

Reason For Incomplete Vaccination and Associated Factors Among Children Aged 12-23 Months in Serbo Town, Jimma Zone, Oromia Region, Southwest Ethiopia.



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ABSTRACT

Background: Each year, vaccination prevents an estimated 2-3 million deaths from diphtheria, tetanus, pertussis (whooping cough) and measles. However, In Ethiopia the percentage of children fully immunized by age 12 months has increased only slightly, from 20 percent to 22 percent in 2011. Therefore this research aimed to assess reason for incomplete vaccination and associated factors among children aged 12-23 Months in Serbo Town, Jimma zone, Oromia region, South west of Ethiopia in June, 2017GC.

Methodology: Community based cross-sectional study design was conducted to on 267 mothers/care takers of children aged 12-23 months from the sampled house hold in Serbo town. Systematic sampling technique was used to select study participants within the kebeles .A structured questionnaires was prepared and data was collected by face to face interview and the analyzed by SPSS version 20 was used. To identify the factors of incomplete immunization chi square test $p < 0.05$ was calculated. Based on the finding the result was presented by tables and figures.

Result: Out of a total of 260 children included in the study 45.5 % (126), were incompletely vaccinated and 48.8% (119) were fully immunized whereas 5.7 % (14) did not take any vaccination. Pentavalent1- pentavalent3 dropout was 23%. The most common reason of incomplete vaccination were 28.4% (40) due to lack of awareness of information for subsequent vaccination left followed by 16.3%(23)lack of awareness on importance of vaccination and 14.2%(20) lack of vaccine supply. The study also showed that educational status ($p=0.00082$), marital status ($P=0.0008$) and monthly income ($P=0.0017$) of the immediate caretaker were significant association with incomplete immunization of p -value < 0.05 .

Conclusion & Recommendation: There was low vaccine coverages with 45.5% incompletely vaccinated children aged 12-23 months in Serbo town. Lack of information and lack vaccine supplies were found to be associated with incomplete vaccinations. Therefore the emphasis should be given to the community awareness creation and provision of an adequate vaccine supplies to the communities by the stakeholders.

KEYWORDS : Ethiopia factors, incomplete vaccination, reason,

I. INTRODUCTION

Immunization is one of the most effective public health initiatives. Each year, vaccination prevents an estimated 2-3 million deaths from diphtheria, tetanus, pertussis (whooping cough) and measles. These are all life-threatening diseases that extremely affect children [1,2]. However, these diseases which occurred due to incomplete and unimmunization of children still accounts for quarter (8.8million deaths/year) of deaths in children under five years of age worldwide [3,4].

The Expanded Program on Immunization (EPI) started in Ethiopia in1980 with the aim of increasing the immunization coverage by 10% annually and reaches 100% coverage of all children under two years old by 1990. At this point, the immunization coverage figures vary largely between the regions, from more than 80% DPT3 coverage in Tigray to less than 5% in Somali and Afar regions, resulting in a national DPT3coverage of about 50% (DPT3=3 doses of diphtheria, pertussis and tetanus) . [5]

The long-term goal of the Ministry of Health EPI Strategy is to achieve 90% DPT3 coverage in all regions [5]. Accordingly, EPI in Ethiopia provides immunization services through static, outreach, and mobile sites to the target groups residing in every corner of the country. Despite these huge efforts made over decades by the federal ministry of health(FMOH) along with its partners, the expansion of the service fell short of the target set for 1990 [6].

World health organization (WHO) has estimated that if all the vaccines now available against childhood diseases were widely adopted, and if countries could raise vaccine coverage to a global average of 90%, by 2015 an additional two million deaths a year could be prevented among children under five years old. This would have a major impact on meeting the global goal to reduce child deaths by two-thirds between 1990 and 2015 millennium development goal 4. It would also greatly reduce the burden of illness and disability from vaccine-preventable diseases, and contribute to improving child health and welfare, as well as reducing hospitalization costs.[7]

Incomplete immunization is when the child’s immunization status was partial or, if the child missed at least one of the recommended vaccines according to immunization schedule [8].

In Ethiopia the percentage of children fully immunized by age 12 months has increased only slightly, however, from 20 percent to 22 percent. Mothers showed vaccination cards for 29 percent of children age 12-23 months but for only 13 percent of children age 48-59 months.[18]

The percentage who had received none of the six basic vaccinations are 15 percent in 2011.[18]

The 2011 national demographic and health survey (DHS) indicated low full immunization coverage among children aged 12–23 months in Ethiopia. Factors contributing to the low coverage of immunization have been poorly understood.[18]

The vaccine preventable death in under five children associated with incomplete immunization has been document in several studies are reported [8, 11-13]. Some study showed that, various reasons were adduced by the mothers for incomplete vaccination of their children. These include long waiting time at the health facility , lack of vaccine on the appointment day , absence of personnel at the health facility , child ill-health at the time of immunization , lack of information about the days for vaccination , forgetting the days of immunization, long distance walking , mother’s illness on the day of vaccination , social engagements , lack of money ,schooling mothers , parents objection, disagreement or concern about immunization safety and other miscellaneous reasons .[13-15]

In Ethiopian, the objective set in 1980 was not met because of factors such as poor health infrastructure, low number of trained manpower, high turnover of staff and lack of donor funding. The same factors still affect the program. [5,9]

Even though, many programmes are implemented in Ethiopia to reduce under vaccination and to increase immunization coverage still the goal the reach immunization coverage to 90% is not reach, as well as the number of unvaccinated children inpatient treatment is greater than that of fully vaccinated children. In the same way, immunization is not only for child health it is also important for vaccine preventable diseases. So, the aim of this research is to identify factors associated with incomplete immunization and to raise vaccination coverage and to reduce under vaccination of children.

II. METHODS AND MATERIALS

Study area and period

Study area:

The study was conducted at Serbo town which is located in Oromia region Jimma zone south west of Ethiopia. Serbo town is located 19km from Jimma town and 335km from Addis Ababa on the main the main road Addis Ababa in south west. The Serbo town has the total population of 6,335 and the town has two kebeles of o1 kebele with house hold of 624 and 02 kebele with the house hold of 430 and with total house hold 1054 who have child of aged between 12-23 months.

Study period: the study was conducted from March15 to April1, 2017

Study design

Community-based cross-sectional study design was conducted.

Sample size determination

The sample size was determined as:-

$$n = \frac{(Z\alpha/2)^2 p (1-p)}{d^2} = 316$$

Where,

P =proportion of children who incompletely immunized (29%) [21, 17]

d= margin of error=0.05

Z α/2=confidence level required and Zα/2 at 95% CI = 1.96

n=minimum sample size

Since the sample size was taken from less than 10,000 populations the required minimum sample size was obtained by making adjustment using population correction formula.

$$nf = \frac{n}{1+n/N} = \frac{316}{1+316/1054} = 243$$

where

N= 1054

nf= final sample size

The total of 267 children aged between 12-23 months was targeted for the study after addition of 10% non-response rate.

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Sampling technique

Systematic sampling techniques was used to select mothers/immediate caretaker of having children aged 12-23 months in Wayu kebele and Toli Karso kebele of Serbo town were included in the study. From each kebele 180 house hold were included in the study according to WHO EPI systematic sampling techniques was used within kebeles. With systematic sampling $k=N/nf$; $1054/267=4$ where k is sampling fraction. Then the sampling fraction was arranged in order (1, 2, 3, &4). Within the first kebele, a random number i between 1 and 4 is selected, representing the first chosen house hold. Subsequent records are identified by successively adding the constant 4 to the starting random number i .

Operational definitions

The following operational definitions were used:

Fully vaccinated-children are considered as fully vaccinated when they have received a vaccination against tuberculosis (BCG), three doses each of the DPT and polio vaccines, two doses of rota vaccines and measles vaccination by the age of 12 months.

Incomplete vaccination -children are considered as incomplete vaccination when they miss at least one doses of the above mentioned vaccines on fully vaccinated definition.

Unvaccinated -children are considered as unvaccinated when they didn't receive any dose of the above mentioned vaccines on fully vaccinated definition.

Vaccinated-children are considered as vaccinated when they took at least one dose of the above mentioned vaccines on fully vaccinated definition.

Dropout rate- This is the rate difference between the first and the last dose or the rate difference between the initial vaccine and the last vaccine.

Data collection tool and collection process

For data collection, interviewers-administered structured questionnaire was adapted from similar previous studies. The data was collected from immunization card of the child and verbal report of the mother or caretakers child. The questionnaire was translated to local language orally and the interview was conducted by with diploma nurses who speaks local languages and trained by the investigator about the content of the questionnaire in details. The data was collected by Face to face interview for the mother's/ care takers of children aged 12 to 23 months of Serbo town residents during study period.

Data quality control

The quality of the data collected was guaranteed by pretesting being done 5% of sample size on randomly selected individuals of mother's/ care takers of children aged 12 to 23 months of Bacho Bore kebele and essential modifications then was made. The researchers trained the data collectors on how to collect data from the records to augment data accuracy and validity. The collected data was reviewed and checked for its' completeness before data entry. There was close supervision of the data collectors by the principal investigators.

Data processing and analysis

After the collected data checked for consistency and completeness, the data was given code and, it was analyzed by using SPSS version 20. For each of the variables frequency distribution was done. More over for dependent variables associations was done. To determine factors that are significantly associated with vaccination incompleteness rate p-value of 0.05 was considered as a cut-off point for statistical significance. Finally, the result was presented by using statement, frequency tables and figures.

Ethical consideration

Ethical clearance was obtained from Jimma Universit , Institute of Health, Institutional Review Board (IRB) research committee and official letter was given to Serbo town kebele administrators Informed consent was obtained from a respondent who was participated in the study. The participation in this study is voluntary; they can also withdraw at any time from the study if they feel uncomfortable. Refusal to participate will not affect their life or care they shall seek at any of the health facilities in any way. Confidentiality was maintained by omitting their name and personal identification and participant was not compelled to the study.

III. RESULTS

Socio-demographic characteristics of mothers/caretakers and children under study

Overall a total of 260 immediate care takers of the children under study were involved in the study which gives response rate of the 97.4%. More than three fourth (86.5%) immediate care taker of the child under study was mother. The mean age of the immediate care taker of the children under study was 28.5 ± 6.6 years with around half (51.5%) of them residing in the age group of 25-34 years. Out of the total participants (260) 82.6%, 85.0%, and 88.0% of participants were Muslims, married and Oromo respectively. Regarding occupational status of the immediate caretaker of the child more than half (58%) were house wife followed by merchant 13.8%. The educational status immediate caretaker of the child was 41.4%, and 34.6% elementary school and illiterate respectively. More than half (56.5%) of immediate caretaker of the child were had greater than four family size. (Table 1and figure 1).

Table1: Socio-demographic characteristics of mothers/caretakers and children under study in Serbo town South West of Ethiopia, June 2017 (n=260).

		Frequency	Percent
Immediate care taker of child	Mother	225	86.5
	Sister	20	7.7
	Father	10	3.9
	Relative	5	1.9
Sex of child	Male	138	53
	Female	122	47
Age of immediate care taker	<15	20	7.7
	15-24	81	31.1
	25-34	134	51.5
	>=35	25	9.7
Marital status of Immediate care taker	Married	221	85
	Single	24	9.2
	Divorced and widowed	15	5.8
Ethnicity of immediate care taker	Oromo	229	88.0
	Kaffa	15	5.8
	Amhara	9	3.5
	Other	7	2.7
Occupational status of immediate care taker	House wife	151	58.0
	Daily laborer	25	9.7
	Farmer	18	6.9
	Merchant	36	13.8
	Gov't employee	12	4.6
	Other	18	6.9
Income	<500	89	34.2
	>=500	171	65.8
Family Size	<4	113	43.5
	>=4	147	56.5

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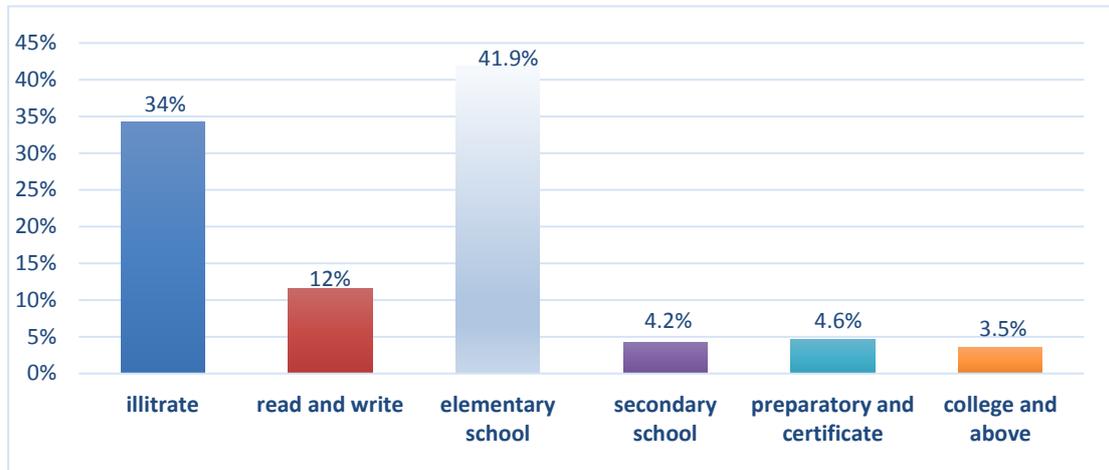


Figure 2: Educational status of immediate care taker in Serbo town South West of Ethiopia, June 2017 (n=260).

Vaccination status of children aged 12-23 months

Among 260 children aged 12-23 months included in the study according to mother/immediate care taker verbal report and immunization card 119(48.8%), 126(45.5%) and 14(5.7%) were fully immunized, incomplete vaccination and not vaccinated respectively. (figure4)

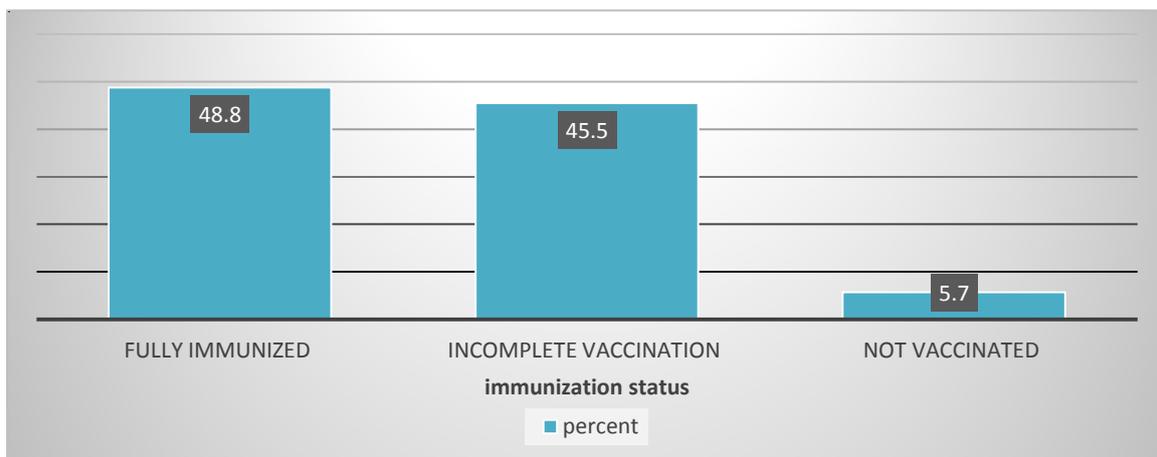


Figure4: Immunization status of children aged 12-23 months both from verbal report and immunization card in Serbo town, Jimma zone, south west of Ethiopia, June 2017GC

Vaccination confirmed by vaccination card and verbal report of care taker

Based on vaccination coverage defined by immunization card and history from mother/immediate care taker of children aged 12-23 months nearly around one third 91(37.1%) children had immunization card. The BCG and OPV0 vaccination coverage was 182(70.0%) and 113(43.5%) respectively as confirmed by maternal /immediate care taker and card. Among 260 children aged 12-23 months 50(19.2%), 39(15%) were vaccinated for polio and measles respectively during national vaccination day campaign. Similarly, DPT-HepB-Hib3 (penta3) and polio three vaccination coverage were around two third (66.9%) by history and vaccination card. The DPTHepB-Hib1 (penta1)-measles dropout rate for children was 19.5% and DPT-HepB-Hib1- DPTHepB-Hib3 dropout was 23% that is around one fourth didn't take DPTHepB-Hib3 (penta3). (figure5)

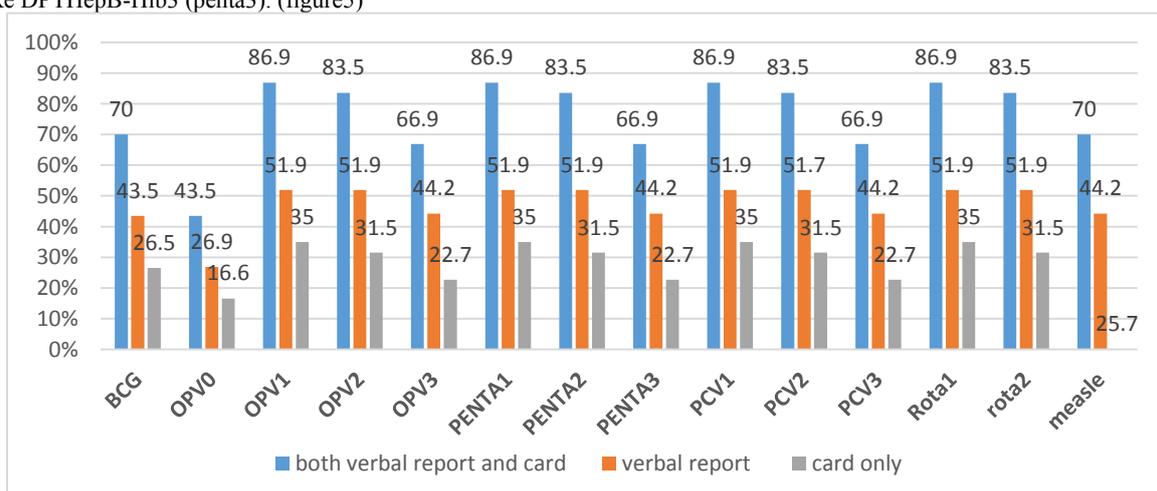


Figure 5; Vaccination confirmed by vaccination card and verbal report of children aged 12-23 months in Serbo town, Jimma south west of Ethiopia, June 2017GC.

Reasons for incomplete vaccination and never vaccinated of children aged 12-23 months

Among children included under study around half of them (54.2%) were incompletely vaccinated and never vaccinated. Whereas, most of the children not completed their immunization due to not knowing whether to come back for subsequent vaccination given (28.4%), next to it lack of lack of awareness on the importance vaccination accounts 16.3%. Regarding obstacles to vaccination 14.2% were not complete their vaccination due to absence of vaccine and 9.2% mothers/immediate care taker were found on faith in immunization. (Table2)

Table2: Reasons for incomplete vaccination and never vaccinated of children aged 12-23 months in Serbo town, Jimma south west of Ethiopia, June 2017GC.

Reasons for incomplete vaccination and never vaccinated (n=141)		
Lack of information	Frequency	Percent
Not knowing to come back for subsequent vaccination given	40	28.4
Lack of awareness on the importance of vaccination	23	16.2
Time of immunization unknown	12	8.4
Fear of side effects	7	4.9
Lack of motivation		
Immunization postponed until another time	6	4.2
No faith in immunization	13	9.2
Obstacles to vaccination		
Time of immunization inconvenient	7	4.9
Vaccine not available	20	14.2
Family problem	5	3.5
Long time waiting for immunizing child	8	5.7

Socio demographic factors associated with incomplete vaccination and never vaccinated of children aged 12-23 months

For further analysis cross tabulation was done for dependent variables non/incomplete vaccination and complete vaccination with socio-demographic characteristics of the mother/immediate caretaker. The shows that marital status, educational status and monthly income of the mother/immediate caretaker had significant association with immunization of the children as p-value were less than 0.05. Whereas religion, ethnicity, occupational status and family size of mother/immediate caretaker, sex of the child under study had no significant association with immunization status of the child as p-value were greater than 0.05.(Table3)

Table3: factors associated with non/incomplete vaccination among children aged 12-23months in Serbo town, Jimma south west of Ethiopia, June 2017GC.

Immediate caretaker of the child	incomplete	Complete	Chi-square statistics	P value
Marital status				
Married	96	125	18.863	0.00083
Single	16	3		
Widowed/divorced	9	1		
Education status				
Less than elementary education	89	40	11.1758	0.000829
Elementary and above	73	68		
Income in ETB				
<500	53	26	18.5226	0.000017
>=500	73	98		

IV. DISCUSSION

This study was conducted to assess incomplete vaccination and associated factors among children aged 12-23 months in two kebeles of Serbo town, Jimma zone Oromia region South West of Ethiopia. From a total of 260 children included in the study 45.5% didn't complete their vaccination and 5.7% never vaccinated which lower than similar study done in rural Nigeria about two-third (62.8%) of the children was not fully immunized. The possible explanations for this variation might be due to different studies are done at different place and time with different socio cultural characteristics. In contrary, the percentage of incomplete vaccination in this study was higher than the study done, at Yirgalem town in 2015 20%, and 2.5% of the children were partially immunized and never vaccinated respectively [12]. This was due to differences in the design, sample size, representativeness of the sample, and selection methodology, as well as differences in the source of information, phrasing of questions, and reporting of data could help explain the observed differences in prevalence (EDHS, 2011). However, this study was relatively higher than the cross-sectional study in kebeles of kombolcha more than half of the children partially immunized 52.9% and completely immunized 22.9%. [20]

The DPT-HepB-Hib1,OPV1 and PCV1 coverage was 86.9%, seen as an indicator of access to vaccination services while the DPT-HepB-Hib3 66.9% and OPV0 43.5% coverage, seen as an indicator of vaccine utilization. This finding was higher than EDHS 2011, 64 percent of children received the first DPT dose and only 37 percent went on to receive the third dose of DPT. [6] In contrary, finding of this study for DPT-HepB-Hib3 (66.9%) lower than Ethiopian EPI cluster survey in May, 2015 the immunization coverage as measured by DPT-HepV-Hib3 was achieved 87%. [5] The possible explanation might be since the data was secondary source over report or data quality control problem could be occur.

OPV0 43.5% coverage was low when compared to other vaccination coverage in this study this was due to OPV0 given only up to two week after child birth ,i.e no catch up unlike other vaccine and home delivery also affect it. Measles coverage was 70% which was lower than other vaccines and similar finding with other similar studies on the area. [12]

DPT-HepB-Hib1to DPT-HepB-Hib3 drop rate was 23% which was lower than EDHS 2011, DPT-HepB-Hib1to DPT-HepB-Hib3 drop rate of 43%. In contrast to this finding was relatively higher than the study done in Yirgalem town in 2015 a dropout rate for DPT-HepB-Hib1- DPT-HepB-Hib3 was 20%. This was due to lack awareness whether to come the vaccine left in this study which accounts 28.5 %.

The most reasons which contributed to incomplete immunization were due to lack awareness whether to come back for second or third vaccine 28.4 %, which was higher than the finding in EDHS 2011, Lack of information about day of immunization 2.5%. On the other side the study done in 2015 by Michael Mesfin there was relative similarity to the finding these study that include Not knowing whether to come back for second and third vaccination (17%%), The finding of this shows that vaccine utilization in this study area was low.

Mothers/immediate caretakers of married, high monthly income, educated were more vaccinate their child as evidenced significant association of p-value less than 0.05. Similarly this study was consistent with the study done by Raji Tajuden in Nov, 2015 in Ethiopia. [13] Another study done Yirgalem town in 2015 shows that there was no association between marital status the mother/immediate caretaker and incomplete vaccination which was not consistent with this study. [12]

Age and family size of immediate care taker, had no significant association with incomplete vaccination, which was consistent to the study done Yirgalem town in 2015. Whereas inconsistent

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with another study done in Raji Tajuden in Nov, 2015 in Ethiopia there was significant association between family size and incomplete vaccination. This might be due to socio cultural difference and perspective of the investigator.

V. CONCLUSION

There is low vaccine coverage with 45.5% partially immunized children aged 12-23 months in Serbo town when compared to Ethiopian EPI multiyear plan and global target. Lack of information, not knowing whether to come back for second and third vaccination and lack awareness on the importance vaccination, and lack vaccine supplies were found to be the most reason for incomplete immunization whereas Marital status, monthly income and educational status of mother/immediate caretaker were found to be significantly associated with incomplete vaccination. Therefore the emphasis should be given to the community awareness creation and provision of an adequate vaccine supplies to the communities by the stakeholders. Further Large scale study with a representative sample size is recommended to be conducted in the future.

Limitation of the study

- ❖ Information received from verbal report of the mother on immunization may subject to recall bias.
- ❖ Due to lack of birth certificate the mother/immediate caretaker may misclassify the age the child.

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Author contributions

All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.

Disclosure

The authors declare that they have no competing interests in this work.

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