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RESEARCH ARTICLE

Assessment of Magnitude and Associated Factors of Immunization Drop Out Rate for Children Aged 12-23 Months In Abobo District South West Ethiopia

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Abstract

Vaccination is the epicenters of preventive care for good children health outcomes in each nation. Nevertheless, numbers of factors have been hindering the attainment of targets to provide complete vaccination in different nations. The aim of this study is to assessed predictors of immunizations in 12-23 months aged children in Abobo District, Gambela regions south west Ethiopia.

Method: A community based cross-sectional study was employed in 436 pairs of mothers to children aged 12-23 months from 12 march - 27 April 2019. The study participant were recruited by multistage-sampling were used for each kebele. Data were entered into Epi-Data version 3.1 after cleaned and coded, exported to STATA/SE-14/R analysis of logistic regression. Variables with P-value < 0.25 in bivariate logistic regression were transported in to multivariable logistic regression; a variable with 95% CI in AOR was used claim predictors for dropout rate.

Results: The overall dropout rate of immunization from completion was found 25.8% (95% CI: 21.5-30.2). Factors like mothers did not attend ANC (AOR = 4.59, 95% CI: 2.58, 7.84), being home delivery (AOR = 6.46, 95% CI: (3.5-11.4), postponed last immunization scheduled (AOR = 3.44, 95% CI: 1.98-5.97), children ill during measles vaccine (AOR = 1.83, 95% CI: (1.02-3.28), Mothers refused ≥ 30 minutes for vaccine service waiting (AOR = 3.58, 95% CI: (1.99, 6.44) were significantly associated with immunization dropout out.

Conclusion: The immunization dropout rate was unacceptable and higher as compare with WHO reference (< 10%). Home deliver, postponed measles vaccine, child illness, ANC status Service refusal ≥ 30 minutes waiting for vaccine were independently associated with dropout.

Keywords

Immunization dropout, Under-five children, South West Ethiopia

Abbreviations

ANC: Ante Natal Care; AOR: Adjusted Odds Ratio; BCG: Bacillus Callmete Guerin; CDC: Centers For Disease Control; CI: Confidence Interval; COR: Crude Odds Ratio; EPI: Expanded Program on Immunization

Introduction

Immunization is the incitement of changes within the immune system through which protection happens. It is considered as one of the foremost cost-effective and capable wellbeing mediations, which reduce childhood dreariness, mortality and disability [1,2]. Globally, 19.9 million newborn children were under-vaccinated. Of which 12.4 million lived in 10 nations, 5.6 million of them still dying every year by vaccine-preventable diseases. The sub-Saharan African countries took the lion's share of 80% of the death [3,4]. Even in Africa has made remarkable progress of immunization services, around 14.8 million (68%) children who did not receive the DTP3 vaccine during the first year of life lived in 10

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countries. According to 2013 immunization data report of Africa, Ethiopia has the second largest number of incompletely vaccinated children from the region, next to Nigeria [5]. In Ethiopia, 70-80% of children received BCG initially, however 50-54% of them received end measles containing vaccine on schedule [5,6]. Many peer reviewed research on immunization dropout rate indicated that socio-economic and demographic factor, difficult on topography, armed conflict, maternal knowledge are factors that affect the completion of childhood immunization [7-11].

Methods

Study setting and populations

A community based cross-sectional study was employed among randomly selected 436 pairs of mothers to children aged 12-23 months children from 12 march - 27 April 2019 in anguawa districts, which is one of the five districts with 24 kebeles in Gamble Regional state southwest, Ethiopia.

Source population and study population: All children aged 12-23 months of aged with a history of vaccination were source populations for this study.

Whereas, children aged 12-23 months of aged with a history of vaccination from 12 marches up to 27 April 2019 were study populations.

Inclusion criteria: Study participant who resident at least six month in Abobo districts of Gambela regions.

Sample size determination and procedures

Sample size was calculated by using single population formula considering the following assumption. Confidence interval of 95%, Zα/2 = 1.96 at 95% CI, d ≤ 1/5 over all dropout rate of p = 22.2% and d = 5% design effect 1.5 and non-response rate 10%, there for the final sample size for the study to be 436 using this formula $n = (Z\alpha/2) * P\frac{(1-P)}{(D)2}$ [9,12]. There are total of 24 kebele in Abobo districts, multi-stage sampling procedure was used to obtain the representative study populations. In the first stage, simple random sampling of lottery methods was used to select 8 (out of 24) Kebele. At end sampling frame was prepared for 12-23 month child-mother paired on excels after proportional sample allocations for each kebele was allocated based on their source of population.

Outcome ascertainments: The outcome variables for this research are 12-23 month children "completed vaccinated/ not completed" vaccination. Whereas ages of mothers, family occupation, PNC service, and comorbidity etc.

Operational definition

Dropout rate (DOR): is the rate difference between the initial vaccines (BCG or Pentavalent I) and the final vaccines (Pentavalent III or Measles). BCG to Measles dropout rate: the percent of children vaccinated for BCG who does not receive measles vaccine. BCG = Measles dropout rate, over all dropout rate $\frac{BCG - Measles * 100\%}{BCG}$ [13].

Data collection instruments

Pre-tested structured questionnaire were used to collect data from respondents. The questionnaire was prepared first in English and translated to the local language. The four diploma nurses and one supervisor were recruited for data collection with one day training before collections.

Data analysis procedure

Epi Data version 3.1 and STATA/R14 (SE) version software were used for data entry and analysis. All bivariate at p-value ≤ 0.25 was exported to multivariable logistic regression. Variables with p-value less than 0.05 with their respective adjusted odd ratio (AOR) with 95% CI were declared as independent predictors for Vaccine dropout.

Results

Socio-demographic characteristics

From total 436 study participant, 422 were interviewed with (response rate 96.8%). Mean age of the respondents were 30 years with (SD ± 6). Nearly two-third 273 (64.6%) mothers had unable to read and write, but 296 (70.1%) caregiver mothers decide immunization service utilization of their children by themselves (Table 1).

Baseline clinical factors of children

The mean age of children was 16 months with (SD ± 2.8), while more than half 221 (52.4%) of children were males in sex and nearly 257 (60.9%) of them were found within second and fourth birth order. One-fourth of 106 (25.1%) the children defaulted from schedule immunization due to medical comorbidity. whereas, 163 mothers -child paired did not started any ANC before delivery.

Immunization dropout status reasons

The overall immunizations dropout rate was found to be 25.8% (95% CI: 21.5-30.2). Out of the total 109 (25.8%) dropout of immunization schedule, 37 (33.9%) were due to absence of staff at health facility, while 21 (19.3%) and 17 (15.6%) were lack of patience for ≥ 30 minute service waiting were some of factors mentioned.

Independent factors associated with immunization dropout

During binary analysis eleven independent variables were found for nominated as candidate for multivariable logistic regressions having p-value of < 0.25. However

Table 1: Socio-economic and demographic characteristics of the study participants in Abobo District, Gambella, 2019.

Variable	Category	Frequency (N)	Percentage (%)
Age of mothers (in months)	15-19	12	2.8
	20-24	77	18.2
	25-29	118	28
	> = 30	215	51
Residence area	Rural	369	87.4
of family	Urban	53	12.6
Educational	Illiterate	273	64.7
status of mother	Read and write	44	10.4
	Elementary and junior	49	11.6
	High school and above	56	13.5
Educational	Illiterate	243	57.6
status of father	Read and write	37	8.8
	Elementary junior	45	10.7
	High school and above	97	13.01
Wealth index	Lowest	84	19.9
	Second	85	20.1
	Middle	84	19.9
	Fourth	85	20.1
	Highest	84	19.9
Maternal decision EPI	Yes	296	70.1
	No	126	29.8
Sex of child	Male	221	52.4
	Female	201	47.6
Child birth order	1st	110	26.1
	2-4th	257	60.9
	≥ 5th	55	13
Child Illness	yes	106	25.1
	no	316	74.9
ANC visit	Yes	259	61.4
	No	163	38.6
TT vaccination	Yes	255	60.4
	No	167	39.6
Place of delivery	Heath facility	248	58.8
	Home	174	41.2
PNC visit	Yes	300	71.1
	No	122	28.9

Others[1] = likes Students, Others[2] = Farmer, Housemaid

after controlling confounding in multivariable logistic regression, five independent predictors were found for immunization dropout rate at p-value < 0.05 were identified.

A child whose mothers did not attend at least once ANC visit during pregnancy was 4.59 times (AOR = 4.59, 95% CI: 2.58-7.84) more likely to dropout out as compared with counterpart. Health institution delivery was indispensible for having well baby and mother after labor in-addition to PNC service unitization and BCG vaccine initiations. However mothers who delivered at home were 6.46 times (AOR = 6.46, 95% CI: (3.5-11.4)) more likely dropout from immunization than mothers who deliver at health facility. Mothers who encountered postponed last immunization schedule by service provider were 3.44 times AOR = 3.44, 95% CI:

Table 2: Multivariable analysis for determinant Factors associated with immunization dropout among children aged 12-23 in Abobo district, Southwest Ethiopia.

Variable	Category	Immunization dropout status		COR (95%CI)	AOR (95%CI)	p-value
		Dropout n (%)	not dropout n (%)			
Place of delivery	Home	78 (44.8)	96 (55.2)	5.68 (3.51, 9.19)	**6.46 (3.55, 11.4)**	**0.001***
	Health facility	31 (12.5)	217 (87.5)	**1R**	**1R**	
Postponed schedule	yes	62 (45.9)	73 (54.1)	4.33 (2.73, 6.78)	**3.58 (1.99, 6.44)**	**0.001***
	No	47 (16.4)	240 (83.6)	**1R**	**1R**	
Child illness	Yes	35 (33)	71 (67)	1.65 (0.99, 2.59)	**1.83 (1.02, 3.28)**	**0.043***
	No	74 (23.5)	241 (76.5)	**1R**	**1R**	
ANC visit	No	69 (42.3)	94 (57.7)	4.01 (2.25. 6.35)	**4.59 (2.58, 7.84)**	**0.001***
	yes	40 (15.4)	219 (84.6)	**1R**	**1R**	
Waiting time	> 30 minutes	80 (37.7)	132 (62.2)	3.78 (2.34, 6.11)	**3.58 (1.99, 6.44)**	**0.002***
	< 30 minutes	29 (13.8)	181 (86.2)	**1R**	**1R**	

1.98-5.97) more likely dropout as compared to those mothers who got service with exact scheduled. Mothers having ill children during measles immunization were 1.83 times (AOR = 1.83, 95% CI: (1.02-3.28) more like dropout as compared counterpart children. Mothers who did waited ≥ 30 minutes for service of immunization at health institution were 3.58 times (AOR = 3.58, 95% CI: (1.99-6.44) more likely drop out as compared to mothers who did not wait longer time at scheduled date of immunizations (Table 2).

Discussion

The overall proportions of immunization drop out was found 25.8% (95% CI: 21.5--30.2). This is incomparable with WHO reference (< 10%) [7]. In fact this might be due to missed appointment date and lack of awareness by caretakers for the scheduled date by health facility. More over this report is higher than finding in n Basra 19.3% [11], Haryana India, 13.88% [12] and Arba Minch 11.7% [13]. This might be due to access to immunization service, and EPI implanting plane different from one area to others. However, it was lower than the previous studies conducted in the Jigjiga Somalia 40.3% [8], Uganda 47% [10].

The reason might be due to health service setup. According to report of this study absence of health workers at the time of immunization was associated with drop out. This is in line with study done in Sudan [14,15]. A child whose mothers fail to attend one of ANC visit during pregnancy was associated with dropout from immunization as compared to mothers followed ANC. This result is similar with finding in central Ethiopia [16]. Similarly mothers who delivered at home in this research were more likely to dropout from who deliver at health facilities. This is agreed with study done in Jigjiga [8]. A Possible explanation for this finding might be mothers who give birth at home would not have communication with health professionals and contact to know about immunization at postnatal periods. However, those health care providers postponed immunization schedule were significant association dropout rate. Those mothers who encountered postponed schedule of last immunization date by service provider were more likely to dropout. This finding is supported in finding in south Ethiopia [17-20]. On the same way, mothers who waited ≥ 30 minutes at health facility for immunize program were more likely to drop out as compared to mothers who did not wait longer than thirty minutes'. This finding is in line with Benin [10]. This might be mothers does not motivate for accumulation of last immunization schedule next time.

Conclusion

This study revealed child immunization dropout in 12-23 months age was higher and unacceptable range as compared with WHO recommendations.

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Authors' Contributions

AK was involved in the conception, design, analysis and interpretation of the data, report writing and drafting of the manuscript. FK, AG and AK assisted with the conception, designing, analysis of the study and critically reviewed the manuscript and all authors approved the final manuscript.

Ethical Clearance

Ethical clearance was obtained from Jimma University Research Ethics Review Committee (JURERC) with (Ref. No: JHRPGI|723/2019) & issued data 21/02/2019) to obtain formal letter.

Of clearance to conduct this research, written official letter of cooperation from Jimma University was given to Abobo District health office.

Data Set

All data used in this obtained upon formal request from main author.

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Consent for Publication

There is no consent for publication for this research.

Disclosure/Conflicts of Interest

The authors declare that there are no conflicts of interest for this research.

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