



## Clients Satisfaction towards Vaccination Service and Associated Factors in Doyogena District, Southern Ethiopia: A Community-Based Cross-Sectional Study

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### ABSTRACT

**Introduction:** Client satisfaction with vaccination service is one of the most commonly used outcome measures, and addressed to improve the value and efficacy of vaccination service provision. Studies conducted in Ethiopia were institution-based on clients who were already decided, but, there are clients in their homes that did not frequently visit the health institution. **Objective:** To assess clients satisfaction with vaccination services and associated factors in the Doyogena district, southern Ethiopia, 2022. **Methods:** A community-based cross-sectional study design was employed from April 1 to 30/2022. The total sample size was 350. A simple random sampling technique was used to select kebeles, and a systematic sampling technique was used to select clients. The data were entered by using Epi data version 3.1 and analyzed by SPSS version 24 software. Frequency, tables, and figures were used. Multi-collinearity was checked and the goodness of fit test was done using the Hosmer-Lemeshow model goodness fit test. Bivariable analysis was done and variables with *p* value less than 0.25 were entered into multivariable logistic regression analysis. Statistical significance was declared at a *p*-value less than 0.05 with a 95% confidence interval. **Results:** The magnitude of clients' satisfaction with vaccination service was 51.7% (95% CI: 46.2-57.5). Clients in age group 25-29 (AOR: 0.32, 95% CI: 0.11-0.95), age group 30-34 (AOR: 0.15, 95% CI: 0.06-0.37), time taken to reach health facility less than 30 minutes (AOR: 7.11, 95% CI: 3.51-14.41), problem after vaccination (AOR: 0.19, 95% CI: 0.09-0.38) and happy when infant got vaccinated (AOR: 2.58, 95% CI: 1.06-6.29) were associated with client satisfaction towards vaccination service. **Conclusion:** The clients satisfaction with vaccination service was low. Therefore, healthcare workers should use outreach sites near the community for vaccination services, explain the side effects, caution, and possible complications of vaccination, and provide health information for clients towards vaccination services.

**Keywords:** Client satisfaction, Infant, Vaccination, Bivariable, Hosmer-Lemeshow

## INTRODUCTION

A client satisfaction with vaccination service is one of the most commonly used outcome measures and is addressed to improve the value and efficacy of vaccination service provision. It affords valuable feedback on how the vaccination service is operating according to clients' views and what changes might be needed to meet clients' anticipation [1-3]. Studies have reported that client satisfaction is key to improving vaccination service [4-6].

Almost 5.3 million children died globally, and over half of the deaths occurred before the age of five due to vaccine-preventable disease, vaccines are considered one of the safest and most cost-effective interventions to reduce childhood morbidity and mortality [7,8]. However, currently, 19.4 million children under the age of one year do not receive basic vaccines, 60% of whom live in Angola, Brazil, Congo, Ethiopia, India, Indonesia, Nigeria, Pakistan, Philippines, and Vietnam [9]. In developing countries, approximately 8 million children die before they reach their fifth birthday [10-13]. Compared with a child in Western Europe, an Ethiopian, child is 30 times more likely to die by his or her fifth year of birth [14-16].

Although efforts have been made thus far, low-income countries continue to meet a substantial burden of vaccine-preventable diseases, and their immunization coverage is low compared to middle- and high-income countries [17]. However, studies show that client satisfaction improves vaccination service coverage [18-20].

Of children who were not immunized or not fully immunized, 11.7 million lived in ten low-income countries, one of which was Ethiopia. The Ethiopian government has made some changes, such as ensuring a continuous supply of vaccines, providing health education on childhood immunization, and improving the service process system to increase client satisfaction, which may increase immunization levels [21,22].

The Ethiopian National Expanded Program on Immunization (EPI) aligns the sustainable development goals 2016-2030, the Global vaccine action plan 2011-2020, and Gavi the vaccine alliance in setting goals for health outcomes and vaccination coverage. The EPI and the Global vaccine plan have set coverage goals of 90% at the national level and 80% at the district level by 2020 but, national coverage for basic vaccination in Ethiopia was 39.7% and single vaccination coverage ranged between 53.2% and 69.2% [9,23]. This shows that the level of client satisfaction towards vaccination service was low and the reason is the problem related to clients' satisfaction towards the vaccination service. In addition to this, studies conducted in Ethiopia were institution based on clients who were already decided, but, there are clients in their homes that did not frequently visit the health institution. As a result, this community-based study assessed clients' satisfaction with vaccination services and associated factors in the Doyogena district.

## MATERIALS AND METHODS

### Study area and period

Doyogena district is found in the Kembata Tembaro zone of the Southern Nation Nationalities and peoples' regional State of Ethiopia. The district is located 67 km away from Durame, the capital of the Kembata Tembaro zone, and 258 km away from Addis Ababa, the capital of Ethiopia. The district has a primary hospital, three health centers, nineteen health posts, seven private clinics, and eight drug stores. The health facilities found in the district provide preventive, curative, and rehabilitative health care services for the population coming from Doyogena and other nearby districts. There are 3,218 infants in the district and from these infants, 1,110 infants were within the selected kebeles. The study was conducted from April 1 to 30/2022.

### Study design

A community-based cross-sectional study was employed.

### Source population

All clients had an infant in the Doyogena district.

### Study population

All selected clients had an infant in the Doyogena district.

**Eligibility criteria:** Clients whose infants received at least one vaccination service in the district before the study period were included. However, clients who were severely ill during data collection were excluded.

**Sample size determination:** The sample size was calculated using a single population proportion formula with the assumption of a 5% margin of error (d), 95% confidence level ( $Z_{\alpha/2}$ ), and proportion of client satisfaction 61.1%, which was taken from a study conducted in Wadla district [1].

Using the above assumptions, the sample size was calculated as follows.

$$n = \frac{(Z_{\alpha/2})^2 P (1-P)}{d^2} = \frac{(1.96)^2 \times 0.682 \times 0.318}{(0.05)^2} = 333$$

Where,

p is the proportion of client satisfaction

d is the margin of error=0.05.

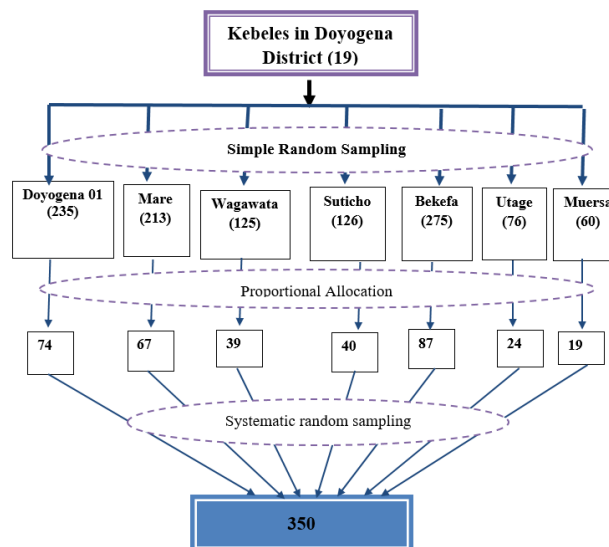
$Z_{\alpha/2}$  is confidence level required and  $Z_{\alpha/2}$  at 95% CI=1.96

n is the minimum sample size.

By considering a nonresponse rate of 5%, the sample size was 350.

### Sampling procedure

There were nineteen kebeles in the Doyogena district. From these nineteen kebeles, seven were included in this study by using a simple random sampling technique. The survey was done in the selected kebeles before the study period and the number of infants was identified. Then, the proportional allocation was used to determine the required number from the total number of infants in each kebele. Finally, a systematic random sampling technique was used to include the clients with a constant value of three which was gained by dividing the total number by the total sample size ( $1,110/350=3$ ). The first client was identified randomly and the data collectors interviewed every third client based on the constant value. The diagrammatic presentation of the sampling procedure is shown below (Figure 1).



**Figure 1** Diagrammatic presentation of the sampling procedure, Doyogena district, Southern Ethiopia, 2022

### Study variables

**Dependent variable:** Client satisfaction with vaccination service.

**Independent variables:** Sociodemographic characteristics of the client: Age, sex, educational status, marital status, religion, residence, occupation, and relationship of infant.

**Characteristics of the infant:** Age, sex, and birth order index.

**Process-related factors:** greeting before giving service in the vaccination room, giving information about the current vaccine type of vaccine infant taken, telling the next schedule.

**Access-related factors:** type of health facility, time taken to reach the health facility on foot, transportation to the health facility, and length of time for service.

**Knowledge of clients on vaccine:** vaccination targets diseases, vaccination protects an infant from infectious diseases, infants should start vaccinated just after birth, vaccinating breastfeeding infants, side effects of vaccines.

### Operational definitions

**Client:** An individual who took the infant to the health facility for vaccination service. It includes the mother, father, guardian, and grandmother.

**Kebele:** This is an administrative structure formed from a combination of villages.

**Health post:** This is the lowest hierarchical health facility in each kebele, in which health care was given including vaccination service.

**Health extension worker:** A diploma-certified health care worker who works in a health post at the kebele level.

**Health facility:** an institution in which different types of care management, including vaccination services, are given. It included primary hospitals and health centers.

**Infant:** A child aged less than one year.

**Clients satisfaction towards vaccination service:** It was measured using 10 satisfaction-related items. Each item was rated on a five-point Likert scale (*i.e.*, 1) Very dissatisfied 2) Dissatisfied 3) Neutral 4) Satisfied, and 5) Very satisfied). Then, dichotomized as satisfied and not satisfied by using the demarcation threshold formula, which is ((total highest score minus total lowest score) divided by two) plus total lowest score [1].

**Clients' knowledge about vaccination service:** It was measured using five 5 questions related to infant vaccination service. Each correct answer was given 2 and the incorrect answer was given 1 point. Then, categorized as good knowledge (if scored mean and above) and poor knowledge (if scored below the mean) [24].

**Data collection tool and data collection procedure:** The data were collected using a pretested structured questionnaire. The tool was adapted by reviewing works of literature related to satisfaction with vaccination services [10,25-28]. Clients with an infant in selected kebele were interviewed at their homes after inspecting the vaccination card. Four diploma nurses and two experienced master in public health holders were recruited for data collection and supervision, respectively. The data collection was carried out by visiting the homes identified by the survey with the guidance of health extension workers.

**Data quality control:** The tools were prepared in English, translated to Amharic (the official language of Ethiopia), translated to Kembtesa (the local language), and then retranslated to English by language experts to maintain consistency after data collection. Before the actual data collection, the 50% (18 clients) tool was pretested in Serara Kebele to test the clarity of the questions. One day of training was given to the data collectors and supervisors regarding the objectives, rationale of the study, informed consent, and interview techniques. All filled data were reviewed each day, and issues arising during the data collection were addressed by a discussion with the supervisors and data collectors. The overall process was monitored by the investigators.

**Data processing and data analysis:** The data were entered by using Epi data Version 3.1 and analyzed by using SPSS version 24 software. Descriptive statistics such as proportions, percentages, frequency distribution, and mean and standard deviation were used. Multicollinearity was checked by considering the variable inflation factor and the goodness of fit test was done using the Hosmer–Lemeshow model goodness fit test. Independent variables with p-

values less than 0.25 in the bivariable analysis were considered a candidate for multivariable analysis. Variables with a p-value less than 0.05 in multivariable analysis were considered statistically significant to declare an association with client satisfaction towards vaccination service.

## RESULTS

### Sociodemographic characteristics of clients

Three hundred fifty clients gave responses that made the overall response rate 100%. The mean age of clients with a standard deviation was  $28.84 \pm 5.816$  years. Most of the clients, 105 (30.0%), were 25-29 years old and 296 (84.6%) of the respondents were females. The majority of 300 (85.7%) were married, and 284 (81.1%) of the infants were taken by mothers. The majority, 233 (66.6%) attended formal education. More than half, 263 (75.1%) were housewives, and 260 (74.3%) were follower of Protestant religion (Table 1).

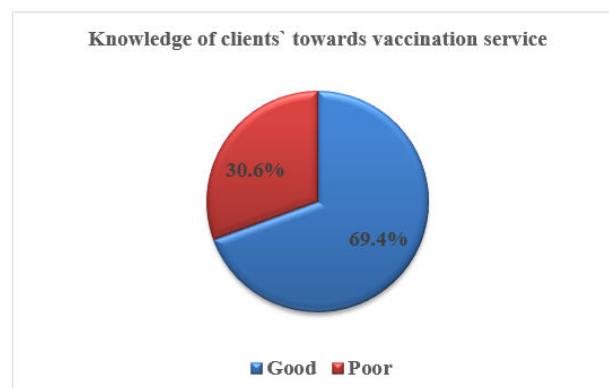
**Table 1 Socio-demographic characteristics of clients, Doyogena district, Southern Ethiopia, 2022**

Variable (n=350)	Category	Frequency	Percent
Age of clients	15-19	20	5.7
	20-24	68	19.4
	25-29	105	30
	30-34	93	26.6
	36- 40	64	18.3
Sex of clients	Male	54	15.4
	Female	296	84.6
Marital status of clients	Married	300	85.7
	Single	28	8
	Divorced	15	4.3
	Widowed	7	2
Relationship of the clients to infant	Mother	284	81.1
	Father	48	13.7
	Guardian	16	4.6
	Grandmother	2	0.6
Education status of the clients	Attended formal education	233	66.6
	Not attended formal education	117	33.4
Grade level of formally attended clients (n=233)	Grade 1-8 <sup>th</sup>	115	49.4
	Grade 9-12 <sup>th</sup>	85	36.5
	Diploma, degree, and masters holders	33	14.2

Occupation of the clients	Government employee	43	12.3
	Private employee	24	6.9
	Merchant	20	5.7
	Housewife	263	75.1
Residence of clients	Urban	129	36.9
	Rural	221	63.1
Religion of clients	Protestant	260	74.3
	Orthodox	27	7.7
	Catholic	32	9.1
	Muslim	19	5.4
	Others	12	3.4

**Infant characteristics:** More than half, 192 (54.9%) of the infants were females and 158 (45.1%) were males. The majority 228 (65.1%) were in the age category of 2-6 months, and 122 (34.9%) were in the age category of 7-11 months. The birth order index of 297 (84.9%) was less than or equal to four and 53 (15.1%) was greater than four.

**Knowledge of clients toward vaccination:** Out of 350 clients, 243 (69.4%) had good knowledge and 107 (30.6%) had poor knowledge about vaccination (Figure 2).



**Figure 2 Knowledge of clients' towards vaccination service, Doyogena district, Southern Ethiopia, 2022**

**Access related factors:** Regarding access-related factors, 157 (44.9%) clients go to the health center where infants are vaccinated. For more than half, 196 (56.0%) clients took 30 minutes or less to reach a health facility on foot, and vaccination was completed in fifteen minutes for 315 (90.0%). The majority, 266 (76.0%) came to health institutions on foot (Table 2).

**Table 2 Access-related factors of clients' satisfaction towards vaccination service, Doyogena district, Southern Ethiopia, 2022**

Variable (n= 350)	Category	Frequency	Percent
Type of health facility where infants vaccinated	Primary hospital	62	17.7
	Health center	157	44.9

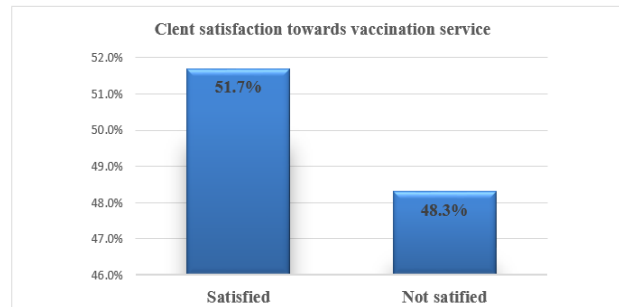
	Health post	131	37.4
The time it takes to reach the health facility on foot (in a minute)	<30 minute	196	56
	>30 minute	154	44
Time spent while getting vaccination (in a minute)	<15 minute	315	90
	>15 minute	35	10
Means of transportation	Bajaj	28	8
	Taxi	38	10.9
	Motor cycle	18	5.1
	On foot	266	76

**Process-related factors:** The majority, 299 (85.4%) of the clients were happy when an infant was vaccinated, and 289 (82.6%) of the clients were greeted by the health team before giving service. More than half, 256 (73.1%) of the clients received information about the current vaccine, 199 (77.7%) of the clients were told the dose of the vaccine an infant took, and 165(64.5%) of the clients were told the next immunization schedule. Only 90 (25.7%) of the client infants experienced problems after vaccination (Table 3).

**Table 3 Process-related factors of clients' satisfaction towards vaccination service, Doyogena district, Southern Ethiopia, 2022**

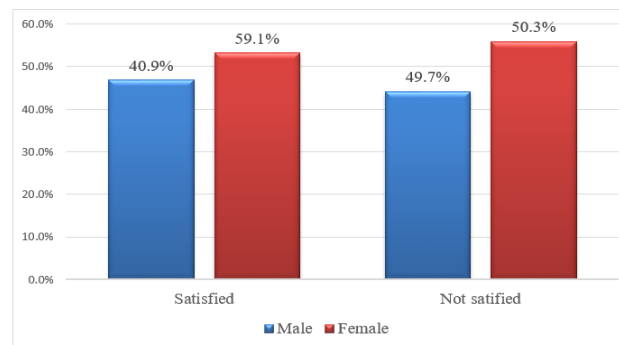
Variable (n=350)	Category	Frequency	Percent
Happy when an infant gets vaccinated	Yes	299	85.4
	No	51	14.6
The health team greeted before giving the service in vaccination	Yes	289	82.6
	No	61	17.4
Given information about the day's vaccine	Yes	256	73.1
	No	94	26.9
Health care worker told the type of vaccine an infant takes (n=256)	Yes	199	77.7
	No	57	22.3
Health care worker told the dose of the vaccine an infant taken (n=256)	Yes	165	64.5
	No	91	35.5
Health care worker told the next immunization schedule	Yes	287	82
	No	63	18
Infants got problems after being vaccinated	Yes	90	25.7
	No	260	74.3

**Client satisfaction with vaccination service:** Out of 350 clients who participated in this study, 181 (51.7%) were satisfied and 169 (48.3%) not satisfied with vaccination services in the study area (Figure 3).



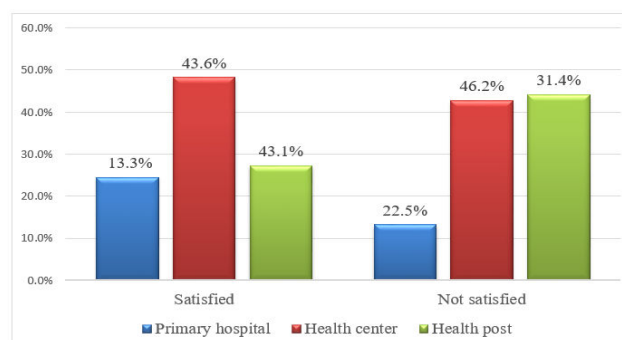
**Figure 3 Clients' satisfaction towards vaccination service, Doyogena district, Southern Ethiopia, 2022**

**Clients satisfaction with vaccination service regarding the sex of the infant:** Out of 350 clients, 84 (49.7%) clients were not satisfied with vaccination services for male infants, however, 74 (40.9%) clients were satisfied with vaccination services for male infants. On the other hand, 85 (50.3%) clients were not satisfied with vaccination services for female infants, but, 107 (59.1%) clients were satisfied with vaccination services for female infants (Figure 4).



**Figure 4 Clients satisfaction towards vaccination service regarding the sex of the infant, Doyogena district, Southern Ethiopia, 2022**

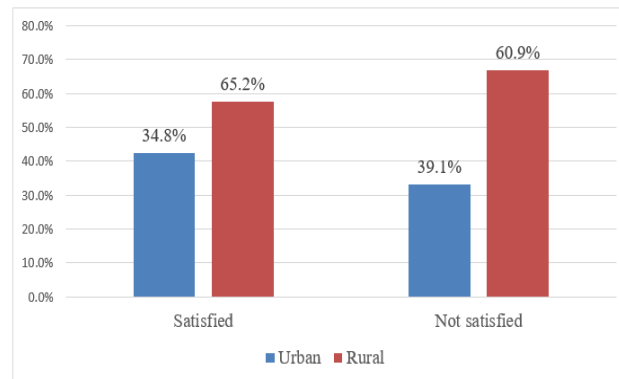
**Clients' satisfaction with vaccination service regarding the type of health facility where infants vaccinated:** In this study, among 62 clients whose infant was vaccinated in a primary hospital, 38 (22.5%) were not satisfied, whereas, 24 (13.3%) were satisfied with vaccination services. Again, among 157 clients whose infant was vaccinated in the health center, 78 (46.2%) were not satisfied, whereas, 79 (43.6%) were satisfied with vaccination services. Also, among 131 clients whose infant was vaccinated in health post, 53 (31.4%) were not satisfied, however, 78 (43.1%) were satisfied with vaccination services (Figure 5).



**Figure 5 Clients satisfaction towards vaccination service regarding the type of health facility where infants are vaccinated, Doyogena district, Southern Ethiopia, 2022**



**Clients satisfaction with vaccination service regarding residence:** Out of 129 clients whose residence was urban, 66 (39.1%) clients were not satisfied with the vaccination service, however, 63 (34.8%) clients were satisfied with the vaccination service. In contrast, out of 221 clients whose residence was rural, 103 (60.9%) clients were not satisfied with the vaccination service, but, 118 (65.2%) clients were satisfied with the vaccination service (Figure 6).



**Figure 6 Clients satisfaction towards vaccination service regarding residence, Doyogena district, Southern Ethiopia, 2022**

**Factors associated with clients' satisfaction with vaccination service:** In bivariable analysis, age, time taken to reach the health facility, information on the dose of vaccine, knowledge of clients towards vaccination, problem after vaccination, and happiness when the infant got vaccinated were candidates for bivariate analysis. In multivariable analysis, age group 25-29 (AOR: 0.32, 95% CI: 0.11-0.95), age group 30-34 (AOR: 0.15, 95% CI: 0.06-0.37), time taken to reach health facility  $\leq 30$  minutes (AOR: 7.11, 95% CI: 3.51-14.41), problem after vaccination (AOR: 0.19, 95% CI: 0.09-0.38) and happy when infant got vaccinated (AOR: 2.58, 95% CI: 1.06-6.29) were associated with client satisfaction towards vaccination service (Table 4).

**Table 4 Factors associated with client's satisfaction towards vaccination service, Doyogena district, Southern Ethiopia, 2022**

Variables (n=350)	Category	Client satisfaction towards vaccination service		COR (95% CI)	AOR (95% CI)	P- value
		Not satisfied	Satisfied			
Age in years	15-19	8 (2.3%)	12 (3.4%)	1	1	
	20-24	34 (9.7%)	34 (9.7%)	0.63 (0.22-1.79)	0.10 (0.01-1.87)	0.124
	25-29	68 (19.4%)	37 (10.6%)	0.42 (0.21-0.86)	0.32 (0.11-0.95)	0.040*
	30-34	40 (11.4%)	53 (15.1%)	0.23 (0.12-0.45)	0.15 (0.06-0.37)	0.000*
	36-40	19 (5.4%)	45 (12.9%)	1	1	
Time taken to reach a health facility	<30 minute	118 (33.7%)	78 (22.3%)	3.06 (1.97-4.75)	7.11 (3.51-14.41)	0.000*
	>30 minute	51 (14.6%)	103 (29.4%)	1	1	
Informed on the dose of vaccine	Yes	69 (27%)	96 (37.5%)	0.39 (0.23-0.66)	0.57 (0.28-1.17)	0.127
	No	59 (23.0%)	32 (12.5%)	1	1	

Knowledge of clients	Yes	63 (18.0%)	44 (12.6%)	1.85 (1.17-2.93)	1.07 (0.57-2.02)	0.831
	No	106 (62.7%)	137 (75.7%)	1	1	
Problem after vaccination	Yes	31 (8.9%)	59 (16.9%)	0.47 (0.28-0.77)	0.19 (0.09-0.38)	0.000*
	No	138 (39.4%)	122 (34.9%)	1	1	
Happy when an infant gets vaccinated	Yes	151 (43.1%)	148 (42.3%)	1.87 (1.01-3.47)	2.58 (1.06-6.29)	0.038*
	No	18 (5.1%)	33 (9.4%)	1	1	
<b>Note:</b> COR: Crude Odds Ratio; AOR: Adjusted Odds Ratio; “*” p<0.05:Statistically associated; “1”=Reference group						

## DISCUSSION

The finding of this study revealed that the magnitude of clients' satisfaction with vaccination service was 51.7% (95% CI: 46.2-57.5). It was in line with an institution-based cross-sectional study conducted in Iraq, which was 50.2%, and in Jigjiga Zone, Somali Region, 53.3% [20,29]. However, it was lower than a study conducted in Wadla district, North Wollo, Ethiopia, 68.2%, Kombolcha town, Amhara Region, Ethiopia which was 61.1%, a report from Egypt at 63%, Ondo State in Nigeria 68.9%, in Jahrom, Iran 66.7%, Guatemala 70.4%, New Cairo district Egypt 74.4%, Suez governorate Egypt 95.2% and Sokoto metropolis, Nigeria 75% [30-35]. The difference might be due to sociodemographic characteristics, the difference in sample size and study setting (institutional-based versus community-based), and the study period difference due to the increase in expectation of clients to the service they are going to receive with rapid advancement in technology and people's thinking, and the techniques used to compute overall satisfaction could be the attributes for the difference. In addition, the difference might be related to the kindly respectful care of the health care providers and the establishment of the health care facility for vaccination service.

Regarding the factors associated with clients satisfaction with vaccination services, age was statistically associated. Clients in the age group 25-29 were 68% less likely to be satisfied with vaccination services compared to clients aged 15-19 years. Also, those clients in the age group 30-34 were 85% less likely to be satisfied with vaccination services compared to clients aged 36-40 years. This is supported by another study in Jigjiga Zone, Eastern Ethiopia [20]. It was explained that older clients have better knowledge of the effect and relevance of immunization on child health due to previous exposures compared to younger [36,37].

In this study, the time taken to reach the health facility was significantly associated with satisfaction with vaccination. Clients whose time taken to reach the health facility was less than thirty minutes were 7.11 times more likely to be satisfied with vaccination service compared to clients whose time taken to reach the health facility was greater than thirty minutes. This was similar to other studies that indicated clients whose time taken to reach health facilities was less than thirty minutes were more likely to vaccinate their infant and be satisfied with the vaccination [16,20,38]. This might be related to easy access to the vaccination service for those who are far from the health facility. In addition, expenses related to transportation, time-wasting, and missing any work expected to be done at that wasting time could have a contribution.

This study identified that the problem that occurred after previous vaccination was significantly associated with satisfaction towards vaccination. Clients whose infants had problems after previous vaccination were 81% less likely to be satisfied with vaccination service compared to clients whose infants did not have a problem after the previous vaccination. Studies indicate that such clients were not only satisfied but also stopped vaccination services [16,39,40]. This is due to the wrong perception of vaccine side effects and inadequate explanations for clients during vaccination.

Clients who were happy when the infant got vaccinated were 2.58 times more likely to be satisfied with the vaccination service compared to clients who were not happy when the infant got vaccinated. This is explained in other studies as clients who have a favorable attitude towards vaccination service were found more likely to be satisfied [1]. The possible explanation might be happy clients would have more opportunities to understand the vaccination, its importance, and better compliance with the immunization schedule which ultimately generates more satisfaction towards vaccination service.

### **CONCLUSION**

The client's satisfaction with the vaccination service was low. Age, time taken to reach a health facility, problems after vaccination, and being happy when an infant got vaccinated were statistically associated with clients' satisfaction with vaccination. Therefore, to improve client satisfaction, healthcare workers should use outreach sites near the community for vaccination services, explain the side effects, caution, and possible complications of vaccination, and provide health information for clients regarding vaccination services.

### **LIMITATIONS OF THE STUDY**

The study may encore recall bias as it asks back information about previous vaccination services, cannot ascertain cause and effect relationship since it was a cross-sectional type, and the absence qualitative study to strengthen the quantitative data could be a potential limitation of the study.

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### **AUTHOR CONTRIBUTION**

Terefe Lafore, Sindu Degefu, Elias Ezo, and Kidist Ashager: Conceived and designed the experiments; Terefe Lafore and Bekafe Kibamo: Experimented. Elias Ezo, and Kebebus Ergicho: Analyzed and interpreted the data. Sindu Degefu, Elias Ezo, and Kidist Ashager: Contributed reagents, materials, analysis tools, or data; Elias Ezo and Sindu Degefu: Wrote the paper.

### **AVAILABILITY OF DATA**

The data are available upon secure and reasonable request.

### **DECLARATION OF INTERESTS**

All authors declare that they have no conflict of interest.

### **ETHICAL CONSIDERATION**

Ethical approval and clearance letter were obtained from Wachemo University, ethical review committee (WCU/CMHS/62/13). A permission letter was also secured from the Doyogena district health office for each selected kebele.

### **INFORMED CONSENT**

Written informed consent was obtained from each participant, and the information obtained from them would not have been disclosed. Coding was used to eliminate names and other personal identification of respondents to ensure anonymity, privacy, and confidentiality. Thoroughly, our research passed required the principles of declaration of Helsinki General Assembly, Seoul, Korea, and October 2008.

## FUNDING

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