigerators."*

Some EPI coordinators tried to enlighten there is problem in transportation of vaccines to health posts due to lack of vehicles and topographical barriers in a few districts of the zone.

6.2.3 OTHER NECESSARY RESOURCES

Other necessary materials for EPI were also assessed for availability. All eighteen health centers had thermometers within refrigerators, AD syringes, vaccination registration books, monthly vaccination reporting form, safety boxes, minimum of one EPI coordinator, separate service delivery room for EPI, EPI manual, vaccine temperature monitor card and stock record books. Three health centers had no disposable syringes, mother and children cards, TT card, daily vaccination tally sheet and graph papers for monitoring vaccination. All assessed health posts were equipped with AD syringes, registration books, daily vaccination sheets and monthly vaccination report form. Twenty two (71%) health posts had no EPI manual.

All assessed health posts were equipped with AD syringes, registration books, daily vaccination sheets and monthly vaccination report form. Twenty two (71%) health posts had no EPI manual.

Table 6-Availability of other necessary materials in health posts Wolaita zone, March 2010

Supplies and materials	No of HPs (%)	Supplies and materials	No of HPs (%)
Thermometer		**Vaccine registration form**	
Available	28 (90.3)	Available	25 (80.6)
Not available	3 (9.7)	Not available	6 (19.4)
Total	31 (100.0)	Total	31(100.0)
AD syringes		**Monthly vaccination reporting form**	
Available	31 (100)	Available	31 (100)
Not available	0 (0)	Not available	0 (0)
Total	31(100)	Total	31(100)
Disposable syringes		**File folders**	
Available	26 (83.9)	Available	15(48.4)
Not available	5 (16.1)	Not available	16 (51.6)
Total	31 (100.0)	Total	31 (100.0)
Bags		**File boxes**	
Available	16 (51.6)	Available	10 (32.3)
Not available	15 (48.4)	Not available	21 (67.7)
Total	31 (100.0)	Total	31 (100.0)
Registration books		**Graph papers for monitoring vaccination**	
Available	31 (100)	Available	19 (61.3)
Not available	0 (0)	Not available	12 (38.7)
Total	31 (100)	Total	31 (100.0)
Mothers and children cards		**Safety boxes**	
Available	26 (83.9)	Available	13 (41.9)
Not available	5 (16.1)	Not available	18(58.1)
Total	31(100.0)	Total	31(100.0)
Tetanus vaccination card		**EPI manual**	
Available	0 (0)	Available	9 (29.0)
Not available	31 (100)	Not available	22 (71.0)
Total	31 (100)	Total	31(100.0)

6.2.4 QUALITY ASSESSMENT OF EQUIPMENTS AND SUPPLIES

All health centers were rated as equipped with adequate vaccines of all types except that 2 health centers and 3 health centers lacked polio and Penta vaccines respectively. Health posts were assessed to be inadequate in terms of refrigerators in that 64.5% of the assessed health posts were not equipped with refrigerators. (Table 7)

Table 7- Quality assessment of Equipments and supplies in primary health care (PHC) facilities in Wolaita zone, 2010

Equipments and supplies	Health centers			Health posts		
	Available (%)	Not available (%)	Quality assessment	Available (%)	Not available (%)	Quality assessment
Refrigerator	18 (100)	0 (0)	Adequate	11(35.5%)	20(64.5%)	Inadequate
Cold box	18 (100)	0 (0)	Adequate	-	-	-
Vaccine carrier	18 (100)	0(0)	Adequate	25(80.6)	6 (19.4)	Adequate
Polio vaccine	16 (88.89)	2(11.1)	Adequate	20(64.58)	11(35.5)	Fairly adequate
Measles vaccine with its diluents	18 (100)	0 (0)	Adequate	24(77.4)	7(22.6)	Adequate
BCG with its diluents	18 (100)	0 (0)	Adequate	22 (71.0)	9 (29.0)	Adequate
Penta vaccine	15 (83.4)	3 (16.6)	Adequate	26 (83.9)	5 (16.1)	Adequate
TT vaccine	15 (83.4)	3 (16.6)	Adequate	25 (80.6)	6 (19.4)	Adequate
Average (%)	94.46	5.54	Adequate	70.5%	29.5%	Adequate

6.3 ASSESSMENT OF PROCESS QUALITY

6.3.1 PROCESS QUALITY PERCEIVED BY CLIENTS

Mothers were asked about process quality of EPI service in terms of technical competence of the vaccinator, confidentiality, consultation, waiting time to get service and waiting area structure. Two hundred forty six (60.7%) of the mothers responded as they had consultation with service provider and 252 (62.2%) of the respondents rated technical competence of the vaccinator good. Two hundred nineteen (54.1%) of the interviewees explained that service provider was confidential about her and her baby and 202 (49.9%) had waiting time of less than or equal to 20 minutes. 192 (47.4%) were explained that they were happy with waiting area structure of EPI service. (Table 8)

Table 8-Immunization Service process as perceived by mothers/caregivers in Wolaita zone March, 2010

Variables	Frequency	Percent
Did you have consultation with vaccinator?		
Yes	246	60.7
No	159	39.7
Total	405	100.0
Technically competent		
Competent	252	62.2
Not competent	153	37.8
Total	405	100.0
Vaccinator confidentiality		
Confidential	219	54.1
Not confidential	186	45.9
Total	405	100.0
Waiting time		
<= 20 minutes	202	49.9
>20 minutes	203	50.1
Total	405	100.0
Waiting area structure of EPI service?		
Good	192	47.4
Not good	213	52.6
Total	405	100.0

6.3.2 VACCINE HANDLING AND STOCK MANAGEMENT

Fifteen (83.3%) of HCs had sufficient vaccines in their stock. Twelve HCs made vaccination utilization according to first in first out principle. Regarding the VVMs, 15 health centers found to be VVMs on the vaccine vials were good. In 3 health centers, VVMs showed signs of out of use BCG and measles vaccines. And none of the health centers found using refrigerator to put other things than vaccines. The arrangement of vaccines with in refrigerator was assessed using standard of arrangements. Nine health centers found stored according to the standard whereas the rest not stored vaccine according to the standard. (Table 9)

Table 9-Status of vaccine handling and stock management in health centers, Wolaita zone, March, 2010

Questions	Number	%
Is the stock of vaccine sufficient until next supply arrives?		
Yes	**15**	**83.3**
No	**3**	**16.7**
Total	**18**	**100**
Is vaccine utilization made according to "first in first out" principle?		
Yes	**12**	**66.7**
No	**6**	**33.3**
Total	**18**	**100**
Are all VVMs on the vaccine vials good?		
Yes	**15**	**83.3**
No	**3**	**16.7**
Total	**18**	**100**
Are the vaccines stored according to the standard?		
Yes	**9**	**50**
No	**9**	**50**
Total	**18**	**100**

All district EPI coordinators explained how to estimate vaccine and supply needs of their district during in-depth interview. Concerning vaccine wastage rate and their avoidable factors most district EPI coordinators believe it is very difficult to avoid BCG vaccine wastage, because of difficulty getting 20 eligible children in one day. One EPI coordinator in a district quoted that *"we have to postpone 20 mothers for one day from the week. In this case we are losing some mothers not vaccinate their baby if they do not come on the day."*

6.3.3 VACCINE TEMPERATURE MONITORING

This study made an effort to see vaccine temperature monitoring with in selected health centers. All HCs recorded temperature of the refrigerator least twice per day for the last three months. All health centers had temperature charts posted on the wall of vaccination rooms. During observation, six (33.3%) the observed health centers found with temperature in the fridge below or above recommended range. (Table 10)

Table 10-Status of vaccine temperature monitoring in PHCs in Wolaita zone, 2010

S.No	Questions	Number	%
1.	Is cold chain temperature monitored and recorded at least twice per day for the last 3 months?		
	Yes	18	100
	No	0	0
	Total	18	100
2.	Temperature charts available?		
	Yes	18	100
	No	0	0
	Total	18	100
3.	Temperature in the fridge normal?		
	Yes	12	66.7
	No	6	33.3
	Total	18	100

It was mentioned by most of the interviewees that there are a lot of refrigerators not functional due to lack of maintenance. Some of the district EPI coordinators tried to explained that because there is only electricity refrigerators, vaccine expose to above normal temperature when electricity fluctuates.

6.3.4 INJECTION SAFETY

Regarding injection safety of vaccination, a total of 36 injection procedures were observed in 18 health centers. All health centers used AD syringes for injection but only 3 of 36 (8.34%) observations were sterile. About 92% of the observed procedures used safety boxes to dispose used syringes.

Table 11-Condition of injection safety in PHCs in Wolaita zone, 2010

S.No	Questions		Number	%
1.	Used AD syringes for injection?			
		Yes	**36**	**100**
		No	**0**	**0**
		Total	**36**	**100**
2.	Is there safety box to dispose used syringes?			
		Yes	**33**	**91.7**
		No	**3**	**8.3**
		Total	**36**	**100**
3.	Does the health worker see the expiry date before giving injection?			
		Yes	**6**	**16.7**
		No	**30**	**83.3**
		Total	**36**	**100**
4.	Is the process of injection sterile?			
		Yes	**3**	**8.3**
		No	**33**	**91.7**
		Total	**36**	**100**
5.	Does provider dispose injection supplies correctly?			
	Yes		**31**	**86.1**
	No		**5**	**13.3**
	Total		**36**	**100**

6.4 ASSESSMENT OUTCOME QUALITY

6.4.1 CLIENT SATISFACTION

One objective of this study was to assess client satisfaction of immunization service. Three hundred forty nine (86.2%) the responded mothers were satisfied by EPI service where as fifty six (13.2%) of the respondents were not satisfied by EPI service provided to them on the day.

Educational status of mothers, marital status, monthly income level, occupation, technical competence of the provider, consultation, confidentiality, waiting time, explanation about immunization and waiting area structure of EPI service were checked for any association with client satisfaction by using multiple logistic regression. And technical competence of the provider, consultation, confidentiality, waiting time, explanation about immunization and waiting area structure of EPI service were found to be predictors of client satisfaction.

Mothers who had consultation with service provider were 5 times more likely to be satisfied with service when compared with those of no consultation (OR= 5.1, 95% CI of 2.3, 11.4). Mothers who waited less or equal to 20 minutes were 3.8 times more likely to be satisfied by service than those waited greater than 20 minutes (OR= 3.8, 95% CI of 1.7,8.5). Mothers rated vaccinator as confidential about them were 4.4 times more likely to be satisfied than those of rated

vaccinator as not confidential about them (OR= 4.4, 95% CI of 2.0,9.6). Mothers to whom explained about immunization by the day were 3.4 times more likely to be satisfied by the service when compared with those of not explained about immunization (OR= 3.4, 95% CI of 1.6, 7.1). Mothers who rated vaccinator as technically competent were 5 times more likely to be satisfied by the service than those of rated vaccinator as technically not competent (OR= 5.1, 95% CI of 2.2, 11.8). Mothers who rated waiting area structure as good were 5 times more likely to be satisfied than those of rated as not good (OR= 5.2, 95% CI of 2.2, 11.1).

Table 12-Association between client satisfaction and predictor variables (Multiple logistic regressions) Wolaita zone March, 2010

Variables	Satisfied	Crude OR (95% CI)	Adjusted OR (95% CI)
Education of mothers			
Literate	293 (72.3%)	0.7 (0.3,1.7)	0.6 (0.2, 1.7)
Illiterate	56 (13.8%)	1	1
Income level			
>500birr monthly	278 (68.6%)	1.0 (0.5, 2.1)	1.9 (0.7, 4.9)
<= 500birr monthly	71 (17.5%)	1	1
Marital status			
Married	332 (81.9%)	0.7 (0.1, 3.2)	0.7 (0.1, 4.0)
Not married	17 (4.1%)	1	1
Consultation with service provider			
Yes	228 (56.2%)	3.9 (2.1, 7.2)	5.1(2.3, 11.4)*****
No	121 (29.6%)	1	1
Waiting time			
<= 20 minutes	187 (46.1%)	3.1 (1.6, 5.9)	3.8 (1.7, 8.5)*****
>20minutes	162 (40%)	1	1
Technical competence			
Competent	226 (55.8%)	2.1 (1.2, 3.7)	5.1 (2.2, 11.8)*****
Not competent	123 (30.3%)	1	1
Vaccinator confidentiality			
Confidential	203 (50.1%)	5.3 (2.7,10.4)	4.4 (2.0, 9.6)*****
Not confidential	142 (35.0%)	1	
Waiting area structure			
Good	183 (45.1%)	5.7 (2.7,12.1)	5.2 (2.2, 11.1)*****
Not good	166 (40.9%)	1	

*p-value less than 0.005

6.4.2 MOTHERS' KNOWLEDGE ON IMMUNIZATION

Mothers were asked four knowledge question regarding immunization. Three hundred twenty eight (81%) of the responded mothers knew when to return to next immunization and 333 (82.2%) of the interviewees knew that at what age a baby completes immunization. Two hundred ninety three mothers (72.3%) mothers knew that there vaccine given to mothers; among those who knew that there is vaccine given to mothers 144 (49.2%) did not know that vaccine for

mothers is for tetanus. To determine overall knowledge level mean score was calculated to be 3. Then mothers who scored mean and above were rated as knowledgeable and scored below mean were rated as not knowledgeable. In this regard, 61.2% of clients were knowledgeable about immunization and the rest were not.

Table 13-Level of knowledge among Mothers/caregivers in PHCs in Wolaita zone, March 2010

Questions		Frequency	Percent
Did mothers or care givers know when to return to the next immunization?			
	Yes	328	81
	No	77	19
	Total	405	100
Did mothers or caregivers know at what age a baby completes immunization session?			
	Yes	333	82.2
	No	72	17.8
	Total	405	100
Did mothers or caregivers know that there is vaccine that is given to mothers?			
	Yes	293	72.3
	No	112	27.7
	Total	405	100
Did mothers or caregivers know the vaccine given to mothers is for tetanus?			
	Yes	149	50.8
	No	144	49.2
	Total	293	100
Overall knowledge level			
	Knowledgeable	248	61.2
	Not knowledgeable	157	38.8
	Total	405	100

All mothers/caregivers were asked to mention why they vaccinate their child. The most commonly mentioned disease was measles (31.6%) followed by polio (24.9%). And none of the respondents mentioned pertusis whereas 20.5% mentioned tetanus. (Table 13)

Table 14-Reasons given by mothers or caregivers immunizing their child in Wolaita zone, 2010

S.No	Reason	Percentage
1.	Prevent measles	31.6
2.	Prevent polio	24.9
3.	Prevent tetanus	20.5
4.	Prevent tuberculosis	14.6
5.	Prevent diphtheria	7
6.	Prevent pertusis	0

*More than 1 response was possible; hence the total is greater than 100%. Among those diseases which mothers thought were prevented by immunization were generally good for health, HIV/AIDS, prevent from diarrheal disease and cough.

CHAPTER 7: DISCUSSION

Structural quality of health facilities was assessed in terms of availability of equipments and supplies necessary to provide immunization services. In this study, all assessed equipments and supplies of EPI service in health centers were rated as adequate. It is higher than result of study in south east Nigeria on quality of child health services in primary health care facilities which rated as fairly adequate in terms of equipments and supplies. The availability of these important equipments has the potential to encourage effective operation of immunization services because maintenance of an effective cold chain system is important to ensure the potency of vaccines. [26]

Eighty three percent of health facilities and (64.58%) health posts observed to have all types of vaccines in their stock and 77.7% of health centers have all the necessary EPI equipments whereas a health facility survey of child health services conducted in SNNPR in 2001 found that 79% of health centers had all the necessary EPI equipment and supplies; all vaccines were present in 89% of facilities. [24] A difference was found regarding vaccine availability in health centers and health posts. This is may be due to lack of refrigerators in health posts to store vaccines, lack of trained human power to maintain refrigerator and topographical barriers to transport vaccines to the remote health posts. Ideally, it is recommended that all facilities have to be equipped with all supplies and equipments necessary to provide vaccination services. Hence findings from this study indicate that there is space to improve regarding vaccine supplies, fridges and other equipments necessary for vaccination in primary health care facilities especially in health posts.

Keeping vaccines at the right temperature is not an easy task, but the consequences of not doing so can be disastrous. Once vaccine potency is lost, it cannot be regained. Damaged vaccines must be destroyed, which can leave a country without adequate vaccine stocks and can cause serious budget problems when the losses involve large lots and/or expensive vaccines. Children and women who receive a vaccine that is not potent are not protected. [32]

Observation checklist was used to assess condition of cold chain management at district health centers. One third (33%) of health centers were found to be refrigerator temperature range below or above normal range. A research done Niassa, Mozambique showed that 69.23% health facilities found to temperature range below above normal range. [25] This may be due to

electricity fluctuation, knowledge gap and/or negligence among health workers and absence of electricity/kerosene refrigerators.

Result of this study showed that in 50% of health centers, vaccine storage in the refrigerator was observed to be improper. On the contrary the study done on cold chain status at immunization centers in Ethiopia showed that vaccine storage in the refrigerator was observed to be improper in 47 (74%) of the health centers [29] and the study done in Canada showed that 13% of vaccines were exposed to freezing during distribution and storage [30], similarly the study done in two rural and one urban administrative area indicated that there were area weakness in cold chain system in Ethiopia which could compromise the potency of the vaccines and general quality of immunization service.

As in many developing countries, considerable attention is needed to improve injection safety in Ethiopia. It is obvious that increasing use of AD syringes is making an important contribution to injection safety. The results of the assessment showed that all health centers use AD syringes for injection. It is shocking that 91.6% of observed injection procedures were found to be non-sterile. As one study in Ethiopia showed that one third of the injections observed during a survey were found to be non-sterile. [25] This is may be due to health workers negligence to injection sterility.

The results in many satisfaction studies revealed that satisfaction is multi-factorial, and no one factor could be claimed to be the sole contributor to satisfaction or dissatisfaction. Nevertheless, some factors are more important than others in contributing to patient satisfaction. Identifying the relative importance of the variables helps to rationalize decisions related to the improvement of health care so that they are not limited to satisfaction rates only. [28]

Findings from multiple logistic regressions illustrated some important factors of client satisfaction. All predictors of client satisfaction were provider related factors, which supports the idea that some factors are more important than others in contributing to client satisfaction. In this regard the study showed that provider related factors are more important than socio-demographic variables in terms of client satisfaction.

The main predictors of client satisfaction were waiting time, provider technical competence, consultation, explanation, confidentiality and waiting area structure. Study done on determinants of satisfaction with primary health care setting and services showed that waiting area structure, explanation and consultation were important determinants of client satisfaction in primary health care facilities. This point toward it is better to focus on provider related factors to amplify client satisfaction.

When we come to client satisfaction level by EPI service, it was showed in the result that 86.2% of the respondents were satisfied by the service. This figure is smaller when it is compared with other similar study done in south east Nigeria which has a client satisfaction level of immunization services is 95.9%. This may indicate that there is difference in provider related factors between the countries in primary health care facilities.

Research from many countries indicates that people will use immunization services at least once if they know what services are offered and where and when they are available. They will return if they know when to come back, they have been treated respectfully; they have confidence that they will receive the vaccinations that they come for. [31]

Mothers'/caregivers knowledge is taken as one outcome of service quality. In assumption that mothers/caregivers who are well informed about EPI services and vaccine preventable diseases during facility visit will have adequate information about EPI services and positive impact quality of the service.

As one element of knowledge, mothers/caregivers were asked if they know when to return to the next immunization at exit of health center. Among them, 81% know when to return to the next immunization. This result is lower when it is compared with a study done in Daka city, Bangladesh which is 96.7% of mothers knew when to return to next immunization. All mothers/caregivers were asked to mention why they vaccinate their child. The most commonly mentioned disease is measles (31.6%) followed by polio (24.9%). And none of the respondents mentioned pertusis whereas 20.5% mentioned tetanus. Similar study in Bangladesh, Dhaka city showed that 35% of mothers responded as to prevent measles, 30% to prevent TB, 25% to

prevent tetanus, 19% to prevent polio and 16% to prevent diphtheria. [14] This shows most mothers are exactly not aware of why they vaccinate their baby. Consequently, this may have negative impact on EPI service in that mothers will not vaccinate their babies for the reason they don't know.

CHAPTER 8: STRENGTHS AND LIMITATIONS OF THE STUDY

8.1 STRENGTHS OF THE STUDY

- Data were collected from all the three components of the program i.e. input, process and output.
- Data quality assurance mechanisms like data collectors training, supervision, and pretesting were employed.

8.2LIMITATIONS OF THE STUDY

- As it was health institution based study information bias can be introduced in that patients can respond in a relatively positive way fearing of being recognized.
- Possibility of observation bias can be there during observation for process of care.
- Similarly satisfied clients are relatively more likely to visit health facilities.

CHAPTER 9: CONCLUSION AND RECOMMENDATIONS

9.1 CONCLUSION

Even though it is essential to note that this study offers only a picture of the quality of immunization services in PHC facilities located within Wolaita zone, there is no reason to believe that the remarks reported in this paper are different from the situation in similar settings in other zones of the region.

Regarding quality of EPI service in the study area the study has concluded the following:

- Majority of health centers rated as adequate in terms of equipment and supply necessary for EPI services. But majority of health posts lack refrigerators.
- Below or above normal temperature in the fridge and inappropriate arrangement of vaccines in the fridge were found to be the key constraints concerning vaccine handling and cold chain management.
- Injection safety of EPI service was poor in that 91.6% of observed injection procedures were found to be non- sterile.
- 86.2% of mothers/caregivers were satisfied by the service and shows that there is a gap in terms of client satisfaction in Wolaita zone when compared with studies in other areas.
- 61.2% of clients were knowledgeable about immunization of mothers/caregivers were found to be knowledgeable on immunization and vaccine preventable disease.
- Factors related with service provider were found to be important determinants of client satisfaction.
- Although it has been argued that patients do not know what the technically acceptable level of care is, it is agreed that dissatisfaction is an indication that services delivered are lacking in some aspects of provider related factors.

9.2 RECOMMENDATIONS

District health offices / EPI coordinators

- Mothers/caregivers come for EPI services in PHCs has to be encouraged and well informed about importance and diseases that prevented by vaccination.
- Immunization service providers need training regarding cold chain management and vaccine handling at primary health care facilities.
- Injection safety measure has to be strengthen and training has to be given to health workers concerning injection safety
- Short waiting time, consultation, explanation about immunization, and competency of vaccinators has to be promoted.

To zonal health department/ Regional Health Bureau

- Health managers in the Wolaita zone and similar locales in the region should undertake a major review of the quality of immunization services in PHC facilities, focusing more on matters involving to process, and with particular prominence on health worker training on cold chain management and maintenance and appropriate vaccine temperature monitoring, and the development and implementation of protocols for injection safety.

- Health facilities have to work strongly in the area of vaccine temperature monitoring, since vaccines are highly sensitive to above or below recommended temperature.

- Provider related factors such as waiting time, consultation, confidentiality, waiting area structure and the like has to be promoted.

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ANNEX 2. QUESTIONNAIRE AND CHECKLISTS

OBSERVATION CHECKLIST FOR VACCINE AND COLD CHAIN MANAGEMENT AT DISTRICT LEVEL

Name of health facility _____

Name of observer _____

1. Does the facility have separate cold chain room?
   a. Yes
   b. No
2. Is the room ventilated?
   a. Yes
   b. No
3. Is the stock of vaccine sufficient until next supply arrives? (i.e. stock sufficient for 1 month or 2 weeks) Observe if all types of vaccines are available and adequate.
   a. Yes
   b. No
4. Is vaccine utilization made according to "first in first out" principle? Record review
   a. Yes
   b. No
5. Is cold chain temperature monitored and recorded at least twice per day for the last 3 months? Record review
   a. Yes
   b. No
6. Has the temperature been maintained at correct level during the last 3 months including weekends and festival days? Record review
   a. Yes
   b. No
7. Are all VVMs on the vaccine vials good? (Observe)
   a. Yes
   b. No
8. Are opened vials of freeze-dried vaccines discarded at the end of immunization sessions? (Observe)
   a. Yes
   b. No
9. Are opened vials of liquid vaccines kept for the next immunization sessions? (Observe)

a. Yes
b. No

10. Are the vaccines stored according to the standard?

Shelf of the refrigerator	Standard	Observed	Comment on what you observed
Top	BCG, polio and measles		
Middle	TT and pentavallent		
Lower	Diluents		
Bottom	Water bottles		

a. Yes
b. No

11. Are they used the refrigerator to store other things other than vaccines?
a. Yes
b. No

12. Temperature charts available?
a. Yes
b. No

13. Temperature in the fridge
a. High
b. Normal
c. Low

14. Read the thermometer before immunization?
a. Yes
b. No

OBSERVATION CHECKLIST OF INJECTION SAFETY

Name the health facility _____

Name of the observer _____

1. Syringe used for injection
    a. AD syringe
    b. Disposable
    c. Re-sterilizeable syringe
2. Is there safety box to dispose used syringes?
    a. Yes
    b. No
3. Does the health worker see the expiry date before giving injection?
    a. Yes
    b. No
4. Type of waste disposal facility used for the disposal of the majority of sharps (circle only one)
    a. Open burning on the ground
    b. Incinerator
    c. Dumping in pit latrine or other secure pit
    d. Transport for off-site treatment
5. Is the process of injection sterile?
    a. Yes
    b. No
6. Does the health worker use swab for skin preparation before injection is given?
    a. Yes
    b. No
7. Does the health worker give injection appropriately? (i.e. intradermal, intramuscular, subcutaneous)
    a. Yes
    b. No
8. Does the health worker do shaking procedures before giving injection?
    a. Yes
    b. No
9. Does provider check and use VVM correctly?
    a. Yes
    b. No
10. Does provider dispose of injection supplies correctly?
    a. Yes
    b. No

EPI Resource inventory checklist for health facilities at district level

Name of Health center/health post_____

Resource inventory	**Available**		**Adequate**		**Comments on the condition of the equipments**
Vaccines	**Yes**	**No**	**Yes**	**No**	
• Polio					
• Measles with diluents					
• BCG with diluents					
• Pentavallent vaccine					
• TT vaccine					
Vaccine containers and transporting materials	**Yes**	**No**	**Yes**	**No**	
• Small vaccine carriers					
• Plastic ice bags					
• Ice packs					
Thermometer					
Syringes					
• AD					
• Disposable					
Bags					
Registration book					
Mothers and child cards					
Tetanus vaccination card					
Daily vaccination tally sheet					
Vaccines registration /control form					
Monthly vaccination reporting form					
File folders					
File boxes					

Graph papers for monitoring vaccination					
Safety boxes					
Cold rooms and freezer rooms					
Motorcycles					
Human resource					
• EPI coordinators					
• Trained service providers					
Steam sterilizers					
Waiting rooms					
Service delivery room for EPI					
Have EPI manual					
vaccine cold chain monitor card,					
freeze indicators					
Stopwatch monitors					
Stock record book/sheets					

IN-DEPTH INTERVIEW CHECKLIST FOR DISTRICT HEALTH SYSTEM EPI COORDINATORS

Name of health center_____

Name of the interviewee _____

Name of the interviewer_____

Cold chain management

1. Who is responsible for vaccine supply and distribution of your district
2. Challenge in management of cold chain management in transportation, in receiving and distributing to health posts
3. What do suggest on record system of vaccine management?
4. Refrigerator (source of energy kerosene, gas, electricity, or solar energy)
5. How do you manage expired vaccine?
6. Communication with zonal health department and health posts (reports and supervision)?
7. Cold boxes and their management?
8. How long do you use vaccine carriers? Maximum length of time is 48 hours.
9. Do you use cold chain monitoring equipment for vaccine temperature management and vaccine safety?
    a. VVMs
    b. Vaccine cold chain monitor card
    c. Thermometers
    d. Freeze indicators
        i. Freeze watch
        ii. Freeze tag

Injection safety

10. What measures do you take to have safe injection in EPI program in your district?
11. What type of syringes do you use for EPI?

Planning

12. How do you plan for immunization in your district?
13. Do you involve community in your planning?
    a. Yes
    b. No
14. If no why?

Vaccine supply estimation

15. How do you estimate vaccine and supply needs of your district?

Stock management

16. What do suggest in stock management at district level
17. What do you suggest in stock management at health facility level
18. Do you use stock cards?
    a. Yes
    b. No
19. If no why?

Vaccine wastage

20. What are avoidable factors in vaccine wastage?
21. What are unavoidable factors in vaccine wastage?

Human resource

22. What is vaccine wastage rate of your district/health center?

23. Adequate and trained human resource for EPI at you district?
    a. Yes
    b. No
24. If no why

Cold chain equipment maintenance

25. Is the refrigerator maintained as necessary
    a. Yes
    b. No
26. If no why
27. Is there any refrigerator out of use due to maintenance problems
    a. Yes
    b. No

Availability and adequacy of supplies and vaccines

28. Are there adequate vaccines and supplies?
    a. Yes
    b. No
29. If no, which vaccine is not available and adequate?
30. And which supply is run out of stock?

Budget

31. Is there adequate budget for EPI of the district?
    a. For training: yes/no
    b. Maintenance of cold chain equipments such as refrigerators: yes/no
    c. Kerosene and any other: yes/no
32. If no why?

General

33. Generally, what do suggest on delivery of EPI service in your district/health facility?

34. What do you suggest to improve the quality of EPI service in your district/health facility/health posts?

35. What are the main problems regarding of cold chain, injection safety, stock management, human resource management, communication and any other activities related with quality of EPI service in your district/health facility/health posts?

INTERVIEW FOR MOTHERS /CAREGIVERS

በጤና ድርጅቶቹ ውስጥ ያለውን የክትባት አገልግሎት አሳጣጥ ለማወቅ የተዘጋጀ ቃለ መጠይቆ

ጤና ይስጥልኝ ..... ንደ ምን አደሩ /ዋሉ?

ይህ ቃለመጠይቅ የተዘጋጀው ጤና ድርጅቶች ውስጥ ያለውን የክትባት አገልግሎት ጥራት ለማጥናት ነው::

ኔ ስሜ ---------- ይባላል፣ የመጣሁትም በዚህ የጤና ድርጅት ውስጥ ያለውን የክትባት አገልግሎት ጥራት ለማጥናት ነው :: ስለዚህ ዛሬ በክትባት አገልግሎት አሰጣጥ ያገጠመዋትን በማቀርብልዋት መጠይቅ መሠረት ለመንገር ከ ኔ ጋር ጥቂት ደቂቃዎች ቢያሳልፉ ደስተኛ ነኝ፣ የሚሰጡኝ መረጃ በሙሉ በሚሰጥር የሚጠበቅ ሲሆን ሰምዎን መግለጽ አያስፈልግም:: የ ርስዎም ተሳትፎ በፍላጎትዎ ላይ የተመሠረተ ነው:: መመለስ የማይፈልጉትን ጥያቄ ንዲመልሱ አይገደዱም::

ንዲቀጥል ፍቃደኛ ነዋት? አዎ ---------- አይደለም ----------

የጤና ድርጅቱ ስም ----------

የወረዳው ስም ----------

የቃለመጠይቁ መለያ ቁጥር ----------

ቀን ----------

የጠያቂው ፊርማ ----------

<u>ክፍል አንድ ማበረሰባዊና ስነ-ሕዝባዊ ጥያቄዎች</u>

1. **የ ናት/ የተንከባካቢ ድሜ በአመት ----------**
2. **የህፃኑ ድሜ በወራት ----------**
3. **የ ናት/ የተንከባካቢ የጋብቻ ሁኔ**
   - **ሀ. ባለትዳር**
   - **ለ. ያላገቡ**
   - **ሐ. የተፋቱ**
   - **መ. ባል/ሚስት የሞተባቸው**
   - **ሠ. የተለያይተው የሚኖሩ**
4. **የ ናት/ የተንከባካቢ የትምህርት ደረጃ**
   1. **ያልተማሩ**
   2. **መሠረተ ትምህርት**

3. ከ1-6ኛ ክፍል

4. 7-12ኛ ክፍል

5. ከ12ኛ በላይ

5. የ ናት/የተንከባካቢ የመኖሪያ ቦ

1. ከተማ

2. ገጠር

6. ሀይማኖትዎ ምንድነው?

1. ኦርቶዶክስ

2. ፕሮነስ ንት

3. መስሊም

4. ሌላ ይገለጽ ----------

7. ብሔረሰብዎ ምንድ ነው?

1. ወላይ

2. ጉራጌ

3. ሲዳማ

4. አማራ

5. ሌላ (ይገለጽ) ----------

8. ሥራዎ ምንድነው?

1. የመንግሥት ሠራተኛ 2. የግል ድርጅት ተቀጣሪ

3. ነጋዴ 4. የቤት መቤት

5. ተማሪ 6. ሌላ ----------

9. ያገቡትን ብቻ የሚጠይቅ፣ የባለቤትዎ ሥራ ምንድነው?

1. የመንግሥት ሠራተኛ 2. የግል ድርጅት ተቀጣሪ

3. ገበሬ 4. ነጋዴ

5. የቀን ሠራተኛ 6. ሌላ ----------

10. የቤተሰብዎ አማካኝ የወር ገቢ በብር ምን ያህል ነው? ----------

11. ልጅዎን ካስከተቡ በኋላ በልጅዎ ላይ የ የ የጤና ችግር ነበር?

1. አዎ

2. አይደለም

3. አላስ ውስም

12. ከላይ በተራ ቁጥር 11 ለተጠየቀው ጥያቄ መልስ «አዎ» ከሆነ፣ ማስረዳት ይችላሉ? ----------
---
---:

ክፍል 3 የአገልግሎት ቅርበት

1. ከቤትዎ ስከዚህ ጤናጣቢያ/ጤና ኬላ ለመድረስ የፈጀብዎት ጊዜ ምን ያህል ነው? ----------
---------- በደቂቃ
2. የጤና አገልግሎት ድርጅት ከቤትዎ ርቆ መገኘቱ የክትባት አገልግሎት አድርሶኛል ብለው ያስባሉ?
   1. አዎ 2. አይደለም (አላሥብም)
3. የክትባት አገልግሎትን ንዳይጠቀሙ የሚያደርጉ አክሎች ካሉ ይንገሩን? ----------
---::

4. የክትባት አገልግሎትን ለማሻሻል ምን መደረግ አለበት ብለው ያስባሉ?

---::

ክፍል 4 ስለክትባት የ ናቶች/የተንከባካቢዎች ውቀት በተመለከተ

1. ክትባት ሊከለከላቸው የሚችለውን በሽ ዎች ሊነግሩኝ ይችላሉ?
   1. ---------- 5. ----------
   2. ---------- 6. ----------
   3. ---------- 7. ----------
   4. ---------- 8. ----------

2. የክትባት ካርድዎን ይዘዋል? ከያዙ ያሣዩ

3. የክትባት ካርድ ለያዙ ናቶች ብቻ የሚጠየቅ ናቶች/ተንከባካቢዎች ለሚቀጥለው ክትባት መቼ መመለስ ንዳለባቸው ይጠየቁ:: ----------
   ቀናት/ሣምን ት/ወራት በኋላ
   ካርድ ላይ የተመለከተው ቀን ---------- ቀናት/ሣምን ት/ወራት በኋላ

4. አንድ ህፃን ሙሉ ክትባት ወስዶ የመጨረሻው በስንት ወር ነው?

---------- በወራት

Good morning/ good afternoon. I would like to assess the immunization service in this institution and would be very much interested to find out your experience today. I would like to ask you a few questions about immunization service in this health institution and would be very great full if you could spend a few minutes answering questions related to the service. All information you give will be kept strictly confidential. Your participation is voluntary and you are not obliged to answer any questions you don't want to respond.

Do I have your permission to continue? Yes _____ No _____

Name of health institution _____

Name or woreda _____

Code No_____

Date of Interview _____

Signature of interviewer_____

PART I: SOCIO-DEMIOGRAPHIC CHARACTERSTICS OF MOTHERS/ CAREGIVERS

1. **Age of mother/care taker in years _____**
2. **Age of the child in months _____**
3. **Marital status of the mother /care taker**
    a) Married
    b) Single/never married
    c) Divorced
    d) Widowed
    e) Separated
4. **What is your education level**?
    a) Illiterate
    b) Attended literacy education
    c) From grade 1-6
    d) From grade 7-12
    e) 12+
5. **Residence**
    a) Urban
    b) Rural
6. **What is your religion?**
    a) Orthodox Christian
    b) Muslim
    c) Protestant
    d) Other specify
7. **What is your ethnic Origin?**
    a) Wolaita
    b) Gurage
    c) Sidama
    d) Amhara
    e) Other (specify) _____

8. **What is your occupation?**
    a) Government employee
    b) Private enterprise employee
    c) Merchant
    d) House wife
    e) Student
    f) Other specify _____
9. **Ask only those married, what is your spouse's occupation?**
    a) Government employee
    b) Private enterprise employee
    c) Farmer
    d) Merchant
    e) Daily laborer
    f) Other
10. **What is the average monthly income of the household?**

    _____ in birr
11. **Did your child face any health problem after taking vaccination?**
    a) Yes
    b) No
    c) I don't remember
12. **If yes to question 11, would you tell me that?**

    _____

    _____

    _____

PART II: CLIENT SATISFACTION

Questions	responses
Are you satisfied with immunization service provided to you today?	1) Yes 2) No
Did you have consultation with vaccinator?	1) Yes 2) No
Technically competent?	1) Competent 2) Not competent
Vaccinator confidentiality	1) Confidential 2) Not confidential
Waiting time in minutes	_____
Did the health worker explained about immunization?	1) Yes 2) No
Waiting area structure of EPI service?	1. Good 2. Not good

PART III: ACCESS TO SERVICE

1. How long does it take you to come to this health facility?
   _____ in minutes
2. Do you think physical distance from the health facility is one barrier not to receive immunization service?
   a. Yes
   b. No
3. Is there any barrier which prohibits immunization services?
   _____
4. Ask each woman if she has suggestions for improving the vaccination services:
   _____
   _____
   _____

_____

_____

_____

PART IV: KNOWLEDGE MOTHERS ON IMMUNIZATION

1. Would you tell me the diseases that can be prevented by vaccination?
    1. _____
    2. _____
    3. _____
    4. ____ _____
    5. _____
    6. _____
2. Ask to see the vaccination card(s). Have the vaccination schedules of the women and children and the rules regarding contra-indications been observed to today?
3. Ask the women the following question: “when must you come back for your next vaccination and/or that of your child? (Compare her answer to the information provided on the vaccination card. If her answer does not correspond to the nearest date indicated the answer as “No”.)

DECLARATION

I, the undersigned, declare that this thesis is my original work, has not been presented for a degree in this or any other university and that all sources of materials used for the thesis have been fully acknowledged.

Name: YIBELTAL KASSA

Signature:

Name of the institution: JIMMA UNIVERSITY, COLLEGE OF PUBLIC HEALTH AND MEDICAL SCIENCE

Date of submission: June 22, 2010

This thesis has been submitted for examination with my approval as University advisor

Name and Signature of the first advisor: CHALLI JIRA (MPH, CHMPP, DVLDP) Professor

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Name and Signature of the second advisor: YOHANNES EJIGU (BSc. MSc)

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