

Parental Satisfaction and Barriers Affecting Immunization Services in Rural Communities: Evidence from North Ethiopia

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Abstract: The purpose of this study was to examine barriers affecting client satisfaction with immunization services rendered in rural district, Ethiopia. A total of 419 caretakers who accessed the service were included and assessed for their satisfaction level using a pretested questionnaire that contained socioeconomic, demographic information, knowledge and various items related to process, service and accessibility factors on immunization service. The response rate was 99.3% and nearly two third of caretakers were satisfied with childhood immunization service. The majorities of caretakers were mothers and over three quarters had formal education. The highest mean rating score of 2.03 was observed in vaccine availability. The major determinants were related to low knowledge on vaccine preventable child illness; desire to vaccinate breastfeeding child and quality of care score. To maximize the benefits of vaccine preventable illnesses and improve the satisfaction levels, augmenting the knowledge of caretakers on vaccine preventable child illnesses and improving the quality of the service is crucial.

Keywords: Caretaker Satisfaction, Vaccine Preventable Child Illness, Quality, Rural Ethiopia

1. Background

Childhood immunization is considered to be among the most effective preventive services and is one of the most important public health interventions which is cost effective to reduce both morbidity and mortality associated with infectious diseases [1]. In 2003 alone, it is estimated that immunization averted more than 2 million deaths globally suggesting that immunization is among the most effective preventive services, and is therefore critical to monitor and evaluate the service from provider as well as consumers end [2] satisfaction. Parental satisfaction is the most important element when dealing with pediatric care because their role is pivotal and it is considered an indicator of provider quality

that has been relatively unexplored in relation to childhood immunization [3, 4]. Moreover, Satisfaction has been said to be a major predictor of use of services, as it is essential if clients were to utilize services, comply with treatments and maintain a continuing relationship with practitioners [5].

The regional immunization strategic plan 2009-2013 including Ethiopia provided significant thrust for immunization coverage depicted mainly in Diphtheria-Tetanus-Pertussis (DTP3). Measles mortality has declined by 88% since 2000. The development of a new vaccine against meningococcal meningitis type A and its introduction has protected millions of children and young adults living in meningitis belt of sub-Saharan Africa from the eruption of the disease [6].

In Ethiopia though the expanded program of immunization

was launched in 1980, the coverage in the first twenty years was very low due to factors related to lack of providing appropriate information on vaccines, poor training facilities of health workers and inaccuracies in the registration of vaccinations [7]. Others documented knowledge related to age specific vaccinations as an impediment to the low uptake of the service [8, 9]. Very recently, in addition to knowledge related to age specific childhood vaccination, courtesy of health extension workers and distance to reach the facilities are among other important determinants affecting the service [10]. Despite all these barriers encountered, the country has performed well in routine immunization coverage as of 2003 [11] though more is projected implying some more uncovered barriers are prevailing which need to be studied.

While many studies attempted to evaluate performance of immunization through coverage, there is scarce or limited evidences or nil particularly in the proposed study sites suggesting a growing awareness about the limitations of such evaluation, in terms of parental satisfaction and barriers affecting the services which this study has uncovered and availed some more evidence based information for some more initiatives in the community as well as in the country.

2. Methods

2.1. Study Area and Population

A health facility based cross sectional study was conducted in Kombolcha town, South *wollo* zone of *Amhara* national regional state-Ethiopia from March to April 2015. It is located 375 km from Addis Ababa and home for 126,145 populations. The district has 12 *kebeles* and four health centers. All the four health centers with static immunization services available in the area were included. The name of the health centers and the population they served at the time of the study were 02HC (N=33,571), 03HC (N=56,289), 05HC (N=26,059) and 07HC (N=10,226), respectively.

The physical health service coverage of the zone is 42.2% [12] with very scanty information on immunization related services. Because of the aforementioned reasons, the site was deliberately selected to examine the status quo of childhood immunization service and the level of satisfaction among parents who accessed the service.

2.2. Ethical Considerations

Ethical clearance was obtained from the school of Public Health Research and Ethical Committee (REC), College of Health Sciences, Addis Ababa University. An official letter was also written from the school of Public Health to *Kombolcha* city administration health office to get permission and cascade the information to the respective health center. Informed written consent was obtained from all participants for their participation after the nature of the study was fully explained to them in their local languages. All the information obtained from the participants is kept confidential and identification of each participant is only possible through numerical codes.

2.3. Sample Size Determination, Data Entry, Processing and Analysis

The required sample size was determined using single population proportion formula assuming a proportion of 50% (since no data are available), level of significance of 0.05 with marginal error of 5.0% and a non-response rate of 10.0% yielding a sample size of 422. The estimated sample size was allocated to the available health centers namely 02HC ($\eta=93$), 03HC ($\eta=144$), 05HC ($\eta=125$) and 07HC ($\eta=60$), respectively based on served client proportion to size.

A pre-tested questionnaire prepared in English and later translated to the local language was used after pretesting it in ten percent of the estimated sample size to cross check the reliability or consistency of data collection tools in similar settings among non-sampled caretakers close to the district. The pretested questionnaire was used to collect caretakers' information on socioeconomic characteristics, knowledge, and various satisfactory items that included process, service and accessibility factors on childhood immunization service through face to face interview.

Prior to the study, a two-day intensive training on the objective and data collection techniques was given to four recruited experienced nurses fluent in the local language drawn from the district at central level by the principal investigator. To maintain data quality, each collected data were checked for completeness and consistency daily by principal investigator. The collected data were coded and entered using Epi-Info 3.5.3 and analyzed in SPSS version 21. The results are presented in percentages and graph. The mean Likert scale score was used to categorize satisfaction level as satisfied when the score is greater than the cutoff value while the value below the cutoff is considered as dissatisfied. The mean rating score for each item was calculated by multiplying the number of responses in each category using its rating which ranged from value zero for poor to three for excellent, 2 for good and 1 for fair responses-all values were added up and divided by the total number of responses for the specified item to provide greater variability and less skewness of responses. To convert the score into percentage for meaningful presentation, we multiplied each item frequency by 100 and divided by 3 (excellent rate) as suggested by Alla [13].

Binary logistic regression was used to examine the association between the outcome variable and predictors, and the results are presented using odds ratios (ORs) and confidence interval (95% CI). To find out the association between the dependent variable and the explanatory variables, stepwise logistic regression was applied and adjusted odds ratio (AOR) with confidence interval (95% CI) was constructed to rule out the confounders. In all analysis, $p < 0.05$ was considered as statistically significant.

3. Results

A total of 419 respondents participated making the response rate 99.3% (419/422). Less than half (42.7%) aged

between 25-30 years. The majority of caretakers were mothers (95.9%) and in marital union (89.7%). Over three-fourth (81.1%) had formal education and three fourth

(75.7%) of respondents were homemakers. Slightly over half (51.6%) of caretakers took their children for age specific vaccination service (Table 1).

Table 1. Socio-demographic characteristics of caretakers, Konbolcha, north Ethiopia, 2015 (n=419).

Variables	Frequency	Percent
Age (in years)		
15-19	12	2.9
20-24	151	36.0
25-30	179	42.7
>30	77	18.4
Relation of caretakers to child		
Mothers	402	95.9
Fathers	17	4.1
Marital status		
Married	376	89.7
Unmarried	43	10.3
Educational status		
Uneducated	79	18.9
Intermediate	192	45.8
Tertiary	148	35.3
Employment status		
Yes (employee)	102	24.3
No (homemakers)	317	75.7
Took children for age specific vaccination		
Yes	216	51.6
No	203	48.4

Table 2 displays the important variables or items addressed in the study. Based on the knowledge items assessed, the majority (85.7%) were aware about EPI targeted diseases and the importance of EPI in preventing common childhood illnesses (95.2%). The majority agreed to vaccinate breastfeeding child (95.5%), and supported the completion of the full dose (90.9%) and adhered with the vaccination schedule (91.6%) with an overall knowledge score of 62.3%.

According to the process factors, the majority were happy with the cleanliness of the waiting room (85.7%) and when the child received the vaccination (85.4%). Over one third

was greeted by service providers (36.3%) and did not complain with the vaccinating waiting time (35.1%) and received information about the common child vaccines (33.2%) and the doses received (10.3).

In terms of access factors assessed, the majority visited the vaccination center to get the service (97.4%), and had a visit of 1-4 times (88.5%). The time taken to reach the center was between 30-60 minutes in 173 (39.6%). Two-thirds (66.0%) of them stated the service waiting time to take 15-30 minutes and 224 (53.5%) mentioned that the time taken for injecting the vaccine was less than 10 minutes.

Table 2. Knowledge, process and service accessibility factors on childhood Konbolcha, north Ethiopia, 2015 (n=419).

Items Assessed	Levels	Respondents category	
		Yes Freq (%)	No Freq (%)
Knowledge	Aware EPI target diseases	359 (85.7)	60 (14.3)
	Aware that EPI prevents childhood illnesses	399 (95.2)	20 (4.8)
	Agreed to vaccinate breastfeeding child	400 (95.5)	19 (4.5)
	Agreed to complete full dose vaccination	381 (90.9)	38 (9.1)
	Adhered with the vaccination schedule	384 (91.6)	35 (8.4)
	Over all knowledge score	261 (62.3)	158 (37.7)
Process	Was happy with the waiting room cleanliness	359 (85.7)	60 (14.3)
	Was happy when child vaccinated	358 (85.4)	61 (14.6)
	Greeted by service provider	152 (36.3)	267 (63.7)
	Did not complain with the vaccinating waiting time	147 (35.1)	272 (64.9)
	Received information about EPI	139 (33.2)	280 (66.8)
	informed about common childhood vaccine types	149 (35.6)	270 (64.4)
	Briefed on the dose of vaccine administered	43 (10.3)	376 (89.7)
	Over all process score	256 (61.1)	163 (38.9)
Access			
Cause for visit	To vaccinate the child	408	97.4
	Appointment/Follow-up	11	2.6
Visit frequency	1-4 times	371	88.5
	≥5 times	48	11.5
Time reached to service center	<30 min	173	41.3
	30-60 min	166	39.6
	>60 min	80	19.1

Items Assessed	Levels	Respondents category	
		Yes Freq (%)	No Freq (%)
Service Waiting time	<15 min	42	10.0
	15-30 min	279	66.6
	>30 min	98	23.4
Time taken for injecting the vaccine	<5 min	76	18.1
	5-10 min	224	53.5
	>10 min	119	28.4

Note: freq=frequency of responded items, %=percentage of responses

Table 3 shows the mean rating and percent of mean score for each item of aspects of care. As shown, the highest mean rating score was seen for vaccine availability and vaccine effectiveness. The mean rating and percent for vaccine availability was 2.03 and 67.7% score while for vaccine effectiveness the mean rating and percent was 2.00 and

66.7%. The lowest mean rating score was observed in cleanness of waiting area and cleanness of examination rooms. The mean rating and percent for cleanness of waiting area was 1.52 and 50.7% while for cleanness of examination rooms it was 1.59 and 53.0%.

Table 3. Mean rating score for items of health care in Konbolcha town, Amhara Regional State, north Ethiopia, 2015 (n=419).

Aspects of care	Poor Freq (%)	Fair Freq (%)	Good Freq (%)	Excellent Freq (%)	Mean rating score	Percent of mean score
Effectiveness of care	0	84 (20)	335 (80)	0	1.80	60.0
Kindness of registers	0	94 (22.4)	325 (77.6)	0	1.78	59.3
Attitude of service providers towards clients	0	89 (21.2)	327 (78.1)	3 (0.7)	1.79	59.7
Building and infrastructure	5 (1.2)	61 (14.6)	341 (81.4)	12 (2.9)	1.86	62.0
Tools and equipments	5 (1.2)	71 (16.9)	326 (77.8)	17 (4.1)	1.85	61.7
Performance of service providers	13 (3.1)	92 (22.0)	314 (74.9)	0	1.72	57.3
Sanitation or hygiene of clinic	3 (0.7)	72 (17.2)	344 (82.1)	0	1.81	60.3
Availability of vaccine	0	7 (1.7)	393 (93.8)	19 (4.5)	2.03	67.7
Providers information about vaccine side effect/illness	18 (4.3)	128 (30.5)	264 (63.0)	9 (2.1)	1.63	54.3
Information and documentation	8 (1.9)	69 (16.5)	342 (81.6)	0	1.80	60.0
Vaccine effectiveness	0	21 (5.0)	382 (91.2)	16 (3.8)	2.00	66.7
Cleanness of waiting area	41 (9.8)	153 (36.5)	192 (45.8)	33 (7.9)	1.52	50.7
Cleanness of examination room	8 (1.9)	155 (37.0)	256 (61.1)	0	1.59	53.0

Note: freq=frequency of responded items, %=percentage of responses

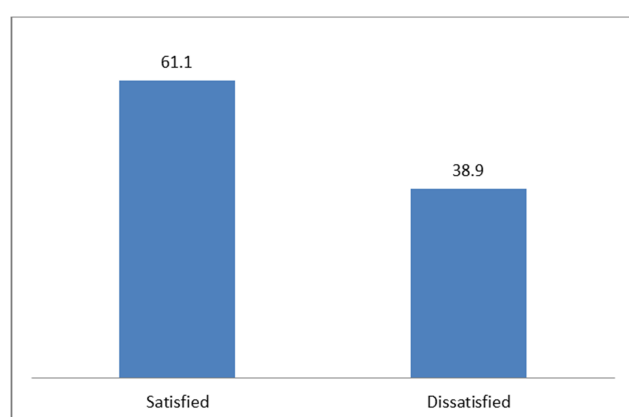


Figure 1. Satisfaction score for childhood immunization delivered in Konbolchatown, north-Ethiopia.

Figure 1 demonstrates the overall satisfaction score of the respondents. As shown about two-thirds (61.1%) of them were satisfied with childhood immunization services delivered in the entire health centers. This satisfaction score is calculated using Likert scale of measurement from items of

satisfaction like cleanness of waiting room, happiness when child vaccinated, greeting by service provider, so forth and the values higher through the cut off (≥ 10) or the mean average is considered as satisfied.

Table 4 depicts the determinants of respondent's satisfaction with childhood immunization services. The major determinants identified for respondent's satisfaction were knowledge about immunization preventable illness, desire to vaccinate breastfeeding child and quality of care score ($p < 0.05$). Respondent's who had no knowledge about immunization preventable illness were 80.0% less likely satisfied than the referent groups (AOR=0.20, 95% CI=0.05-0.89), and the odds to be satisfied with the service was more than 19 times among respondents who had the desire to vaccinate their breastfeeding child (AOR=19.15, 95% CI=2.46-148.97) than those who did not. Respondents that had perceived the quality of care score as low were 2 times more likely to be satisfied than their counterparts (AOR=2.11, 95% CI=1.36-3.28). Nonetheless, all the socio-demographic and other independent variables considered in the study didn't show significant association with the

satisfaction level of respondents ($p>0.05$).

Table 4. Univariate and multivariate analysis for predictors of child hood immunization satisfaction in Konbolchatown, north-Ethiopia, 2015 (n=419).

Variables	Satisfied (≥ 10.8) Freq (%)	Dissatisfied (<10.8) Freq (%)	COR (95% CI)	AOR (95% CI)
Parental age in years				
15-19	7 (58.3)	5 (41.7)	1	
20-24	98 (64.9)	53 (35.1)	1.32 (0.40-4.37)	-
25-30	109 (60.9)	70 (39.1)	1.11 (0.34-3.64)	
≥ 31	42 (54.5)	35 (45.5)	0.86 (0.25-2.94)	
Parental sex				
Female	244 (60.7)	158 (39.3)	1	-
Male	12 (70.6)	5 (29.4)	1.55 (0.54-4.49)	
Marital status				
Married	228 (60.6)	148 (39.4)	1	-
Unmarried	28 (65.1)	15 (34.9)	1.21 (0.63-2.35)	
Employment				
Employee	65 (63.7)	37 (36.3)	1	-
Homemakers	191 (60.3)	126 (39.7)	0.86 (0.54-1.37)	
Know common child hood illnesses can be prevented by immunization				
Yes	238 (59.6)	161 (40.4)	1	1
No	18 (90.0)	2 (10.0)	0.16 (0.04-0.72)	0.20 (0.05-0.89)*
Need to vaccinate breastfeeding child				
Yes	238 (59.5)	162 (40.5)	1	1
No	18 (94.7)	1 (5.3)	12.25 (1.62-92.69)	19.2 (2.5-148.97)*
Time spent for injecting the vaccine				
<5 min	52 (68.4)	24 (31.6)	1	1
5-10min	140 (62.5)	84 (37.5)	0.77 (0.44-1.34)	0.77 (0.43-1.35)
>10 min	64 (53.8)	55 (46.2)	0.54 (0.29-0.98)	0.55 (0.29-1.03)
Quality of care score				
High	187 (66.1)	96 (33.9)	1	1
Low	69 (50.7)	67 (49.3)	0.53 (0.35-0.80)	2.11 (1.36-3.28)*

*showed significant association, freq=frequency of items, %=percentage, cutoff value=10.8

4. Discussion

Universal childhood immunization introduced through EPI is the most efficient public health innovation for the prevention of vaccine-preventable common child illnesses provided that the program is uninterrupted and parents are satisfied with the service and adhere to the program. Although there are new vaccination initiatives globally, the discussions are limited to the common types of vaccinations used in Ethiopia among respondents who had taken their children to the health facilities.

Based on the knowledge items assessed in this study, the results are encouraging since the majority of caretakers were aware about EPI targeted diseases including the importance of vaccine preventable childhood illnesses with an overall satisfaction rate of 61.1%. Compared with the study done among pastoralists communities in Ethiopia, which focused on quality aspect of the EPI program, the satisfaction level observed in the present study is relatively better (61.1% vs. 53.3%) [14]. This is expected since in the present study the populations assessed are permanent settler as opposed to the pastoralists' study whose study participant probability of skipping the services is high because they travel in search of water and pasture.

Nevertheless, when compared with the Egypt study (61.1% vs. 95.2%), Nigeria (61.1% vs. 89.7%), Lucknow India (61.1% vs. 90%), and Timor (61.1% vs. 97.0%) findings, the present figure is low because of the difference in

vaccine set up and work ethics. For instance, in Egypt [3], the vaccination set up was entirely different from ours and in Nigeria due to the difference in the method of vaccination and the set up [15] while in India better reception of clients [16] and in Timor good information delivery system were cited as important factors [17].

When the knowledge score is further aggregated and compared with the Nigerian study (62.3% vs. 87%), still it is lower and EPI coordinators need to do more advocacy work that includes better reception, coherent information and proper work ethics during the service delivery [18]. This high level of knowledge observed may be attributable to the quality of information provided to mothers at the health facilities.

In terms of the process factors, the majorities were happy with the cleanliness of the waiting room and when the child received the vaccination though there was dissatisfaction with the vaccinating waiting time and in vaccine related information delivery during the service and is concordant with the study done among the pastoralists community in east Ethiopia [14].

In this study, the highest mean rating score was for vaccine availability and vaccine effectiveness whereas the lowest mean rating score was for cleanness of waiting area and cleanness of examination rooms and similar findings were recognized in the Bangladesh study [19] which acknowledged that cleanness of waiting area and examination room, and even low quality of care to enhance dissatisfaction of participants and it is felt a gray area that needs some improvement.

The major determinants identified for caretakers'

satisfaction were knowledge about vaccine preventable childhood illness; desire to vaccinate breastfeeding child and quality of care score. Caretakers' who had knowledge about childhood immunization were more satisfied in the service delivered than those with low knowledge about immunization preventable illness. The odds to be satisfied with the service were significantly higher among those who had the desire to vaccinate their breastfeeding child and had perceived high quality of care service delivered in the health facilities on cleanness of waiting area and examination room, accessibility of vaccine and vaccine effectiveness, provider performance and courtesy of service providers with clients.

Surprisingly none of the socio-demographic and other independent variables considered in the study showed significant association with the satisfaction level of respondents and the findings concur with the Bangladesh study where age-group and education had no association with satisfaction. Contrary to our present findings, the study done among pastoralis community documented that age, time spent to reach health facility, and waiting time to get the service were important predictors of maternal satisfaction with the immunization service provided [14] deserving further study.

5. Strength and Limitations

The high response rate and identifying the important barriers of caretaker satisfaction for some programmatic initiatives could be considered as the strength of this study. Identification of temporal relationship, social desirability biases are acknowledged as limitation of the study. In addition, the available little researches in the area were limited in statistical capacity and we found all previous studies unsuitable for comparison because they reported only frequency percentage for satisfaction items as opposed to our study in which we used average score for the interpretation of satisfaction and minimized biases.

6. Conclusion

Although several studies attempted to evaluate performance of immunization based on coverage the gaps in terms of caretaker's satisfaction and barriers affecting the services had not been dealt well in the Ethiopian context. This study has examined and identified the important barriers affecting both caretakers' satisfaction and service delivery which ranged from knowledge about vaccine preventable childhood illness; desire to vaccinate breastfeeding child and quality of care score. To maximize the benefits of vaccine preventable illnesses and improve the satisfaction levels, augmenting the knowledge of caretakers on vaccine preventable child illnesses and improving the quality of the service is crucial.

Authors' Contributions

AH collected data, thesis write-up and presented the finding. AL contributed for thesis review, data analysis and manuscript

preparation. JH designed the study, participated from the inception of the study up-to finalization of the thesis work. All authors read, critically revised and approved the final manuscript.

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