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PHYSIOLOGY & REHABILITATION | RESEARCH ARTICLE

Socio-Cultural Factors Associated with Incomplete Routine Immunization of Children _ Amach Sub-County, Uganda

Omike Jillian¹ and Omona Kizito^{1*}

Abstract: Immunization is one of the world's most cost-effective health interventions that help prevent childhood diseases. However, many infants are not usually fully vaccinated especially in developing countries. This contributes to the mortality of Vaccine-Preventable Diseases (VPD) in children. The study examined the socio-cultural factors that are associated with incomplete routine immunization of children aged 0–1 year old in Amach Sub-County, Lira District _ Uganda. An analytical cross-sectional-mixed study among a sample of 326 parents and three health workers were made. Simple random sampling and purposive techniques were used to select the respondents. In-depth interviews, focus group discussion and Interviewer administered questionnaires were used to collect data. A modified Poisson regression model was used to compute the prevalence ratios. Variables were analyzed at bivariate and multivariate levels for their association with incomplete immunization. Incomplete immunization was at 27.3%. Marital status ($p = 0.05$), wealth level ($p = 0.001$), and side effects of vaccines was found to be associated with incomplete routine immunization. Age, occupation, education, religion, utilization of other health services, family structure, and support, gender, accessibility, and health education were not found to be associated with incomplete routine immunization. Incomplete immunization rate is quite high in Amach Sub-county.

Subjects: Health & Society; Midwifery; Public Health Policy and Practice

Keywords: incomplete immunization; socio-cultural factors; children



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PUBLIC INTEREST STATEMENT

Complete immunization of children less than 1 year of age remains one of the most cost-effective strategies to reduce child mortality and to help achieve Sustainable Development Goals (SDG). It is recommended that children receive the complete schedule of vaccinations before their first birthday. However, many infants are not usually fully vaccinated especially in developing countries. This contributes to the high mortality rate of Vaccine-Preventable Diseases (VPD) in children. Parents need to be encouraged to avoid the incompleteness of immunization schedules of their children.

1. Introduction

1.1. Background of the study

Routine immunization is important to both individual and public health (Gilmour et al., 2011). It is the primary strategy of the Expanded Program on Immunisation (EPI) to protect children from vaccine-preventable diseases (VPDs). Routine immunization is strongly promoted by the World Health Organisation (WHO), Health professionals, and Public Health Authorities worldwide (Gilmour et al., 2011). Immunization is one of the most cost-effective interventions with proven strategies which make it accessible to even the hardest to reach and vulnerable populations, as well as a proven tool for controlling and eliminating life-threatening infectious diseases. Immunization averts an estimated 2–3 million deaths each year (Muhammad et al., 2018). It prevents illness, disability, and death from vaccine-preventable diseases including diphtheria, measles, whooping cough (pertussis), pneumonia, polio, rotavirus diarrhea, rubella, and tetanus (Dicko & World Health Organization, 2018). Immunization also improves substantially the number of children who reach their first birthdays (Anderson, 2015). Complete immunization of children less than 1 year of age remains one of the most cost-effective strategies to reduce child mortality and to help achieve Sustainable Development Goals (SDG) (Ekouevi et al., 2018). It is recommended that children receive the complete schedule of vaccinations before their first birthday (Ebrahim & Salgado, 2015).

If a child misses at least a dose out of the required vaccines recommended when he/she is under 12 months old that child has not completed the immunization schedule (Anokye et al., 2018). This forms the basis of this study. Despite the clear benefits of immunization, many parents choose not to vaccinate their children Anderson (2015). Globally, it is reported that 22.6 million infants under 1 year of age were partially protected (Yenit et al., 2015). Of the 12.9 million infants worldwide, who did not receive any vaccinations in 2016, an estimate of 6.6 million infants did not complete the full three-dose of DTP immunization series (DTP3) (World Health Organization/United Nations International children's fund, 2017). A similar study further indicated that 19.9 million infants worldwide under 1 year of age did not receive the three recommended doses of Diphtheria, Tetanus, pertussis (DTP) in the year 2017 (Don, 2017).

It is also recommended that children receive the complete schedule of vaccinations before their first birthday and that the vaccinations be recorded on a vaccination card that is given to the parents or guardians. It is also recommended that children receive the complete schedule of vaccinations before their first birthday and that the vaccinations be recorded on a vaccination card that is given to the parents or guardian Children in Uganda are immunized against 11 vaccine-preventable diseases routinely before they reach 1-year old. These vaccines include; polio, tuberculosis, whooping cough, diphtheria, Tetanus, Hepatitis B, measles, haemophilus, PCV (pneumococcal conjugate vaccine), IPV (inactivated polio vaccine), and Rota (World Health Organization and United Nations International Children's Fund, 2018). According to the "Goal" of UNEPI, "every child" must be fully vaccinated against the target diseases. They refer to the word "fully" here to mean completing a vaccination schedule, which is getting several vaccines at different pre-determined points in time. A child is considered fully vaccinated if he/she has received: a bacillus Callmete Guerrin (BCG) vaccination against Tuberculosis, at least three doses of polio vaccine. He/she should also receive one dose of the measles vaccine; three doses of the pentavalent vaccine (DPT-Hep B-Hi-b) to prevent diphtheria, pertussis, tetanus, haemophilus influenza type b, and hepatitis B (Negussie et al., 2016). A child should also receive 3 (Three) doses of pneumococcal conjugate vaccine (PCV) (Ninsiima, 2013) and one dose of inactivated polio vaccine (IPV) which was included in the infant routine immunization (World Health Organization and United Nations International Children's Fund, 2018). Uganda was among the 10 countries with over 60% of the

18.7 million infants not fully immunized (Adedire et al., 2016). According to Vonasek et al. (2016), vaccine coverage rates remain well below the WHO goal of 90%, with 82% of the children receiving the measles vaccine and 78% completing the three-dose series of pentavalent vaccine in the Sub-Saharan African Countries including Uganda. In 2011, Uganda was among the African countries with 8.4 million infants who had not received their third dose of DTP vaccine, out of the 29 million infants who survived to their birthday. Upon a child receiving immunization at birth, most parents fail to return their children for follow up jabs, which increases the risk of children contracting killer but preventable diseases (Lanyero, 2012), incomplete immunization.

According to the New vision report of 2013, Lira District was reported among the 11 Districts lagging behind in routine immunization. Torantola, et al. (2013) also reported a failed target of Districts achieving the 80% Coverage of DTP-3 vaccine in all Districts (Bbaale, 2013). The URCS quarterly project reports of July 2012–June 2014 showed that there were 738 routine immunizations defaulters out of the households visited in Lira District in 2014 (Mbabazi, 2015). These reports indicate a gap which needs to be filled by conducting a research on incomplete routine immunization. One researcher noted that often the socio-cultural context relevant for health-seeking behavior is not considered during program implementation (Babirye et al., 2011). For the above reason, this study sought to find out the socio-cultural factors associated with incomplete routine immunization of children aged 0–1 year old in Amach Sub-County in Lira District to ensure that parents support the full immunization of their children thus promoting more infant survival and improved health.

Thus, the manuscript presents the background of the study, study area, problem statement, objectives, methods, and results, among others. Discussion followed the result section.

1.2. The study area

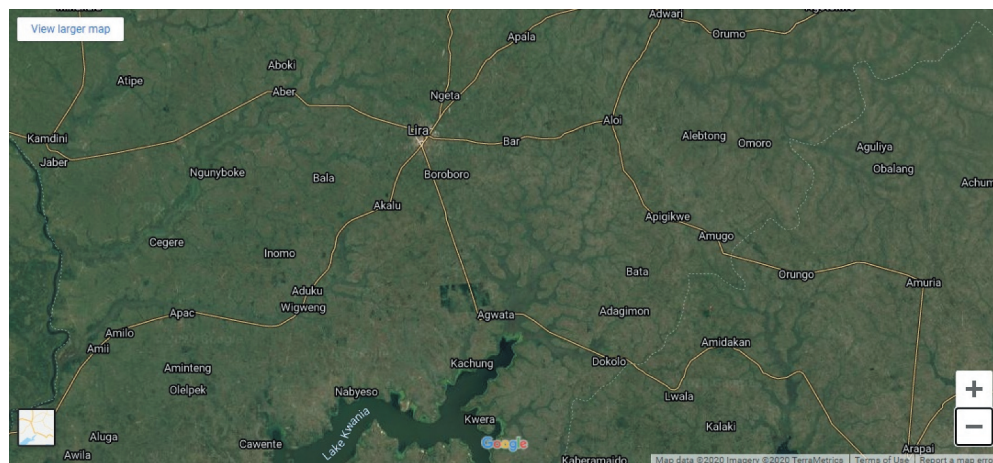
Amach Sub-county is one of the 24 Sub-counties in the Lira District. It is located approximately 24 km southeast of the District Headquarters. It is bordered by 5 sub-counties of Adekokwok to the Northwest, Batta Sub-county to the East, Agali sub-county to the North, Agwata Sub-county to the South, in Lira District and Akalo Sub-county in Apac District to the West.

The study was conducted in Amach Sub-County in Lira District in Northern Uganda. It has nine Parishes and 80 villages. Crop farming at the Sub-County level is the main source of livelihood. Most of the community member access medical services at Amach Health-Centre 3 which is found in the Sub-county. Figure 1 shows Lira district headquarter, where planning for

Figure 1. Lira district headquarter.



Figure 2. Google satellite map of Amach.



Amach Sub-county also occurs. Figure 2 shows the google satellite map of Amach. It is situated in Erute, Lira, Uganda. Its geographical coordinates are 2° 5' 54" North, 33° 0' 58" East, and its original name is Amach.

The Sub-County is faced with the challenge of a high infant mortality rate of 100 infants per 1000 live births. This rate is high because of diseases, poverty, food insecurity, illiteracy, and low access to social services like health centres. There is high morbidity, low immunization coverage, Inadequate access to health care, among others (Lira District Local Government, 2019).

1.3. Problem statement

Children in developing countries like Uganda do not receive the full series of basic immunization (WHO & Dicko, 2018). Only 36% of Ugandan one-year-old are fully immunized (Nyakato, 2013) and thus there is a problem of incomplete routine immunization of children aged 0–1 year old. As a result, children suffer effects such as impaired physical growth, cognitive development, emotional development, and social skills because of incomplete immunization (Shuaib et al., 2010). Children who have not been fully immunized are also at greater risk of becoming infected with serious vaccine-preventable diseases (Yenit et al., 2015). Although various studies have done indicated incomplete routine immunization in Uganda, most of the studies have been extensively conducted in all other parts of Uganda like in Central, Eastern, Western, and North-Eastern parts of Uganda with limited studies done in the Lira district. Therefore, just like in the rest of Uganda, in Amach there is also incomplete immunization. There is however limited literature, which is made worst by the existence of old literature and limited current statistics on the magnitude of the problem in Amach Sub-county. It is against this background that the researchers conducted a study on the socio-cultural factors associated with incomplete routine immunization of children aged 0–1 year old, in order to fill this gap.

1.4. Secondary objective of the study

To contribute to the completion of routine immunization of children aged 0–1 year old in Amach Sub-County in Lira District.

1.5. Primary objectives of the study

There were four (4) primary objectives as outlined below;

- (1) To find out the status of incomplete routine immunization of children aged 0–1 year old in Amach Sub-County in Lira District.
- (2) To determine the socio-demographic factors associated with incomplete routine immunization of children aged 0–1 year old in Amach- Sub-County in Lira District.
- (3) To establish the socio-cultural factors associated with incomplete routine immunization of children aged 0–1 year old in Amach- Sub-County in Lira District.
- (4) To identify the experiences of parents associated with incomplete routine immunization of children aged 0–1 year old in Amach-Sub-County in Lira District.

2. Methodology

2.1. Study design

An analytical cross-sectional study design was used to conduct the study in Amach Sub-county in Lira Districts. The researchers used both quantitative and qualitative methods to collect data.

2.2. Study population

The study populations were parents and health workers.

2.3. Study unit

The study units were; a parent to a child who has missed one or more vaccines at his/her first birthday and a health worker.

2.4. Sample size

The sample size of respondents was determined using the formulae which was adopted by Kasiulevicius, (2006) as cited by Kasiulevičius, Šapoka, and Filipavičiūtė (1996) as indicated below;

$$n = \left[\frac{N}{(1 + N(e^2))} \right]$$

Where; n = sample size

N = population size (1747)

e = level of precision/sampling error = (0.05)

$$n = \left[\frac{1747}{(1 + 1747(0.05^2))} \right] = \frac{1747}{(1 + 4.3675)} = \frac{1747}{5.3675} = 325.4774$$

$n = 326$

According to the formula above, a sample size of 326 parents were included in the study. The researchers also included eight (3) health workers who were purposively selected from the Health facility to give a more in-depth understanding and validity to the findings.

2.5. Sampling techniques

A simple random sampling technique was used to select the respondents. A total of eight (3) Health workers from the categories of nurses and midwives were purposively selected for key informants' interviews from the Health facility during the day of the interview.

2.6. Data collection tools and procedures

2.6.1. Data collection tools

The data collection tools used included questionnaires for quantitative data and interview guide and a focus group discussion guide for qualitative data.

2.6.2. Data collection procedures

2.6.2.1. Questionnaires. Questionnaires were used for quantitative data collection from the respondents. Closed-ended questions were constructed in English under each Sub theme, following the primary objectives. Questions were administered in the native language of the study area, which is Luo.

2.6.2.2. In-depth interviews. Key informant interviews, with three health workers, were conducted to ascertain some of the experiences of these mothers on routine immunization practice in Amach Sub-County.

2.6.2.3. Focus group discussion. Using a simple random technique, the researchers randomly picked the parents to a maximum of 30 parents from the sample size of 326 parents for two (2) focus group discussions.

2.7. Data entry, analysis and presentation

Data collected were entered into Statistical Package for Social Sciences (SPSS), version 21. It was edited and cleaned. The analysis was done using SPSS and Microsoft excel, as appropriate. Univariate, bivariate, and multivariate analyses were done as necessary. Findings were presented as narratives and in tables as appropriate.

2.8. Ethical considerations

Ethical approval was obtained from the ethical committee of Uganda Martyrs' University. This approval was presented to the District Health Officer, Maternal, and Child Health in Lira District, and to Amach Health Centre III as well as to the community leaders within the study area. Informed Consent was obtained from the parents. The participants were assured of confidentiality regarding their responses.

3. Results

3.1. Background characteristics of respondents

The majority of the respondents (73.9%) were married. Most participants were aged above 20 years; 42.3% between 20 and 30 years and 31.3% above 30 years. About 50% of the parents attained primary education while 5.5% of them attained tertiary education. About 76.1% of the respondents were Christians and 90.2% of them were not formally employed.

3.2. Status of incomplete routine immunization of children aged 0-1 year old

About 27.3% of the parents did not complete their children's routine immunization schedules as shown in Table 1

Table 1. Prevalence of incomplete immunization

Participant Characteristics	Completed immunization?		Prevalence Ratio (PR)			
	Incomplete (%)	Complete (%)	Crude PR (UPR:95% CI)	P value	Adjusted PR (95% CI)	P value
Number of respondents	89(27.3%)	237(72.7%)				

3.3. Socio-demographic factors associated with incomplete routine immunization of children aged 0-1 year old

The unmarried status category of participants was significantly associated with incomplete routine immunization ($p = 0.05$). Parents, whose marital status was categorized as unmarried, were 0.67 times more likely not to complete children's routine immunization compared to the married. The age of the parents was not significantly associated with incomplete routine immunization.

Although occupation was not significantly associated with incomplete routine immunization ($p = 0.58$), parents who were formally employed were 0.16 times more likely not to complete children's routine immunization.

The level of education was also not significantly associated with incomplete routine immunization. Parents who attended secondary school had a p-value of 0.45; those who attended primary school had a p-value of 0.16 and those who had no formal education with a p-value of 0.35.

Again, even though religion was not significantly associated with incomplete routine immunization, parents who were Christians were 0.85 times more likely not to complete routine immunization (See Table 2)

3.4. Socio-cultural factors associated with incomplete routine immunization of children aged 0-1 year old

Wealth was significantly associated with incomplete routine immunization ($p < 0.001$). Although accessibility was not significantly associated with incomplete routine immunization ($p = 0.53$), parents who had no difficulty in accessing health facilities were 1.28 times more likely not to complete routine immunization.

Likewise, even if gender was not significantly associated with incomplete routine immunization ($p = 0.18$), parents whose children's gender were female were 1.26 times more likely not to complete routine immunization. Family support and structure were not significantly associated with incomplete routine immunization ($p = 0.46$); parents who do not ask permission to take their children for routine immunization were 1.24 times more likely not to complete routine immunization. In the same way, participants who had existing community support systems were 1.28 times more likely not to complete routine immunization.

Although health education was not significantly associated with incomplete routine immunization ($p = 0.39$), parents who received health education from the media on routine immunization were 1.27 times more likely not to complete routine immunization (See Table 3)

3.5. Experiences of parents associated with incomplete routine immunization of children aged 0-1 year old

Experiences of parents with children were ascertained using themes;

3.5.1. Theme 1: side effects of vaccines

After a focus group discussion (FGD) with parents, almost all of the mothers were concerned about the side effects of vaccines after their children's immunization.

"My child developed a painful swelling on her left thigh [...]" (Respondent 3 in FGD).

"[...] my child developed a very high temperature" (Respondent 30 in FGD).

"My child lost appetite and refused to eat anything" (Respondent 7 in FGD).

"[...] my child cried the whole night and could not sleep [...]" (Respondent 5 in FGD).

Table 2. Socio-demographic factors _ Comparisons of proportions of proportions have done using adjusted prevalence ratios & poisson regression model

Variables	Completed Immunization?		Crude PR (CPR:95% CI)	P Value	Adjusted PR (95%CI)	P value
	Incomplete Freq (%)	Complete Freq (%)				
Marital status						
• Married	72(29.9)	169 (70.1)	1.0			
• Unmarried	17(20)	68 (80.0)	0.67 (0.42–1.10)	0.06	0.64(0.41–1.03)	0.05*
Age category in years						
• >30	30(29.4)	72(70.6)	1.0			
• >20–30	35(25.4)	103(74.6)	0.86 (0.569–1.31)	0.48		
• ≤20	24(27.9)	62 (72.1)	0.95 (0.603–1.49)	0.82		
Level of education						
• Tertiary	7(38.9)	11(61.1)	1.0			
• Secondary	20(29.9)	47(70.1)	0.76 (0.45–.38)	0.45		
• Primary	40(24.5)	123(75.5)	0.63 (0.33–1.19)	0.16		
• No formal education	22(28.1)	56(71.9)	0.72 (0.35–1.43)	0.35		
Occupation						
• Not formally employed	79(26.9)	215(73.1)	1.0			
• Formally employed	10(31.3)	22(68.7)	1.16 (0.67–2.01)	0.58		
Religion						
• Non-Christian	24(30.8)	54(69.2)	1.0			
• Christian	65(26.2)	183(73.8)	0.85(0.57–1.26)	0.42		

CPR = Crude Prevalence Ratio, CI = Confidence Interval

Table 3. Socio-cultural factors _ Comparisons of proportions of proportions have done using adjusted prevalence ratios & poisson regression model

Variables	Completed Immunization?		Crude PR (UPR:95%CI)	P value	Adjusted PR (95% CI)	P value
	Incomplete Freq (%)	Complete Freq (%)				
WEALTH						
Household income per month						
• Less than 50,000	8(61.5)	5(38.5)	1.0			
• 50,000 or more	81(38.0)	232(74.1)	0.42 (0.26-0.67)	0.0001	0.41(0.25-0.68)	<0.0001*
Household income enough						
• No	56(26.4)	156(73.6)	1.0			
• Yes	33(28.9)	81(71.1)	1.09 (0.76-1.57)	0.62		
Problem getting off your work						
• Yes	44(25.2)	131(74.8)	1.0			
• No	45(29.8)	106(70.2)	1.18 (0.83-1.69)	0.35		
UTILIZATION OF OTHER HEALTH SERVICES						
ANC during current pregnancy						
• Home	13(21.7)	47(78.3)	1.0			
• Health facility	76(28.6)	190(71.4)	0.76 (0.45-1.27)	0.29		
ACCESSIBILITY						
Home >5kms						
• Yes	54(26.2)	152(73.8)	1.0			
• No	35(29.2)	85(70.8)	1.11 (0.77-1.60)	0.56		

(Continued)

Table 3. (Continued)

Variables	Completed Immunization?		Crude PR (UPR:95%CI)	P value	Adjusted PR (95% CI)	P value
	Incomplete Freq (%)	Complete Freq (%)				
Distance from your home discourage you						
• Yes	29(25.2)	86(74.8)	1.0			
• No	25(27.5)	66 (72.5)	1.09(0.68–1.72)	0.72		
If you have to wait for more						
• No	30(30.0)	70 (70.0)	1.0			
• Yes	59(26.1)	167(73.9)	0.87(0.60–1.26)	0.46		
Difficulty in accessing health facility						
• Yes	47(24.5)	145(75.5)	1.0			
• No	42(31.4)	92(68.6)	1.28 (0.90–1.82)	0.17	1.13(0.77–1.63)	0.53
RELIGION						
Religious denomination						
• Non-Christian	24(30.8)	54(69.2)	1.0			
• Christian	65(26.2)	183(73.8)	0.85(0.57–1.26)	0.42		
Religion encourages you to take your child						
• No	26(22.8)	88(77.2)	1.0			
• Yes	63(29.7)	149(70.3)	1.30 (0.87–1.94)	0.19	1.15(0.76–1.74)	0.49
Religious leaders support vaccination of infants						

(Continued)

Table 3. (Continued)

Variables	Completed Immunization?		Crude PR (UPR:95%CI)	P value	Adjusted PR (95% CI)	P value
	Incomplete Freq (%)	Complete Freq (%)				
• No	7(25.0)	21(75.0)	1.0			
• Yes	82(27.5)	216(72.5)	1.10 (0.56–2.15)	0.78		
Anyone who refused						
• Yes	18(31.6)	39(68.4)	1.0			
• No	71(26.4)	198(73.6)	0.83(0.54–1.29)	0.42		
Religious leaders advocate						
• No	71(26.5)	197(73.5)	1.0			
• Yes	18(31.1)	40(68.9)	1.17 (0.75–1.81)	0.47		
GENDER						
• Male	42(24.3)	131(75.7)	1.0			
• Female	47(30.7)	106(69.3)	1.26 (0.89–1.80)	0.19	1.28(0.89–1.80)	0.18
Birth order of your child						
• Third or more	37(29.6)	88(70.4)	1.0			
• Second	35(27.6)	92(72.4)	0.93 (0.63–1.38)	0.72		
• First	17(23.0)	57(77.0)	0.78 (0.47–1.28)	0.32		
Ever refused vaccine						
• Yes	7(24.1)	22(75.9)	1.0			
• No	82(27.6)	215(72.4)	1.14 (0.58–2.24)	0.69		

(Continued)

Table 3. (Continued)

Variables	Completed Immunization?		Crude PR (UPR:95%CI)	P value	Adjusted PR (95% CI)	P value
	Incomplete Freq (%)	Complete Freq (%)				
FAMILY STRUCTURE AND SUPPORT						
Family member discourage you						
• Yes	27(27.0)	73(73.0)	1.0			
• No	62(27.4)	164(72.6)	1.01(0.69–1.49)	0.94		
Permission to take child for immunization						
• Yes	54(25.2)	160(74.8)	1.0			
• No	35(31.3)	77(68.7)	1.24 (0.86–1.77)	0.20	1.15(0.79–1.67)	0.46
Existence of community support groups						
• No	44(24.3)	137(75.7)	1.0			
• Yes	45(31.0)	100(69.0)	1.28 (0.89–1.82)	0.18	1.08(0.74–1.59)	0.68
People/family/community for support						
• No	46(25.6)	134(74.4)	1.0			
• Yes	43(29.5)	103(70.5)	1.15 (0.81–1.64)	0.43		
HEALTH EDUCATION						
Received health education						
• No	37(25.2)	110(74.8)	1.0			
• Yes	52(29.1)	127(70.9)	1.15 (0.80–1.65)	0.44		
Advice on subsequent immunization						

(Continued)

Table 3. (Continued)

Variables	Completed Immunization?		Crude PR (UPR:95%CI)	P value	Adjusted PR (95% CI)	P value
	Incomplete Freq (%)	Complete Freq (%)				
• No	1(16.7)	5(83.3)	1.0			
• Yes	88(27.5)	232(72.5)	1.65 (0.27–9.99)	0.59		
Health educ from media						
• No	50(24.8)	152(75.2)	1.0			
• Yes	39(31.5)	85(68.5)	1.27 (0.89–1.81)	0.18	1.19(0.80–1.76)	0.39
Health educ on importance						
• No	41(29.9)	96(70.1)	1.0			
• Yes	48(25.4)	141(74.6)	0.85 (0.59–1.21)	0.36		
Side effects						
• Yes	58(27.5)	153(72.5)	1.0			
• No	31(27.0)	84(73.0)	0.98 (0.67–1.42)	0.92		

However, only three participants never experienced any side effects of vaccines following immunization.

“My child was so normal [...]” (Respondent 27 in FGD)

“I did not notice any side effect to the vaccine” (Respondent 15 in FGD)

“[...] my child breastfed very well [...]” (Respondent 10 in FGD)

In order to attain more information, the researchers also conducted key informant interviews (KII) with three health workers from Amach Health center as shown below;

Health workers were asked whether any parent (s) ever experienced a bad reaction to a vaccine by their child/children that made them reconsider coming back for subsequent vaccination. Two (2) health workers reported that mothers experienced bad side effects with their children. For example, some of them had this to say;

“[...] a mother brought her child to the health center with a very swollen thigh after receiving a routine immunization. She was so disappointed. Although she received help from us, I never saw her bringing her child back to us for more immunization [...]” (Health worker 3 in KII).

“These mothers sometimes miss subsequent immunization after their children experiencing a bad side effect [...]” (Health worker 1 in KII)

However, one health worker never had any experience in which a parent ever experienced bad reactions to a vaccine by their child/children. He was quoted saying;

“[...] I have never seen any parent who experienced a bad reaction to a vaccine by their child [...]” (Health worker 2 in KII)

3.5.2. Theme 2: long hours of waiting

Most of the parents had no problem with long hours of waiting for routine immunization. Twenty mothers responded that they had no problem with long waiting hours. For example; some of them had this to say;

“[...] I wait for the health workers to first register the children. So, I have no problem [...]” (Respondent 2 FGD).

“For me, immunization of my child is priority, so I can wait until I immunize my child [...]” (Respondent 13 FGD)

“I always come at 9:00am in the morning and start receiving the vaccination at around mid-day but I have no problem with it [...]” (Respondent 4 in FGD).

“[...] I want my child to be healthy, so I can wait until I immunize my child” (Respondent 6 in FGD)

However, one participant had a problem with the long waiting hours;

“[...] Sometimes I just go back to attend to my business after waiting for so long to immunize my child” (Respondent 11 in FGD)

After conducting key informant interviews (KII) with the health workers so as to ascertain whether long hours of waiting discouraged parents from immunizing their children; there responses were as shown below;

“Sometimes the children are so many and overwhelming for us, that a lot of time is taken organizing, but I have never seen a parent going back without having their child immunized [...] (Health worker 1 in KII).

“These mothers wait patiently no matter the time, until they immunize their children [...]” (Health worker 3 in KII).

“[...] one day a mother had a pressing issue to attend to, since the line was so long, she requested for a special consideration for her child to be immunized before it was her turn, but never went back without her child’s vaccination” (Health worker 2 in KII).

3.5.3. Theme 3: absence of service providers

The absence of service providers never discouraged parents from completing routine immunization of their children aged 0–1 year old.

When parents were asked during a focus group discussion (FGD) about their experiences with the absence of service providers, these were the responses of 10 mothers;

“[...] most times only two health workers are in charge of so many children but they work hard and vaccinate all children present [...] (Respondent 19 in FGD.)

“I have always found a health worker in charge of vaccination a round, and thus I vaccinated my child [...]” (Respondent 6 in FGD).

“Even the student nurses are always available to help with the routine immunization [...]” (Respondent 5 in FGD).

Health workers were also asked during key informant interviews whether there has ever been a day (s) when parents had to go back without getting routine immunization services for their child/children because there were no health workers, and here are some of their responses;

“No, there is always a health worker present who makes sure to vaccinate all the children who have been brought for routine immunization [...]” (Health worker 1 in KII)

“There is always a lot of load for us health workers, but that does not stop us from vaccinating the children brought for routine immunization [...]” (Health worker 2 in KII)

“[...] a parent can only be told to come back another day if they come very late when we have already finished and packed all the equipment and vaccines [...]” (Health worker 3 in KII).

4. Discussions

In this study, the status of incomplete routine immunization of children was 27.3%, out of the 326 respondents in Amach Sub-County. This was attributed to the category of unmarried status and wealth level of parents that was UGX50,000/ = Ugandan shillings or more per month. This is consistent with many studies conducted in different countries with incomplete status of immunization of children being attributed to being unmarried and more income (Landoh et al., 2016; Anokye et al., 2018; Mekonnen et al., 2019).

The study revealed that marital status was significantly associated with incomplete routine immunization. This is in agreement with studies conducted in Ghana by Anokye (2018), Mekonnen et al. (2019), Zida, et al., (2019), and Landoh et al. (2016). The reason why the unmarried were less likely to complete routine immunization of their children could be because of the low awareness among unmarried young women, fear to meet the nurses, and feeling of shame to meet older married women.

Parents whose household income was UGX50,000/ = or more per month were 0.42 times more likely not to complete routine immunization of their children compared with those whose household income per month was less than UGX50,000/ = Ugandan Shillings. This is

in line with studies done in Uganda by Kamanda (2010) and Barata et al. (2012) in Brazil. The reason for this outcome might come from the fact that having money symbolizes good life and good health and thus these parents feel that their children do not need immunization.

In this study, an association was found between the side effects of vaccines and incomplete routine immunization. This is consistent with studies done by Babirye et al. (2011), Rahji and n.d. ikom (2013), Adedokun et al. (2017), Favin et al. (2012), and Negussie et al. (2016).

5. Conclusion

Routine immunization of children in Amach Sub-county in Lira District was high but reduced by incomplete vaccinations from the unmarried parents and the parents whose monthly income per month was UGX50,000/ = Ugandan shillings and more, and those parents who feared the negative side effects of vaccines. Therefore, strategies targeted at achieving complete routine immunization practices for the entire community need to be developed and implemented. Such strategies could include sensitization, minimizing cultural barriers that make the unmarried fear associating with the married, and assessing health facility and education emphasizing the benefits of complete childhood Immunization.

Regular follow-up studies may need to be done to compare findings over a certain period of time. Trends of improvement or non-improvement may be revealed from these follow-up studies.

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Declaration

We, the authors of this work, hereby declare that this research is our original work and has not been submitted for any publication elsewhere except to this journal.

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