CLIENT FACTORS THAT CONTRIBUTES TO NON-ADHERENCE TO THE IMMUNIZATION SCHEDULE FOR CHILDREN UNDER FIVE YEARS OF AGE IN CHEPSAITA LOCATION
Josphat Too, Student, Department of Public Health, School of Health Sciences, Kisii University, P.O Box 2956 – 30100, Eldoret, Kenya. Dr. Judith Nekesa Mangeni, Lecturer, Department of Community Health, College of Health Sciences, Moi University Box address: P. O. Box, 512-30100, Eldoret. Dr. Stanslaus Musyoki, Lecturer, Department of Epidemiology, Kisii University, Kenya, P. O. Box, 408 Kisii, Kenya.

Corresponding author: Josphat K. Too, P.O Box 2956 – 30100, Eldoret, Kenya. Email: josphattoo5@gmail.com

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J. K. Too, J. N. Mangeni and S. K. Musyoki

ABSTRACT

Background: Worldwide about 29,000 children under the age of five die every day, mainly from preventable diseases. Every year around 8 million children in developing countries die before they reach their fifth birthday; many during the first year of life. By 2016, child mortality rate for Kenya was 49.2 deaths per 1,000 live births.

Objective: The main objective of the study was to assess client factors that contributes to non-adherence to the immunization schedule for children under five years in Chepsaita location.

Study Setting: This study was carried out in Chepsaita location, Turbo Sub-county, in Uasin Gishu County

Study Subjects: The study population was all households with children aged below five years within Chepsaita location consisting of 300 households. The proxies were their mothers or caretakers found at home at the time of data collection. The health workers at the health centre who offer MCH services as well as community volunteers were included in the study as key informants.

Methods: This study adopted a cross-sectional study design. Purposive and Snowball sampling techniques were used to select households. Further, the staff working at the immunization clinic were purposively selected for in-depth interview at the health facility.

Results: A total of 172 households participated in this study. Majority of the respondents were from the age brackets of 35-39 years (22.7%) and 30-34 years (22.1%). Most of the participants were married (91.9%). Most of the mothers indicated their highest level of education as primary (53.5%). Majority of the study area residents were found to be protestants (64.5%). The immunization coverage rate according to the findings from the present study was 74.4%. Client factors associated with non-adherence to the immunisation schedule were; maternal age (X^2 =48.611, *P <0.001*), education level (X^2 = 50.351, P < 0.001), Marital Status (X^2 =11.993, *P <0.001*),

place of delivery (X^2 =0.175, *P<0.001*), family size (X^2 =5.307, *P =0.021*) and maternal knowledge about immunization (X^2 =10.872, *P <0.001*).

Conclusion: Adherence to immunization is still low in Chepsaita location. Client related factors associated with adherence to EPI immunization schedule for children under five years of age include; older maternal age, lower maternal education level, marital status, mother's occupation and lower family monthly income, place of delivery, large family size and lower maternal level of knowledge on immunization.

Recommendation: Based on the study findings, its recommended that mothers should be educated on importance of adherence to EPI immunization schedule for children under five years which it was found to be low in Chepsaita location. The study recommends the collaboration of national government, county government, community-based organization (CBOs), NGOs and other health sector actors to come up with sensitization campaigns on adherence to EPI immunization which will benefit all mothers.

INTRODUCTION

Immunization is the main health intervention to reduce child morbidity and mortality. During one-quarter of the year 2002 under five-mortality rate was attributable to vaccine preventable diseases (WHO 2009). Low rates of immunization leave many young children at risk for various vaccine-preventable diseases and also serve as an indicator of an inadequate provision of other preventive health care services (UNICEF, 2009), (WHO 2009).

According to guidelines developed by the World Health Organization (WHO, 2013), children are considered fully vaccinated when they have received a vaccination against tuberculosis Bacillus Calmette Guerin (BCG), three doses each of diphtheria, pertussis and tetanus toxoids (DPT), three doses of polio vaccines, and a measles vaccination by the age of 12 months. In Kenya, the immunization schedule is given by the Division of Vaccines and Immunizations (DVI) in the Ministry of Health and is commonly known as KEPI (Kenya Expanded Programme on Immunization).

Subsequently, after 12 months of age children are supposed to attend health facilities for growth monitoring and vitamin A supplementation up to five years old. Factors influencing compliance in the recommended immunization are client factors. Client factors include lack of knowledge or inaccurate perception about the importance of preventing diseases by use of vaccines, socioeconomic status, high birth order and big family size, single parent and families who live in temporary housing or who migrate between jobs (Sarab, *et al.*, 2008)

Regular health care among children under five years in health facilities is very important for improvements of their health and becomes one of the health interventions. World Health organization reports indicated by the year 2011 worldwide coverage of three doses of DPT, one dose of measles and three doses of polio vaccine were 83%, 84% and 84% respectively. However, more than one-fifth of the world's children, especially those in low-income countries, were still not fully vaccinated at 12 months of age and remained at risk for vaccine-preventable morbidity and mortality (WHO, 2011).

According to Uasin Gishu County health records (monitoring & evaluation 2015) immunization coverage, 67% were fully immunized implying that there were 33% of children did not complete the scheduled immunizations. In Chepsaita Location immunization coverage was 65% and 35%

did not complete immunization (Uasin Gishu county health records, 2015). The client factors that contributes to non-adherence to the immunization schedule among children under five years in Chepsaita location remain unknown. This gap the current study sought to fill it.

METHODS

Research Design: This study adopted a cross-sectional study design.

Study Site: This study was carried out in Chepsaita location, Turbo Sub-county, in Uasin Gishu County.

Study Population: The study population was all households with children aged below five years within Chepsaita location consisting of 300 households (Public health office-Chepsaita, 2015). The health workers at the health centre who offer MCH services as well as community volunteers were included in the study as key informants.

Sample Size calculation: The researcher calculated the sample size using the following formula as recommended by Reid and Bore (1991).

Where n = $\dfrac{N}{(1+N (e)^2)}$

Where n = Sample size

     N = Approximated target population size (households with under-fives), to be 300

     e = accepted level of error taking alpha as 0.05.

By substitution in the formula the sample size was:

N = $\dfrac{300}{1+300 (0.05)^2}$

     = 172 households

Sampling Procedures: Purposive and Snowball sampling techniques were used.

Inclusion and Exclusion Criteria:

Mothers and caretakers with children less than five years at the time of data collection.

Residents of Chepsaita location for at least 6 months

Immunization staff at Chepsaita health centre.

Community Health Workers in Chepsaita

Exclusion Criteria:

Mothers who do not consent to participate in the study

Non-residents of Chepsaita location.

Mentally unsound mothers/caretakers

Children who are sick and need urgent medical attention

Health workers not involved in immunization services

Research instruments: The main tools for data collection were structured questionnaires; interviews schedule and check list/observation. The structured questionnaires were designed to capture the socio-demographic characteristics of the mothers and client related factors that influence adherence to child immunization. Two sets of interview guide questions were developed. These were for the mothers who were recruited into the study, community health workers and the health care workers who were involved in immunization services in each of the two facilities.

Validity of the Instrument: To ensure validity of the research instruments, the researcher availed the research instruments to the supervisors to advice accordingly.

Reliability of the instrument: A test-retest method was carried out in Ng'enyilel location on a population that is equivalent to 10% of the sample size. 17 of which is 10 % was used to determine the reliability of the questionnaire and the outcome showed consistency of the information obtained.

Data Analysis: Following completion of data collection, structured questionnaires were coded. The data was entered into Ms Excel spreadsheet and exported to SPSS version 21.0 for statistical analysis. Quantitative data was summarized using frequencies, means and standard deviation. Knowledge level was assessed as Number of correct responses

by mothers/guardians on immunization over total questions asked where (low=below 50%, moderate=50-74% and high=75% and above).

Chi-square and independent samples t-test was used to check for association between client - factors and non-adherence to the immunization schedule for children under five years of age in Chepsaita location. A p value of <0.05 was considered significant. Multiple logistic regressions were done to identify significant factors influencing childhood immunization incompleteness controlling for controlling.

Ethical Considerations: Permission was sought from Kisii University after proposal approval. Ethical approval was sought from Institutional Research and Ethics Committee (IREC). The nature and purpose of the study was explained to all participants including the benefits to the respondents about the information they provided. When participants are satisfied with the explanation, they were asked to sign a written informed consent. Only those willing and offering to be interviewed were interviewed. Confidentiality and anonymity were also assured. The consent form is attached as appendix

RESULTS

A total of 172 households participated in this study. Majority of the respondents were from the age brackets of 35-39 years (22.7%) and 30-34 years (22.1%). Most of the participants were married (91.9%). Most of the mothers indicated their highest level of education as primary (53.5%). Majority of the study area residents were found to be protestants (64.5%) and too few Catholics because the protestants comprised of several denominations.

In terms of occupation, most of the participants were housewives with monthly income of less than Ksh. 2500. The frequency descriptions of these socio-demographic characteristics are indicated in table 1.

Table 1
Socio-demographic characteristics of the study participants

Variables		Frequency	Percent (%)
Age	15-19	13	7.6
	20-24	17	9.9
	25-29	37	21.5
	30-34	38	22.1
	35-39	39	22.7
	40-45	28	16.3
	Total	172	100.0
Marital Status			
	Married	158	91.9
	Single	14	8.1
	Total	172	100.0
Education			
	None	19	11.0
	Primary	92	53.5
	Secondary	42	24.4
	College/University	19	11.0

		172	100.0
Religion			
	Protestant	111	64.5
	Catholic	61	35.5
	Total	172	100.0
Occupation			
	Housewife	133	77.3
	Farmer	18	10.5
	Business	11	6.4
	Employed	10	5.8
	Total	172	100.0
Income			
	Less than 2500	141	82.0
	2501-5000	13	7.6
	5001-10000	4	2.3
	Above 10000	14	8.1
	Total	172	100.0

The sex of the child, place of delivery and family size was also computed. Most children (56.4%) were female. Majority of the mothers gave birth at the health facility (77.3%). Most families had more than five people.

Table 2
Frequency table showing sex of the child, place of delivery and family size

Variables		Frequency	Percent
Sex of the child	Male	75	43.6
	Female	97	56.4
	Total	172	100
Place of delivery	Home	39	22.7
	Hospital	133	77.3
	Total	172	100
Family size	More than 5	108	62.8
	5 or Less Than 5	64	37.2
	Total	172	100

Adherence to immunization on the basis of EPI schedule: The findings from this study indicate that the adherence to EPI immunization rate was (128) 74.4% and the non-adherence rate among the study respondents was found to be (44) 25.6%.
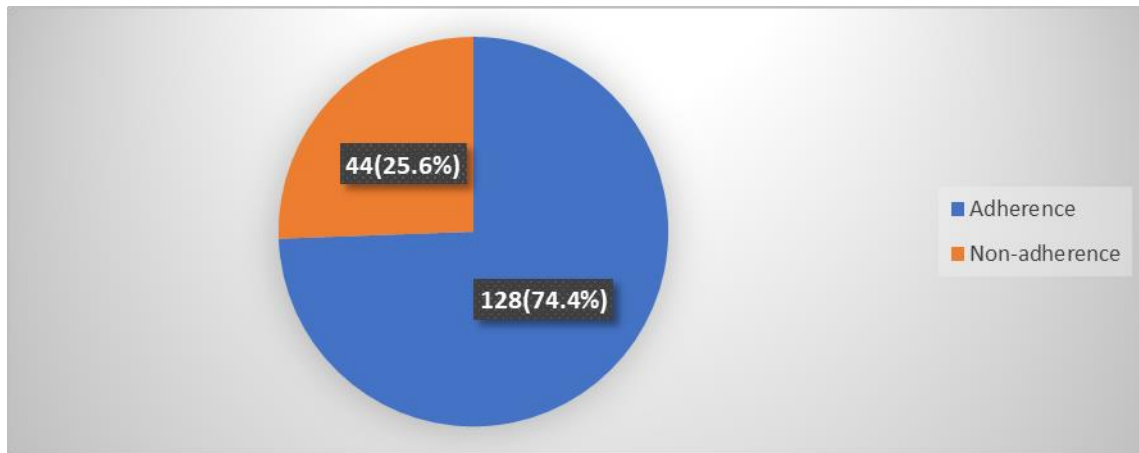
Figure 1 Adherence to immunization on the basis of EPI schedule

Client associated factors that contribute to non-adherence to immunization schedule: From the data collected, statistical analysis was carried out to identify any existing association between the client's age, education level, marital status, occupation, monthly income, sex of the child, place of delivery and family size with non-adherence to EPI immunization schedule. Out of the total 44 non-adherence cases, (20) 45.5% were found to fall within the age bracket of 40-45, (14) 31.8% in 35-39 age, (3) 6.8% in 30-34. 4 (9.1%) in 25-29, (3) 6.8% in 20-14 and none was found in the age group of 15-19.

Chi-square test for independence from the statistical analysis showed that there was significant association between EPI immunization schedule and maternal age. The outcome shows that maternal age is statistically significant factor of non-adherence to child immunization. This is indicated by the $P < 0.001$.

Out of the total 128 adherence cases, majority of the respondents were from the age between 25 and 34 equivalents to 53.1% while the least were from the age between 40 – 45 (6.3%). According to this study findings, the highest level of non-adherence was noted among those respondents who indicated their level of education as primary (40.9%) and those without formal education (38.6%). On the other hand, the highest adherence cases were noted among the respondents with primary and secondary education level (57.8% and 30.5% respectively).

There was a significant statistical association between education level and adherence to child immunization (P< 0.001). The results indicate that the higher the level of education the higher the level of adherence to child immunization. The study shows that 96.1% of the adherence cases were those who are married. Similarly, majority of the non-adherence cases were among those who indicated to be married (79.55%). There was a significant association between marital status and adherence to immunization (P = 0.02). All the study participants were Christians. They were categorized into Protestants Of the non-adherence cases, 64.5% were Protestants while 35.5% were Catholics. However, there was no statistically significant relationship between religion and adherence to immunisation (P=0.341). The study findings revealed that 75.8% of the adherence cases were housewives and 81.8% of the non-adherence were housewives. There was no significant relationship between mothers' occupation and adherence to immunization (P = 0.301).

On the other hand, monthly income was significantly associated with EPI immunization adherence (P value = 0.027).

Majority of the participants indicated a monthly income of less than 2500. Consequently, the largest proportion of adherence and non-adherence cases also came from this category (80.5% and 86.4% respectively).

The sex of the child, place of delivery and family size were also analysed to identify any association with EPI immunization. Fifty five percent of female children immunization cases were found to have adhered to EPI immunization schedule while on the non-adherence cases, there were 56.4% female children. The gender of the child was not statistically significantly associated with adherence to EPI immunisation. The place of delivery was found to be statistically significant in determining the adherence to EPI immunization schedule with $P < 0.001$. It was noticed that out of 39 mothers who indicated to having delivered at home, 29 were found to be non-adherence cases (65.9% of the total non-adherence) and 15 mothers out of the total 133 who responded that they delivered at health facility were found to be non-adherence cases (34.1% of total non-adherence). Ninety two percent of the total adherence cases of the adherence cases were found to be among those mothers who delivered in a health facility delivered at home.

Out of the total non-adherence cases, 62.8% were children from households of more than 5 in size. On the other hand, 57% of adherence cases were children from family size of more than 5 and 42.2% were from those family size of less than 5. Family size influences adherence to immunization of children ($p = 0.021$).

The study respondents were asked question to assess their level of knowledge with respect to immunization and it was found that 57.6% had adequate knowledge while 42.4% had poor knowledge about immunization. Maternal knowledge on immunization was significantly associated with adherence to EPI immunization schedule ($p < 0.001$). (Table 3).

Table 3
Tabulated summary of association between EPI immunization adherence and client related factors

Client related factors		Non-adherence frequency (%)	Adherence frequency (%)	Chi-square	P-value
Age	15-19	0(0.0)	13(10.2)	48.611	0.000
	20-24	3(6.8)	14(10.9)		
	25-29	4(9.1)	33(25.8)		
	30-34	3(6.8)	35(27.3)		
	34-39	14(31.8)	25(19.5)		
	40-45	20(45.5)	8(6.3)		
Marital Status	Married	35(79.5)	123 (96.1)		0.001
	Single	9(20.5)	5 (3.9)	11.993	
Education	None	17(38.6)	2(1.6)		0.000
	Primary	18(40.9)	74(57.8)		
	Secondary	3(6.8)	39(30.5)	50.351	

	College/University	6(13.6)	13(10.7)		
Religion	Protestant	31(70.5)	80(62.5)	.905	0.341
	Catholic	13(29.5)	48(37.5)		
Occupation	Housewife	36(81.8)	97(75.8)		0.301
	Farmer	5(11.4)	13(10.2)	3.654	
	Business	3(6.8)	8(6.3)		
	Employed	0(0.00)	10(7.8)		
Income	Less than 2500	38(86.4)	103(80.5)		0.027
	2501-5000	6(13.6)	7(5.5)		
	5001-10000	0(0.0)	4(3.1)	9.216	
	Above 10000	0(0.0)	14(10.9)		
Child Gender	Male	18(40.9)	57(44.5)	.175	0.676
	Female	26(59.1)	71(55.5)		
Place of delivery	Home	29(65.9)	10(7.8)	.175	0.001
	Hospital	15(34.1)	118 (92.2)		
Family Size	5 or less than 5	34(77.3)	54(42.2)	5.307	0.021
	More than 5	10(22.7	74(57.8)		
Maternal immunization knowledge	Good	16(36.4)	83(64.8)	10.872	0.001

DISCUSSION

The study was conducted to assess client factors that contributes to non-adherence to the immunization schedule among children under five years in Chepsaita location in Uasin Gishu location. It can be revealed that immunization coverage rate according to the findings from the present study was 74.4%. The immunization schedule adherence rate was slightly low when compared to estimated immunization coverage rate of 78% by WHO/UNICEF (2016). However, the study findings are much better than 23% fully immunized children that were reported from previous study in East Pokot in Kenya (Elizabeth, *et al*., 2015). Martin et al., in a study carried out in Nairobi reported immunization coverage rate of 66.6% which is slightly lower than the findings of the present study (Martin K. M, et al., 2016). The better immunization adherence shown in this study may be accredited to efforts previously made by ministry of health and stakeholders to improve the uptake of immunization services and other health services in the area even though more needs to be done to cut down the gap on immunization adherence. The results from the current study trail the overall immunization coverage of 77% of children aged 12 to 23 months (KDH, 2014).

Client factors that contributes to non-adherence in child immunization: The study has shown that maternal age is significantly associated with immunization of children. Poor adherence rate was found among mothers aged above 35 years while most of the immunization adherence rates were noted among mothers aged between 25 and

30 years. This may be attributed to the fact that mothers of younger age might have few children and thus they may be motivated to provide good care. This agreed with findings of a similar study carried out in Ibadan, Nigeria by Fatima & Chizoma (2013). Although they reported poor immunization compliance rate among mothers of a younger age contrary to the current study. Also, from this study, the level of education and marital status was significantly associated with immunization of children with (P < 0.000) and (P<0.001) respectively. Other studies have also reported that there is significant relationship between immunization and education level of the mother (Elizabeth, *et al*., 2015, Mutual Mk, *et al*., 2011, and Lauridsen J & Pradhan J, 2011). In this study most of the immunization adherence cases were among those whose level of education was secondary and primary. This could be because of the fact that most of the study respondents were from these two levels of education. Mothers with higher level of education may be in a better position to utilize the knowledge received during ANC and may be from media. However, many previous studies indicate that marital status has no significance with respect to immunization which is contrary to the results of the present study. In this study, majority of the respondents were found to be married when compared to those who are single (91.9% vs 8.1% respectively). This was perceived to have contributed to majority of the non-adherence level being high among participants who reported to be married.

Other client related factors that were found to have a statistical relationship with immunization were family monthly income (P = 0.027), family size (*P*=0.021), place of delivery (*P*<0.000) and mothers' level of knowledge (*P*<0.001). Other previous studies have also asserted that there is an association between place of delivery of child and immunization uptake (Etana & Deressa,

2012; Fatiregunet *al.* 2013). The association between these two factors was noted in this study also because of the possibility that the health facilities in the study areas were actively promoting vaccination of children after delivery. The current study has demonstrated that economic factors can play a role in determination of compliance to immunization since majority of the respondents were found to have a monthly income of less than Ksh 2500 monthly with family monthly income having an association with adherence to immunization.

The size of a family was found to be a determinant in immunization of children. In agreement to the present study, children from large families have also been found to have low vaccine uptake by several investigators (Orenstein, et al., 2005; Elizabeth, et al., 2015). The present study also noted an association between maternal knowledge level and compliance to immunization schedule of their children (*P*=0.001). Many other studies have demonstrated that maternal knowledge on immunization improves compliance to immunization schedule (Manjunath & Pareek, 2003, Etana & Deressa, 2012).

CONCLUSION & RECOMMENDATIONS

The study concluded that there were seven client related factors which were statistically significant in determining adherence to EPI immunization schedule for children under five years. This included; the maternal age, maternal education level, marital status, mother's occupation and family monthly income, place of delivery, family size and maternal level of knowledge on immunization.

Based on the study findings, it is recommended that mothers should be educated on importance of adherence to EPI immunization schedule for children under five years which it was found to be low in Chepsaita location. The study recommends

the collaboration of national government, county government, community-based organization (CBOs), NGOs and other health sector actors to come up with sensitization campaigns on adherence to EPI immunization which will benefit all mothers. This because from the finding's client factors such as maternal age, maternal education level, marital status, mother's occupation and family monthly income, place of delivery, family size and maternal level of knowledge on immunization affect the adherence which call for a sensitization campaign for awareness and importance of adherence.

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