

## Research Article

# Maternal Satisfaction towards Childhood Immunization Service and Its Associated Factors in Wadla District, North Wollo, Ethiopia, 2019

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**Background.** Maternal satisfaction is considered one of the most frequently used indicators to measure the quality and efficiency of childhood immunization service. Evaluating maternal satisfaction towards childhood immunization service is very relevant as it likely affects the clinical and revisit adherence, service quality, and its coverage. In countries like Ethiopia, where childhood immunization coverage is below average (39%) with low maternal satisfaction on the service, identifying factors associated with maternal satisfaction is very critical. Despite the acknowledgement made on the importance of maternal satisfaction for the successful provision of child immunization services, there is limited knowledge in Ethiopia on its contributing factors. **Objective.** The aim of this study was to assess maternal satisfaction towards childhood immunization service and its associated factors among mothers' having children aged less than 1 year in Wadla district, North Wollo, Ethiopia, 2019. **Methods.** A community-based cross-sectional study was conducted among 682 mothers from March to April 2019 in Wadla district, North Wollo, Ethiopia. A two-stage cluster sampling technique was used to select households of the study participants. A pretested interviewer-administered structured questionnaire was used. During the period of data collection, every questionnaire was cross-checked and the collected data were checked for completeness and consistency on a daily basis. Then, the cleaned data was coded and entered into Epi Info software version 7.2.2.2 and exported to SPSS software version 23.0 for analysis. Bivariable and multivariable logistic regression analyses were done to identify variables having a significant association with maternal satisfaction. Variables with a *p* value of  $\leq 0.05$  and adjusted odds ratio with 95% CI were considered having a statistically significant association during multivariable logistic regression analysis. Then, the findings were presented using tables, graphs, and charts. **Result.** The overall proportion of maternal satisfaction towards childhood immunization service was found to be 68.2% [95%CI = (64.7% – 71.7%)]. The finding revealed that attending secondary education [adjusted odds ratio (AOR) = 0.26; 95%CI = (0.13 – 0.53)], being divorced [AOR = 0.46; 95%CI = 0.23 – 0.91], and having favorable attitude towards child immunization [AOR = 1.58; 95%CI = (1.05 – 2.33)] were found to be significantly associated with maternal satisfaction. Furthermore, the multivariable logistic regression analysis showed that short waiting time before receiving service [AOR = 1.83; 95%CI = (1.21 – 2.79)], greeting from care providers, [AOR = 5.69; 95%CI = (3.36 – 9.65)], having information about the current vaccine [AOR = 2.03; 95%CI = (1.25 – 3.32)], dose of vaccine [AOR = 2.24; 95%CI = (1.40 – 3.58)], and next immunization schedule [AOR = 3.21; 95%CI = (1.70 – 6.04)] were also significantly associated with maternal satisfaction towards childhood immunization services. **Conclusion and Recommendation.** Generally, the study showed that more than two-thirds of the mothers were satisfied by the immunization service rendered. The level of satisfaction was higher with respect to the health workers' relationship, communication, and immunization system aspects. However, more efforts need to be put towards improving the service waiting time for immunization, and provision of health information and communication is also recommended to enhance the level of favorable attitude among mothers towards childhood immunization services.

## 1. Background

Expanded Program on Immunization (EPI) has been taken as one of the world's most important public health strategies used to reduce morbidity and mortality associated with infectious diseases in children. It forms a key building block for the health care delivery systems by which over two million deaths are delayed each year worldwide through its successful implementation [1].

Maternal satisfaction is one of the most frequently used outcome measures for quality of care, and it needs to be addressed to improve the quality and efficiency of health care service provision within the health care delivery system. It provides important feedback on how the service is functioning according to clients' perception and what changes might be required to meet clients' expectation [2, 3].

In 2015, almost 6 million children died globally before the age of five. Over half died from vaccine-preventable infectious diseases [4]. Every year, around 8 million children in developing countries die before they reach to their fifth year birthday; many during the first year of life. When compared with a child in Western Europe, an Ethiopian child is 30 times more likely to die by his or her fifth-year birthday [5–7].

In Ethiopia, the Expanded Program on Immunization was started in 1980 to increase the immunization coverage by 10% annually and to reach 100% coverage in 1990 [8]. However, it remained unmet today because of several factors such as poor health infrastructure, lower number of trained manpower, high staff turnover, lower level of awareness among parents regarding infant immunization, inaccessibility to the services, high dropout rates, and lack of donor funding [9, 10].

Several interventions were also considered to strengthen immunization coverage in Ethiopia. Among them, expansion of primary health care service, implementation of an integrated health extension package, and training of front line health extension workers are the major interventions done [11]. However, regardless of the above interventions, immunization coverage in many parts of the country is still found to be less than desired one [1]. According to the Ethiopian Demographic and Health Survey (EDHS) report, in 2016, close to two in every five children aged 12–23 months (39%) received all basic vaccinations at some time, only 22% were vaccinated at the appropriate age, and about 16% of children have not received any vaccinations [12–14].

Different study reports find out that maternal satisfaction plays a key role in improving the quality of EPI service and ultimately will enhance its coverage [15, 16]. Facility opening time, immunization service waiting time, and service provider's approach and setup of service delivery environment were some of the key factors that determined client satisfaction towards childhood immunization service [17, 18]. Thus, evaluating the clients' satisfaction towards the immunization service is clinically relevant as satisfied clients are more likely to comply with treatment and revisit of childhood immunization service. It will also help to pass on encouraging messages to others, take an active role in their care, continue using medical care services, and recommend center's services to others. On the other hand, clients who are not satisfied with

a service may share undesirable experience with others and less likely to return or continue the use of immunization service and it is a major determinant of child under-vaccination in developing countries [19–23].

Recently, acknowledgement is made on the importance of maternal satisfaction for the successful provision of childhood immunization services and some interventions are also undergoing to improve maternal satisfaction like ensuring uninterrupted supply of vaccines and associated logistics, improving the service process system, and providing health information and education on childhood immunization [14, 24]. However, the level of maternal satisfaction towards childhood immunization is still low and in addition to this, there is limited knowledge in Ethiopia on the contributing factors. Specifically, in the study area, so far, no study was conducted in relation to the level of maternal satisfaction towards childhood immunization and associated factors. Hence, information on factors associated with the level of maternal satisfaction towards childhood immunization is urgently needed. Therefore, the current study intended to assess maternal satisfaction towards childhood immunization service and its associated factors in Wadla district, North Wollo, Ethiopia.

## 2. Methods

*2.1. Study Design.* A community-based cross-sectional study was conducted.

*2.2. Study Period and Area.* The study was conducted from March 6 to April 15, 2019, in Wadla district, North Wollo, Amhara Regional State of Ethiopia. Wadla district is located 250 km away from Bahir Dar and 642 km from Addis Ababa in the north which are the capital of Amhara Regional State and Ethiopia, respectively [25]. The district is classified into 23 Kebele (the smallest administrative unit in Ethiopia), and there is 1 district level hospital, 26 health posts, 6 health centers, 6 private clinics, and 2 drug stores in the town.

The health facilities found in the district provides preventive, curative, and rehabilitative health care services for the needy population coming from Wadla and other nearby districts. In the health facilities of the district a total of eleven [11] currently available EPI vaccines in the country, namely, BCG, measles, DPT-HepB-Hib or pentavalent, rotavirus, pneumococcus vaccine (PCV), OPV, and inactivated polio virus (IPV) vaccines are delivered for the target population based on the national immunization schedule through static and outreach activities with free of charge [25].

*2.3. Source Populations.* All mothers whose child age is less than one-year and receiving immunization services within the catchment area of Wadla district are included in the source population.

*2.4. Study Population.* Sampled mothers whose child age is less than one year, who resides in the selected kebeles, and receiving immunization services within the catchment area of Wadla district are included in the study population.

**2.5. Inclusion Criteria.** Mother whose children aged is less than one year, who resides in the selected kebeles, and whose children receiving immunization service in at least one schedule within the catchment area of Wadla district were included in the study.

**2.6. Exclusion Criteria.** Those mothers who fulfil the inclusion criteria but who are mentally ill or critically sick were excluded from the study.

**2.7. Sample Size.** The sample size for this study was determined by using a single population proportion formula by considering the proportion of maternal satisfaction 72% [26] at 95% confidence interval  $Z_{\alpha/2} = 1.96$  with 5% margin of error

$$n = DE * (z_{\alpha/2})^2 p(1 - p) / d^2, \quad (1)$$

$$n = (1.96)^2 \times 0.72 \times 0.28 / (0.05)^2 = 310.$$

By taking a 10% nonresponse rate, the total sample size becomes 341. Finally, by using a design effect of 2, it becomes 682 mothers.

The sample size was also calculated using Epi Info software for the second objective (i.e., determinants of maternal satisfaction) by taking variables like greeting (AOR = 3.55), room cleanness (AOR = 5.52), information provision (AOR = 12.09), and waiting time (AOR = 12.23) which showed statistically significant association with maternal satisfaction [22]. But, the sample size calculated using single population proportion (i.e., proportion of maternal satisfaction) was found to be the largest than the predictors. Based on this, the sample size resulted from the single population proportion formula (i.e., proportion of maternal satisfaction) which is 682 was taken as a sample size for this study.

**2.8. Sampling Technique and Procedure.** A two-stage cluster sampling technique was used to select the households. First, the study area was categorized into six clusters based on geographical location and availability of health institution. Each cluster contains a maximum of seven and a minimum of two “kebeles” (i.e., the lowest governmental administrative unit in Ethiopia). During the first stage of cluster sampling, two clusters (33% of the total clusters) which have six kebeles were randomly selected using the lottery method as the primary sampling units. Then, in the second stage of sampling, all mothers whose child age is less than one year and resides in the selected kebeles were interviewed. In case of the presence of more than one eligible mother per a household, the mother with the youngest child was selected purposively.

**2.9. Data Collection Instrument (Tools) and Procedure.** Data was collected through a pretested, structured, and interviewer-administered questionnaire developed from different literatures. A total of six [6] diploma nurses who are fluent in “Amharic” language (i.e., the dominant local languages in the study area) were used to conduct the data collection, and the process was supervised by two [2] Bachelor of sciences (BSC) Nurses. Finally, filled questionnaires were

checked for completeness and consistency of the data by the principal investigator on daily basis.

The questionnaire was developed in English and translated to “Amharic” language. It majorly assessed the sociodemographic characteristics of the respondent-, maternal-, access-, and process-related factors of maternal satisfaction towards childhood immunization service.

Maternal knowledge about childhood immunization was measured using eight [8] questions related to childhood immunization. Each correct answer was given a point of one [1] and zero (0) point was given to the incorrect ones. Respondents who scored the median and above were considered to have a “good knowledge,” and those who scored below were considered having a “poor knowledge” about childhood immunization.

Maternal attitude towards childhood immunization was assessed using nine [9] items rated on a five-point Likert scale as [1] strongly agree, [2] agree, [3] not sure, [4] disagree, and [5] strongly disagree. For the purpose of ease of analysis, attitude of mothers towards child immunization items were condensed into three categories as “agree”, “disagree,” and “not sure”. Furthermore, the attitude measurement Likert scale was summarized as “favorable attitude” (those who scored the mean and above on attitude measuring items) and “unfavorable attitude” (those who scored below the mean on attitude measuring items).

Maternal satisfaction towards childhood immunization was measured using 20 satisfaction-related items categorized into Health Workers’ Relationship, Attitude and Communication (9 items), Physical Environment (6 items), and Immunization system (5 items). Each tool used to measure satisfaction is rated in a 5-point Likert scale response (i.e., 1 very dissatisfied, 2 dissatisfied, 3 neutral, 4 satisfied, and 5 very satisfied). First, the overall maternal satisfaction level was computed by adding the mean score of 20 satisfaction-measuring items. Then, the threshold score for satisfaction was determined using the demarcation threshold formula, which is  $[(\text{total highest score} - \text{total lowest score})/2] + \text{total lowest score}$ . Finally, mothers’ overall satisfaction was categorized/dichotomized into “Satisfied” and “not satisfied” [3, 27, 28]. Based on this, mothers who scored above 69% on the satisfaction measurement tool were considered “satisfied” whereas, mothers who scored  $\leq 69\%$  on satisfaction measurement tool were taken as “dissatisfied” towards childhood immunization services.

**2.10. Data Quality Assurance and Control.** To ensure the quality data, the questionnaire, information sheet, and informed consent were translated from English into the local language (i.e., “Amharic”) for the purpose of appropriateness and easiness in approaching the study participants and retranslated to English for analysis by using an expert of the two languages. A one- (1-) day training was given for both data collectors and supervisors prior to data collection, and common understanding was established on the data collection method and procedure. The questionnaire was pretested on 5% (34 mothers) on those living in Mekit town which is out of the study area. In addition to this, the instrument was tested for reliability and validity and accordingly, the

TABLE 1: Sociodemographic characteristics of mothers receiving immunization service in Wadla district, North Wollo, Amhara regional state, northeast Ethiopia, 2019,  $n = 682$ .

Variables	Categories	Number	Percent
Parents age (yr.)	15-19	44	6.5
	20-24	149	21.8
	25-29	200	29.3
	30-34	132	19.4
	≥35	157	23
Relationship of the client to child	Mother	638	93.5
	Father	37	5.4
	Other	7	1.0
Sex of child	Male	330	48.4
	Female	352	51.6
The position of the index child	1	176	25.8
	2-3	296	43.4
	≥4	210	30.8
Marital status	Single	44	6.5
	Married	577	84.6
	Divorced	52	7.6
	Widowed	9	1.3
Religion	Orthodox	628	92.1
	Muslim	52	7.6
	Other	2	0.3
Occupation	Housewife	458	67.2
	Civil servant	89	13
	Merchant	85	12.5
	Student	48	7
	Other	2	0.3
Educational status	No formal education	341	50
	Primary education	187	27.4
	Secondary education	59	8.7
	College/university	95	13.9

Cronbach alpha coefficient was found to be 0.884. Furthermore, close supervision was undertaken during the data collection period, every questionnaire was cross-checked, and the collected data were checked for completeness and consistency on a daily basis to ensure the quality of the data.

**2.11. Data Processing and Analysis.** First, the collected data was cleaned, coded in order to check the accuracy, consistency, and missing values and variables. Next the data was entered into Epi Info version 7.2.2.2 and then exported to Statistical Package for Social Sciences (SPSS) version 23.0 for analysis.

Descriptive statistics were carried out to illustrate the percentage and frequencies of study variables. A bivariable logistic regression model was used to test if there was an association between a dependent variable and each independent variable. Statistically significant variables at a  $p$  value of  $\leq 0.2$  in the bivariate analysis were taken to multivariable

logistic regression. The goodness of the model was assessed whether the required assumptions for the application of multivariable logistic regression was fulfilled and showed that the model adequately fits the data (Hosmer and Lemeshow test as the  $p$  value = 0.684) and multicollinearity was also assessed. Variables with the  $p$  value of  $\leq 0.05$  with 95% CI in multivariable logistic regression were considered statistically significant.

**2.12. Ethical Considerations.** Before conducting the study, the proposal was publicly presented and defended and a letter of Ethical Clearance approval was obtained from University of Gondar, school of Nursing Ethical Review Committee. The purpose of the study was explained to the study participants; anonymity, privacy, and confidentiality were ensured. Prior to data collection, informed verbal consent was obtained from the study participants. While obtaining consent from each participant, information related to publishing the study finding were addressed. The respondents' rights to

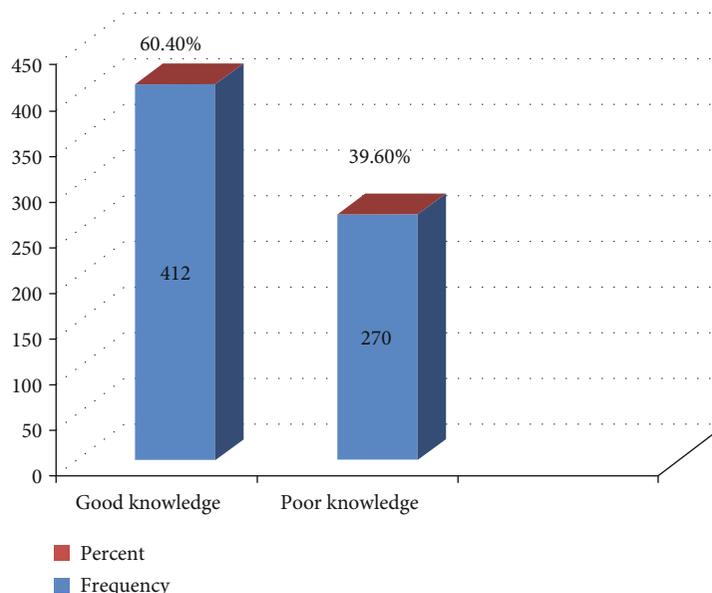


FIGURE 1: Knowledge of clients about immunization in Wadla district, North Wollo, Amhara regional state, northeast Ethiopia, 2019.

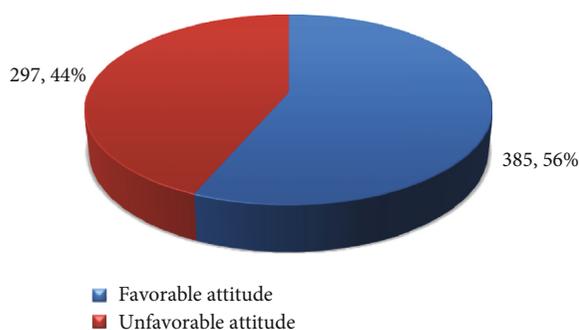


FIGURE 2: Client’s attitude towards immunization service in Wadla district, North Wollo, Amhara regional state, northeast Ethiopia, 2019.

refuse or withdraw from participating in the study were also fully acknowledged.

### 3. Results

**3.1. Sociodemographic Characteristics of the Respondents.** A total of 682 participants were involved in the study giving a response rate of 100%. The highest proportion of respondents 199 (29.2%) were under the age group of 25-29 years, with a median age of 28.00 (24.00-33.25 IQR) years. Over 90% of the respondents were orthodox Christian by their religion, and majority 577 (84.6%) of them were married. Regarding respondents’ occupational status, two-thirds (67.2%) of clients were a housewife followed by civil servant 89 (13%) and about half of the participants (50%) did not attend formal education (Table 1).

#### 3.2. Maternal-Related Factors

**3.2.1. Knowledge of Mothers about Childhood Immunization.** The result of knowledge assessment items showed that

around three-fourth of the respondents (76.8%) were aware of EPI target diseases; about 590 (86.5%) knows that vaccination prevents against infectious disease, majority of them 578 (84.8%) were stated that, it is necessary to vaccinate breast-feeding child; and about 586 (85.9%) believes that vaccination is not harmful. Furthermore, about 475 (69.6%) of the respondents were aware of the next vaccination schedule of their child, but only 203 (29.8%) of them know about the side effects of EPI vaccines. The overall knowledge assessment summary index revealed that about 60.4% of the mothers involved in this study had “good knowledge” about childhood immunization service (Figure 1).

**3.2.2. The Attitude of Mothers towards Childhood Immunization.** With regard to attitudes, the summary index of attitude measuring items indicated that more than half (56.5%) of respondents had a “favorable attitude” towards childhood immunization service. Accordingly, majority of the respondents 595 (87.2%) believed that compliance to immunization schedule is important, about 599 (87.8%) thought that vaccination is beneficial for the wellbeing of their children. On the other hand, only 115 (16.9%) of study participants presume that vaccination makes infants sick and about 87 (12.8%) believe that it could bring the infants even to death (Figure 2).

**3.3. Access-Related Factors.** Access-related factors to childhood immunization services were also assessed using 5 items. Based on this, only seventy-four (10.9%), 302 (44.3%), and 306 (44.9%) of the mothers reported that they visited the health center once, two to three times, and four to five times, respectively. Regarding service access waiting time, 425 (62.4%) mothers reported that they wait for more than 30 minutes and the rest 257 (37.6%) said that the waiting time before accessing the service was below 30 minutes (Table 2).

TABLE 2: Access-related factors for mothers whose children receiving immunization service in Wadla district, North Wollo, Amhara regional state, northeast Ethiopia, 2019.

Accessibility factors	Categories	Number	(%)
How many times do you visit the health facility?	Once	74	10.9
	Two to three times	302	44.3
	Four to five times	306	44.9
How long it takes to go to the health facility? (per minute)	<30 minutes	317	46.5
	≥30 minutes	365	53.5
How much did you wait to get the vaccination?	<30 minutes	257	37.6
	≥30 minutes	425	62.4
How much time did you spend on vaccination?	≤5minutes	208	30.5
	5-10 minutes	264	38.7
	>10 minutes	210	30.8
How do you get to the health facility?	On foot	577	84.6
	Bajaj/taxi	105	15.4

**3.4. Process-Related Factors.** Regarding process-related factor assessment, the finding of this study showed majority (81.7%) of mothers stated that they got greeting/well-coming approach from the health care providers during vaccination of their child. Over three-fourths (77.9%) of mothers were given information about the current vaccine; about 55% of mothers were informed about the type of the vaccine in which their children was taking, whereas only one-third (35.3%) of mothers got information about the dose of the vaccine (Table 3).

**3.5. Maternal Satisfaction towards Childhood Immunization Service.** Maternal satisfaction towards childhood immunization was measured using 20 satisfaction-related items categorized into Health Workers' Relationship, Attitude and Communication, Physical Environment, and Immunization system (Table 4). Finally, the overall satisfaction was computed by adding the mean score of 20 satisfaction items. The maximum total satisfaction score was 100, and the minimum score was found to be 38. The threshold score for satisfaction was determined using the demarcation threshold formula, which is  $[(\text{total highest score} - \text{total lowest score})/2] + \text{total lowest score}$ . Accordingly, the finding showed that the threshold value for the maternal satisfaction was found to be 69. Based on this, a total of 465 (68.2%) mothers scored a satisfaction score above 69 and categorized as "satisfied" and the remaining 217 (31.8%) scored 69 and below then categorized as "not satisfied" with the overall childhood immunization service (Figure 3).

**3.6. Factors Associated with Maternal Satisfaction towards Childhood Immunization Service.** First bivariable logistic regression analysis was conducted to detect the presence of association and measure the relative effect of each independent variable on overall maternal satisfaction towards childhood immunization service (i.e., dependent variable). As a result, among all other variables, parental age, the position of index child, marital status, educational status, maternal

knowledge, maternal attitude, frequency of visit, means of transport, service waiting time, happiness during vaccination, greeting, information about the current vaccine, type of vaccine, a dose of vaccine, and next immunization schedule were found to have association (i.e.,  $p$  value of  $<0.2$ ) and become eligible for multivariable analysis. Then, the multivariable logistic regression analysis showed that marital status, educational status, maternal attitude, waiting time, greeting/welcoming approach, information about the current vaccine, a dose of vaccine, and next immunization schedule were found to be statistically significant predictors of maternal satisfaction (Table 5).

Accordingly, divorced mothers [AOR = 0.46; 95%CI = 0.23 – 0.91], mothers who attended up to secondary school education [AOR = 0.26; 95%CI = 0.13 – 0.53], and mothers who have a favorable attitude towards childhood immunization service [AOR = 1.58; 95%CI = 1.05 – 2.33] were found to be 2.17, 3.80, and 1.58 less likely to be satisfied by the childhood immunization service than their reference groups.

This study showed that the likelihood satisfaction by the mothers on the childhood immunization service was 1.83 times more among mothers who got immunization service less than 30 minutes [AOR = 1.83; 95%CI = 1.21 – 2.79] than mothers with a waiting time report of >30 minutes. Mothers who got greetings/a welcoming approach were also found more likely to be satisfied by the childhood immunization service [AOR = 5.7; 95%CI = 3.36 – 9.65] than their complements. Moreover, mothers who got information about current vaccines [AOR = 2.03; 95%CI = 1.25 – 3.32] and the dose of the vaccine [AOR = 2.24; 95%CI = 1.40 – 3.58] were 2.03 and 2.24 times more likely to be satisfied by the childhood immunization service than their counterparts, respectively. Similarly, the analysis also revealed that maternal satisfaction towards childhood immunization service was reported 3.21 times more likely among mothers who got information about the next immunization schedule [AOR = 3.21; 95%CI = 1.70 – 6.043] than their equivalent (Table 5).

TABLE 3: Process-related factors for mothers in Wadla district, North Wollo, Amhara regional state, northeast Ethiopia, 2019 ( $n = 682$ ).

Process factors	Respondents categories			
	Yes	(%)	No	(%)
Are you happy when your child got a vaccine?	569	83.4	113	(16.6)
Did the health team greet you?	557	81.7	125	18.3
Are you given information about the current vaccine?	531	77.9	151	22.1
Did the health care worker tell you the type of the vaccine your child taken?	375	55.0	307	45.0
Did the health care worker tell you the dose of the vaccine your child was taken?	241	35.3	441	64.7
Did the health care worker tell you the next immunization schedule?	622	91.2	60	8.8
Did your child develop a problem after vaccination?	184	27.0	498	73.0

TABLE 4: Maternal satisfaction scores for respondents whose children receiving immunization service in Wadla district, North Wollo, Amhara regional state, northeast Ethiopia, 2019,  $n = 682$ .

Item/variable	Very satisfied N (%)	Satisfied N (%)	Neutral N (%)	Dissatisfied N (%)	Very dissatisfied N (%)
<b>Health workers' relationship, attitude, and communication</b>					
The behavior of health care provider	175 (25.7)	398 (58.4)	22 (3.2)	80 (11.7)	7 (1.0)
Health care provider greet you	166 (24.3)	389 (57.0)	12 (1.8)	99 (14.5)	16 (2.3)
Health care providers being respectful, compassionate, and polite	193 (28.3)	344 (50.4)	81 (11.9)	44 (6.5)	20 (2.9)
Information was given by health worker regarding vaccines and benefits of vaccinations	157 (23.0)	365 (53.5)	18 (2.6)	123 (18.0)	19 (2.8)
Possible side effects of the vaccines well-described in a way clients could understand	105 (15.4)	284 (41.6)	83 (12.2)	179 (26.2)	31 (4.5)
The attitude of service providers towards clients	127 (18.6)	332 (48.7)	180 (26.4)	37 (5.4)	6 (.9)
Competence of health care provider	134 (19.6)	365 (53.5)	99 (14.5)	62 (9.1)	22 (3.2)
Confidentiality discussion providers with clients	110 (16.1)	302 (44.3)	233 (34.2)	36 (5.3)	1 (.1)
Health care provider respecting your decision	120 (17.6)	314 (46.0)	179 (26.2)	62 (9.1)	7 (1.0)
<b>Physical environment</b>					
Sanitation and hygiene of the facility	128 (18.8)	378 (55.4)	40 (5.9)	120 (17.6)	16 (2.3)
Building and infrastructure	112 (16.4)	336 (49.3)	69 (10.1)	131 (19.2)	34 (5.0)
Waiting place clean and comfortable	74 (10.9)	405 (59.4)	61 (8.9)	135 (19.8)	7 (1.0)
Cleanness of immunization room	108 (15.8)	409 (60.0)	44 (6.5)	117 (17.2)	4 (.6)
Access to drinking water, latrine, and hand-washing facility	62 (9.1)	191 (28.0)	116 (17.0)	273 (40.0)	40 (5.9)
Cleanness of toilet and washroom	41 (6.0)	198 (29.0)	102 (15.0)	299 (43.8)	42 (6.2)
<b>Immunization system</b>					
The convenience of working hour	179 (26.2)	412 (60.4)	25 (3.7)	62 (9.1)	4 (.6)
Availability of vaccine at a facility	166 (24.3)	372 (54.5)	68 (10.0)	69 (10.1)	7 (1.0)
The number of days services are available to you	131 (19.2)	449 (65.8)	35 (5.1)	61 (8.9)	6 (.9)
Tools and equipment's availability	128 (18.8)	393 (57.6)	88 (12.9)	66 (9.7)	7 (1.0)
Waiting time to get the vaccine	93 (13.6)	291 (42.7)	43 (6.3)	200 (29.3)	55 (8.1)

#### 4. Discussion

This study was conducted to assess the level of maternal satisfaction towards childhood immunization service and the associated factors in Wadla district. The finding revealed that the overall level of maternal satisfaction towards childhood immunization service was 68.2%, at 95% CI (64.7%-71.7%), which is relatively higher than a report from Egypt (63%) [29], Calabar, south Nigeria (43.6%) [18], Iraq (50.2%) [30],

and Bangladesh (61.5%) [17]. This variation might be due to a real difference in the quality of services provided in the district, the expectation of mothers, type of health facilities, or a combination of them. Sociocultural difference and focus of attention by the government of Ethiopia to reduce infant and child mortality through EPI service could also be another justification but is consistent with the study conducted in Kombolcha (71.9. %) [26], Ondo State in Nigeria (68.9%) [31], in Jahrom, Iran (66.7%) [32], and Guatemala (70.4%)

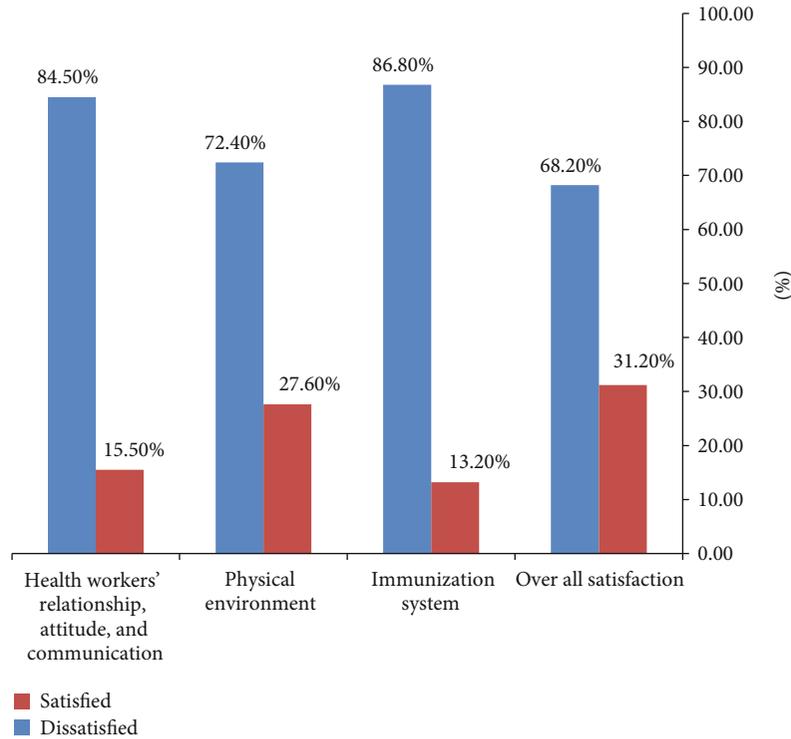


FIGURE 3: Maternal satisfaction for respondents whose children are receiving immunization service in Wadla district, North Wollo, Amhara regional state, northeast Ethiopia, 2019.

[33]. However, it is lower when compared with studies in New Cairo district, Egypt (74.4%) [34], Suez governorate Egypt (95.2%) [24], Sokoto metropolis, Nigeria (75%) [16], southeast Nigeria (95.9%) [35], and Lucknow district, India (90%) [36]. Sociodemographic characteristic, the difference in sample size and study setting (institutional-based vs. community-based) and study period difference due to the increase in expectation of clients to the service as 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 the current study, mothers who were divorced were found less likely to be satisfied by the childhood immunization service than those mothers who were married. The finding is congruent with a study done in Nigeria [37], as divorced mothers are single parents who are responsible for the overall care of their child and they are less stable than their counterparts which could be a contributing factor for the observed dissatisfaction.

The study also investigated that mothers who attended up to secondary school education were less likely to be satisfied by the childhood immunization service than those who did not attend any formal education. This finding is congruent with Nigeria [37, 38], Guatemala [33], Iraq [30], and Bengal [39] research report which showed that uneducated mothers were satisfied than mothers who attend higher education. The difference on the level of service provision expectation between the two groups might be possibly explained by this (i.e., mothers with a relatively higher educational status probably will have higher expectations on the immunization

services which might not be comparable with the actual service provided in the ground). However, other studies conducted in South-western Nigeria [40] and Uganda [41] reported that higher educational level is associated with higher satisfaction.

In consistent to the study conducted in the United Arab Emirates [42], mothers who have a favorable attitude to childhood immunization service were found more likely to be satisfied by service than mother with unfavorable attitude. The possible explanation might be mothers who have favorable attitudes will have more opportunities to understand the vaccination and its importance and better compliance with the immunization schedule which ultimately generate more satisfaction towards childhood immunization service [43, 44].

Furthermore, in this study, shorter service waiting time (i.e., less than 30 minutes) to get vaccination was another significant predictor for maternal satisfaction towards childhood immunization service. The result is in line with the study finding from Jigjiga [14] and Kombolcha [13] of Ethiopia and Nigeria [38]. As shorter service waiting times might be linked with better accessibility of care and quality service provision, it could increase the satisfaction of mothers towards childhood immunization service and enhance the utilization of health services provided by the health center.

In this study, 62.3% of mothers wait for more than 30 minutes prior to receiving immunization service for their children's, which is higher than the studies conducted in two towns of Ethiopia: kombolcha (23.4%) [13] and Jigjiga (30.1%) [14]. Higher client flow and delayed opening time in the current study area could contribute for the differences.

TABLE 5: Bivariable and multivariable logistic regression analyses for maternal satisfaction among clients whose children are receiving immunization service in Wadla district, North Wollo, Amhara regional state, northeast Ethiopia, 2019 (n = 682).

Variable	Satisfaction		COR (95%,CI)	AOR (95%,CI)
	Satisfied N (%)	Not satisfied N (%)		
<b>Age category</b>				
15-19	29 (4.25)	1 (2.20)	1.00	1.00
20-24	108 (15.83)	41 (6.01)	1.36 (0.66-2.80)	—
25-29	141 (20.67)	58 (8.50)	1.26 (0.63-2.52)	—
30-34	89 (13.05)	44 (6.45)	1.05 (0.51-2.15)	—
≥35	98 (14.37)	59 (8.65)	0.86 (0.43-1.73)	—
<b>Position of the index child</b>				
1	124 (18.18)	52 (7.62)	1.00	1.00
2-3	213 (31.23)	83 (12.17)	1.08 (0.71-1.62)	—
≥4	128 (18.77)	82 (12.02)	0.66 (0.43-1.00)	—
<b>Marital status</b>				
Married	401 (58.8)	176 (25.80)	1.00	1.00
Single	34 (4.98)	10 (1.47)	1.49 (0.72-3.09)	1.67 (0.69-4.00)
Divorced	28 (4.10)	24 (3.52)	0.51 (0.29-0.91)*	0.46 (0.23-0.91)**
Widowed	2 (0.29)	7 (1.02)	0.12 (0.03-0.61)	0.22 (0.03-1.55)
<b>Educational status</b>				
No formal education	220 (32.26)	121 (17.74)	1.00	1.00
Primary education	136 (19.94)	51 (7.48)	1.47 (0.99-2.17)	1.003 (0.63-1.59)
Secondary education	32 (4.69)	27 (3.96)	0.65 (0.37-1.14)	0.26 (0.13-0.53)**
College/university	77 (11.29)	18 (2.64)	2.35 (1.35-4.12)*	0.70 (0.36-1.38)
<b>Maternal knowledge</b>				
Poor knowledge	151 (22.14)	119 (17.45)	1.00	—
Good knowledge	314 (46.04)	98 (14.37)	2.53 (1.82-3.52)*	—
<b>Maternal attitude</b>				
Unfavorable attitude	182 (26.67)	115 (16.86)	1.00	1.00
Favorable attitude	283 (41.50)	102 (14.95)	1.75 (1.27-2.43)*	1.58 (1.04-2.33)**
<b>Service waiting time</b>				
< 30 minute	189 (27.71)	68 (9.97)	1.50 (1.07-2.11)*	1.83 (1.20-2.78)**
> 30minute	276 (40.47)	149 (21.84)	1.00	1.00
<b>Frequency of visit</b>				
Once	41 (6.01)	33 (4.84)	1.00	—
Two to three times	205 (30.06)	97 (14.22)	1.70 (1.01-2.86)*	—
Four to five times	219 (32.11)	87 (12.76)	2.02 (1.20-3.41)*	—
<b>Means of transportation</b>				
On foot	387 (56.74)	190 (27.86)	1.00	1.00
Bajaj/taxi	78 (11.43)	27 (3.96)	1.42(0.89-2.27)	—
<b>Happy when your child got the vaccine</b>				
No	59 (8.65)	51 (7.48)	1.00	1.00
Yes	406 (59.53)	163 (23.90)	2.28 (1.51-3.44)*	—
<b>Greeting/welcoming approach</b>				
No	33 (4.84)	92 (13.49)	1.00	1.00
Yes	432 (63.34)	125 (18.33)	9.63 (6.17-15.03)*	5.69 (3.36-9.64)**
<b>Information about the current vaccine</b>				
No	58 (8.50)	93 (13.64)	1.00	1.00
Yes	407 (59.68)	124 (18.18)	5.26 (3.582-7.73)*	2.03 (1.24-3.31)**

TABLE 5: Continued.

Variable	Satisfaction		COR (95%,CI)	AOR (95%,CI)
	Satisfied N (%)	Not satisfied N (%)		
Information about type of the vaccine				
No	167 (24.49)	140 (20.52)	1.00	1.00
Yes	298 (43.70)	77 (11.29)	3.24 (2.31-4.54)*	—
Information about dose of the vaccine				
No	264 (38.70)	177 (25.95)	1.00	1.00
Yes	201 (29.47)	40 (5.87)	3.36 (2.28-4.97)*	2.24 (1.40-3.58)**
Information about immunization schedule				
No	23 (3.37)	37 (5.42)	1.00	1.00
Yes	442 (64.80)	180 (26.39)	3.95 (2.28-6.83)*	3.20 (1.70-6.04)**

\**p* value < 0.05 at bivariable logistic regression; \*\* *p* value < 0.05 at multivariable logistic regression.

But, it is consistent with a study result carried out in Kenya (61%) [45] and in Calabar, Nigeria [37]. The current study also reported that about 56.3% of mothers were satisfied by the waiting time prior to immunization service. This result is consistent with other study findings in India (57.9%) [46], North Kolkata (57.1%) [15], and Guatemala (58%) [33], but lower than the findings in Suez governorate, Egypt (61.5%) [24], New Cairo district (62.3%) [47], Cairo governorate (81%) [29], Kano Nigeria(69.8%) [48] and Ilorin, North Central Nigeria (70%) [38].

In congruent with a study conducted in Kombolcha of Ethiopia [13] and Kenya [45], the finding of the current study also revealed that greeting/welcoming approach by health care providers had a positive effect on the level of maternal satisfaction towards childhood immunization. Mothers who got greetings were 5.7 times more likely satisfied than mothers who did not get greetings/welcoming approach. Effective interaction between health care providers and clients can address the concerns of vaccine supportive parents and motivate a hesitant parent towards vaccine acceptance. Conversely, poor communication can contribute to the rejection of vaccinations or dissatisfaction with the service [48]. In addition to this, good communication between clients and care-providers has been also described as the single most important component of good medical practice [49].

Moreover, the current study showed that information provision about the current vaccine was also another significant predictor of satisfaction to childhood immunization service. This finding is consistent with the study findings done in Jigjiga [14] and Kombolcha [13] of Ethiopia, Ilorin, north-central Nigeria [38], and India [50].

Regarding the level of respondent satisfaction on the provided information, the result of this study indicated that 76.5% of them were satisfied with the information given by health workers about vaccines and benefits of vaccinations. This finding is comparable with study results in Kombolcha (72%) [13] and India (75.9%) [46], but higher than finding reports from Jigjiga (69.6%) [14], Egypt (61%) [24], New Cairo district, (62.5%) [34], Nepal (62.9%) [2], and Timor-Leste (35%) [51].

Additionally, in line with a study finding in Kombolcha of Ethiopia [13], having prior information about the dose of the vaccine was significantly associated with maternal satisfaction towards childhood immunization service. Similarly, having prior information about the next immunization schedule was also found to be significantly associated with the maternal satisfaction towards childhood immunization service which is consistent with study finding reports in Kombolcha of Ethiopia [13] and urban Dili, Timor-Leste [51].

Accordingly, literatures also pointed out that the most important factor influencing parental satisfaction and decisions about vaccinations is communication with the health care providers. Parental education provided by primary care providers can be particularly important in influencing higher vaccine uptake which could enhance satisfaction. On the other end, poor communication and negative relationships of health workers with parents will have an impact on the vaccination decision of the mothers. As most parents are not familiar with the specific vaccines that their children receive, the dose, the schedule, and the infections that they prevent, health professionals should have a central role in maintaining public trust in vaccination; this includes addressing parents' vaccine concerns which ultimately improves the satisfaction on childhood immunization service [52].

## 5. Strength and Limitation of the Study

Utilization of a community-based data collection method with valid and standardized instrument could be the strength of the current study. This study cannot ascertain cause and effect relationship since it is a cross-sectional type, recall bias cannot be also totally eliminated, and absence qualitative study to strengthen the quantitative data could be mentioned as a potential limitation of the current study.

## 6. Conclusion and Recommendation

Generally, the study showed that more than two-thirds of the mothers were satisfied by the immunization service rendered. The level of satisfaction was higher with respect to the health workers' relationship, communication, and immunization

system aspects. Based on the finding, it is recommended that more efforts need to be put towards improving the service waiting time for immunization, and public health education must be intensified through provision of Information, Education, and Communication (IEC) materials and using local FM radio. It is also recommended that the district health office department together with the health care providers in the district should plan a regular outreach campaigns activity to advance mothers' awareness and attitude towards childhood immunization by focusing on the importance of vaccination, its dose, and immunization schedule. It is also necessary to improve the accessibility of general care offered at the units, particularly the service waiting area, time, and greeting/welcoming approach of the healthcare providers in the health institutions. Finally, we recommend a separate, detailed, and more in-depth qualitative study in the topic.

### Abbreviation

AEFI: Adverse events following immunization  
 AOR: Adjusted odds ratio  
 BCG: Bacillus Calmette Guerin  
 CI: Confidence interval  
 COR: Crude odds ratio  
 DPT: Diphtheria, pertussis, and tetanus  
 EDHS: Ethiopian Demographic and Health Survey  
 EPI: Expanded Program on Immunization  
 Hib: Haemophilus influenza type B  
 IEC: Information, education, and communication  
 MCH: Maternal and child health  
 OPV: Oral polio vaccine  
 SNNP: South Nation Nationality and People  
 SPSS: Statistical product and service solution  
 WHO: World Health Organization.

### Ethical Approval

Before conducting the study, the proposal was presented and defended and a letter of ethical clearance was obtained from the school of the nursing Ethical Review Committee on behalf of University of Gondar. The purpose of the study was explained to the study participants, privacy and confidentiality were ensured.

### Consent

The study does not include images of or videos relating to the individual. But concerning other collected and used data in this study, while obtaining consent from each participant, information related to publish the study finding was addressed and participants agreed on that. Before data collection, informed verbal consent was obtained from the study participants. The respondents' right to refuse or withdraw from participating in the study was fully acknowledged.

### Conflicts of Interest

The authors declare that they have no any financial or nonfinancial competing interests.

### Authors' Contributions

FA is the principal investigator and conceived the study; carried out the overall design and execution of the study, and design of questionnaires; performed the data collection; performed the statistical analysis; and served as the lead author of the manuscript. NT equally participated in the conceptualization of the study, design, analyses, and interpretation of results as well as drafting and review of the manuscript. NT equally participated in the conceptualization of the study, design, analyses, and interpretation of results as well as drafting and review of the manuscript. BZ equally participated in conceptualization and design of the study, drafting, and critical reviewing of the manuscript.

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