

Barriers for Full Immunization Coverage among under Five Years Children in Mogadishu, Somalia

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Abstract

Background: Immunization is amongst the most cost effective public health interventions for reducing global childhood morbidity and mortality. However globally 9 million deaths of children occur as a result of vaccine-preventable disease, a bigger proportion occurred in sub-Saharan Africa which was 4.4 million. Therefore, this study aimed to assess barriers for complete vaccination coverage among under five years children in Mogadishu, Somalia.

Methods: A community based Cross-sectional study was conducted in between April to July, 2019 in Mogadishu-Somalia. Two-stage cluster sampling with systematic random sampling was used to select a sample of 820 households. Data was collected through structured, interviewer administrator questionnaire. In case more eligible children found at single selected household, one child was randomly selected and the information related to immunization was interviewed from his/her caregiver.

Results: the overall, fully vaccinated under five years children was found to be 45.2%. Immunization was found to be increased by being a younger caregiver ($\beta = -0.019$, $P\text{-value}=0.042$), being married caregiver, being Father with Secondary & above education ($AOR=1.755$, $95\% CI=1.161-2.655$, $P\text{-value}=0.008$), being a young child ($\beta = -0.018$, $P\text{-value}=0.011$), being children from birth order of fifth & above ($AOR=1.539$, $95\% CI=1.011-2.343$, $P\text{-value}=0.044$), Married caregiver ($AOR=0.244$, $95\% CI= 0.063-0.94$, $P\text{-value}=0.041$), increased Household monthly family income= ($\beta = 0.003$, $P\text{-value}=0.000$), Availability of vaccine at the time of visit ($AOR=6.147$, $95\% CI=1.943-19.441$, $P\text{-value}=0.002$), Cost affordability of vaccine =($AOR =1.951$, $95\% CI=1.238-3.076$, $P\text{-value}=0.004$), Being born at health facility ($AOR =1.517$, $95\% CI=1.104-2.086$, $P\text{-value}=0.010$), having good Knowledge on immunization ($AOR =1.125$, $95\% CI=1.070-1.181$, $P\text{-value}=0.001$), having good Practice on immunization ($AOR =2.756$, $95\% CI=2.233-3.402$, $P\text{-value}=0.001$) and having good Perception on vaccine ($AOR =4.976$, $95\% CI=2.183-11.340$, $P\text{-value} =0.001$).

Conclusion: In conclusion, the result of this study has revealed that the proportion of fully vaccinated under five children in Mogadishu is very low. Steps to promote Health education and vaccine availability should be lounged.

Introduction

Immunization is amongst the most cost effective public health interventions for reducing global childhood morbidity and mortality (1). In 1974, WHO established the Expanded Program on Immunization (EPI) to ensure that all children get access for vaccination. To synergize EPI, the United Nations General Assembly Special Session (UNGASS) set a goal to ensure full immunization of children under one year at 90% coverage nationally with at least 80% coverage in every district by 2010. Building on this goal, the World Health Assembly endorsed the Global Vaccine Action Plan (GVAP) in 2012 to extend immunization to all children across the globe. GVAP's key targets include achieving and sustaining 90% national penta coverage and $\geq 80\%$ Penta coverage in every District by 2015 (2).

When the EPI was initiated in 1974, less than 5% of children in developing countries were receiving a third dose of diphtheria-tetanus-pertussis (DTP-3) and poliomyelitis vaccines in their first year of life (3). A report from WHO revealed that around 60% of children's who were not reached with routine immunization services are from 10 countries where majority are from sub-Saharan African countries (4). Routine immunization coverage is assessed by Penta 3 coverage (5).

With the support of WHO and UNICEF, EPI program in Somalia started in 1978, with the strategy of mobile and outreach services. An evaluation of the program in 1985 showed that the strategy achieved very low immunization coverage. Between 1985 and 1988, a strategy of mass immunization campaign was adopted and implemented in major towns of the country. The operation resulted in about 75% coverage of children in towns. However, this could not be sustained and immunization coverage rapidly declined when fighting broke out in 1988. The civil war of 1988–1992 devastated the health infrastructure and dispersed health workers. The modest gains of the program were completely lost due to the war (6). By the end of 1992, the international community, led by UNICEF, gave priority to the initiation of EPI services; and in 1996, more than 100 MCH centers and 4 zonal cold stores were functioning (7). The trend of low childhood immunization coverage was evident during the baseline survey conducted in Nov 2017 where we accessed the immunization coverage for the four basic vaccines namely BCG (57%), Measles (47%), Polio (14%), and Pentavalent (28%) vaccines in 9 districts i.e. Kismayo, Adado, Afmadow, Iskushuban, Armo, Alula, Bosaso, Barga and Ufayn (8). UNICEF, 2010 reported that the immunization coverage of under five children in Mogadishu was 40% (9).

The Federal government, its member states and communities with helps from international and local agencies established numerous mother and child health care centres which provide immunization services that makes immunization among the most cost effective public health intervention, however, unlike many other developing countries the immunization coverage of Somalia is still relatively very low. Thus this study aimed to find out factors barriers with complete immunization coverage among under five years of age children in Mogadishu, Somalia.

Methods

Study Design and setting

A community based cross-sectional study design was carried out among 820 households with one child from each household. Any Caregivers with child of 12 to 59 months lived at the selected Divisions and available at the time of data collection were considered eligible to the study. In case a single selected household has more than one eligible child, one child was selected randomly.

Sample Size determination

To calculate the minimum sample size, a Cochrane formula (10) with Design effect of 2 and 10% addition of expected non-response rate was used.

$$\frac{Z^2 pq}{d^2} * DEFF$$

Where n = minimum sample size, Z = Standard normal deviate corresponding to 5% significant level, p = prevalence in previous studies (40%) (9), q = 1 - p, d = precision set at 0.05, DEFF is set at 2. Z = 1.96, p = 0.40, q = 0.60. Applying the formula above the calculated minimum sample size was 738. Thus, a sample size of 820 households was used in this study taking into consideration with 10% addition of expected non-response rate.

Sampling Techniques

A mixture of two-stage cluster sampling and systemic random sampling was used to select households. At the first stage, Mogadishu was divided into 17 districts, with each district represents a cluster, then one district (Wadajir) was selected randomly. At the second stage, the selected district was divided into four divisions in which again two divisions (Halane and Hawatako) was selected randomly, finally all households in that selected divisions was selected through systemic random sampling up to calculated sampled sample size.

Data collection

Data was collected with a pretested, structured, Researcher administered questionnaire which was initially developed in English and later translated into Somalia language. The questionnaire comprised three sections; a section on Socio-demographic variables of child's current caregiver, child and father, a section on immunization status of the child and section on the barriers affecting immunization coverage. Any household with eligible child was selected and the caregiver of that was interviewed through face to face interview. In the presence of immunization card, Information about child immunizations was collected from immunization cards or mother's verbal report with the verification of the presence of a BCG scar.

Data Analysis

Data were entered into Statistical Package for Social Sciences (SPSS-IBM) version 20. Data entry, cleaning, processing, preliminary analysis and final write-up were done by the researchers. Frequencies and percentages were used to display immunization status of the children. Binary analysis was used to assess the association between independent and dependent variables. Odds ratios (ORs) and their 95% confidence intervals (CIs) were calculated. A p-value <0.05 was considered as statistically significant. Bivariate analysis was done to identify the crude association between dependent and independent

variables. Then, all variables that showed statistical significance in the bivariate analysis were included in the multivariate logistic regression model to determine the barriers on full immunization coverage among children aged under five years. Full immunization status of the children (card plus mothers recall) was included in the logistic regression model as a dependent variable, while socio-demographic characteristics of the caregiver, child characteristics, father characteristics, health centre related factors and of socio-cultural factors were used as independent variables. Adjusted ORs with their 95% CIs were computed to determine the association.

Ethical considerations

The study protocol was reviewed and approved by the Institutional Review Board of the Jazeera University. Permission to undertake the study was obtained from the Ministry of Health, Federal Republic of Somalia. A written informed consent was obtained from the participants prior to participation in the study, and data collection was conducted confidentially.

The following operational definitions were used

Fully vaccinated- A child aged under five years old who received at least three doses of pentavalent

Not fully vaccinated: A child aged under five years old who didn't received at least three doses of pentavalent

Results

Immunization Status of the children their confirmation

A total of 741 caregivers of children aged under five years old were interviewed, with a response rate of 90.4%. Of the total 741 children, 335(45.2%) were fully immunized by whom 38% were confirmed by card. (Table 1)

Barriers of complete Immunization

- Multivariate logistic regression of socio-demographic factors and vaccination coverage

Table 2 shows the multivariate logistic regression of socio-demographic factors on vaccination coverage. Younger caregivers were more likely to fully vaccinate their children than older caregivers ($\beta = -0.019$, P -value = 0.042). Fathers with Secondary/above education were 43% and 42.3% more likely to vaccinate their children than those with Non-formal or primary education respectively [(AOR = 0.570, CI = 0.377–0.862, P -value = 0.008) and (AOR = 0.577, CI = 0.382–0.871, P -value = 0.009)]. Single caregivers were 0.244 less likely to immunize their children than married caregivers (AOR = 0.244, CI = 0.063–0.940, P -value = 0.008). For additional one unit increase in Household monthly family income, there was an

increase in vaccination coverage of the children by a factor of 0.003 ($\beta = 0.003$, $P\text{-value} = 0.000$). Young children were more likely to be fully vaccinated than older children ($\beta = -0.018$, $P\text{-value} = 0.011$). Children from birth order of fifth/above were 36.1% more likely to be vaccinated than those from third or fourth and 35% more likely than those from first or second birth order. This again shows that younger children were more likely to be vaccinated. This is may be due to the child vaccination campaign [(AOR = 0.639, CI = 0.426–0.957, $P\text{-value} = 0.030$) and (AOR = 0.650, CI = 0.427–0.989, $P\text{-value} = 0.044$)]. Lastly, Married caregivers were 75.6% more likely to vaccinate their children than single caregivers (AOR = 0.244, CI = 0.063–0.94, $P\text{-value} = 0.041$) (Table 2)..

- Multivariate logistic regression of health system factors and vaccination coverage

Availability of vaccine at the time of visit, cost affordability of vaccine and being born at health facility were found to increase the chance of immunizing children [(OR = 6.147, CI = 1.943–19.441, $P\text{-value} < 0.05$), (OR = 1.951, CI = 1.238–3.076, $P\text{-value} < 0.05$), (OR = 1.517, CI = 1.104–2.086, $P\text{-value} < 0.05$)]. (Table 3)

- Multivariate logistic regression of socio-cultural factors and immunization coverage

For additional one unit increase of caregivers' knowledge and practice was found to increase the immunization coverage of children by factor of 0.117 and 1.014 respectively ($\beta = 0.117$, $P\text{-value} < 0.05$ and $\beta = 1.014$, $P\text{-value} < 0.05$) respectively. Caregivers who believed immunization was useful for the children were nearly 5 times more likely to immunize their children than those who had a neutral perception on immunization. (See Table 4)

Discussion

The proportion of under five children with complete immunization coverage in Mogadishu was found to be 45.2% and out of these 38% of them were confirmed through immunization cards and 62% were confirmed through caregiver's recall. This is coverage is very small compared to goals of Global Immunization Vision and Strategy (11) of at least 80% vaccination coverage in every district.

We found that age of the caregiver had negative significant association with immunization coverage of the children. Younger caregivers immunize their children compared to older caregivers ($\beta = -0.024$; 95% CI: 0.976–0.996, $P\text{-value} = 0.019$). This finding is consistent with study conducted in Iraq by (12) which found that the frequency of unvaccinated children was greater among older mothers. This disparity sends a positive message of little improvements on community awareness on vaccination. The study also found that educational level of the child's father was significantly associated with immunization coverage of the children. Fathers with no formal education or primary school education were less likely to vaccinate their children than fathers with secondary educational level/above educational level [(AOR = 0.577; 95% CI: 0.377–0.862, $P\text{-value} = 0.008$) and (AOR = 0.577; 95% CI: 0.3982–0.871, $P\text{-value} = 0.009$) respectively. Our findings are in line with studies done in Nigeria by (13), Zimbabwe by (14), Ghana by

(15) and Kenya by (16). This may be fathers with higher educational level were more aware of the vaccination importance than their counterparts.

Our study also showed that there was significant positive association between monthly household income and immunization coverage of the children. For additional one unit (USD) increase in household monthly income is likely to be associated with an increase by a factor of 0.003 on immunization coverage of the children ($\beta = 0.003$; 95% CI: 1.002–1.005, *P-value* = 0.000).

Concerning age of child, our study found that age of the child had a negative association with immunization coverage, That is older children were less likely to be immunized when compared to younger children ($\beta = -0.018$; 95% CI: 0.968–0.996, *P-value* = 0.011). This is contradicting findings of study from Khartoum state, Sudan which showed that vaccination coverage of child increases with increase of his age (17).

Also birth order of the child was associated with immunization coverage, first/second and third/fourth born children were 0.650 and 0.639 times less likely to be vaccinated than the fifth/above birth order children. [(AOR = 0.650, 95% CI: 0.427–0.989, *P-value* = 0.044) and (AOR = 0.639, 95% CI: 0.426–0.957, *P-value* = 0.030)].

Our analysis also found that there was significant association between vaccine availability in the center at the time of visit and immunization coverage of the children. Mothers who got vaccine available in the center by the time of visit were six times more likely to vaccinate their children when compared to those who did not get it. (AOR = 6.147; 95% CI: 1.943–19.441, *P-value* = 0.002). Our findings were supported by study in Nigeria showed that (26.2%) of them were not fully immunized because of unavailability of the vaccine at level of the health center and this was the most common reason of not completing or immunizing their children (18) and it is obvious that vaccine availability is the corner stone for vaccine coverage.

We found that affordability of costs incurred to vaccine had significant association with immunization coverage of the children. Caregivers who afforded the costs were two times more likely to vaccinate their children when compared to caregivers who could not afford it. (AOR = 1.951; 95% CI: 1.238–3.076, *P-value* = 0.004) this is consistent study from Togo also supports the notion that economic conditions influence the incompleteness of immunization coverage in children. This is probably because access to immunization services can be affected by indirect costs linked to vaccination such as the purchase of immunization records cards, transport cost or medication for vaccine-related care (19).

In our study, place of child delivery was significantly associated with immunization coverage of the children. Children born at health facility were 1.5 times more likely to be vaccinated than those born at home. (AOR = 1.517; 95% CI: 1.104–2.086, *P-value* = 0.010). Our findings are in line with study in central Ethiopia which also showed that immunization coverage of children delivered in health facility was higher than children delivered at home (20) and the reason behind this may be the parents get health

education when the child is delivered in health facility and gets vaccination card starting with BCG vaccine in the first day of live.

For additional one unit increase in caregivers' knowledge on immunization was found to increase the immunization coverage of children by factor of 1.125 (AOR = 1.125, 95% CI: 1.070–1.181, *P-value* = 0.001). Our findings agreed study carried out by (21) *in* rural setting of western Uganda, mothers with a basic understanding of the importance of childhood immunizations were more likely to have timely, full vaccination of their children compared to those with less knowledge.

Caregivers who had positive perception on immunization were nearly 5 times more likely to immunize their children than those who had a neutral perception on immunization (AOR = 4.976, 95% CI: 2.183–11.340, *P-value* = 0.001). this results is in line with the finding from previous study in Somalia by (9) that showed “children’s immunization status was significantly associated with caregivers’ positive perceptions on the usefulness of immunizations to children”

For additional one unit increase in practice of the caregivers was found to increase the immunization coverage of children by factor of 2.756 (AOR = 2.756, 95% CI: 2.233–3.402, *P-value* = 0.001). two different studies conducted in Saudi Arabia by (22) and Italy by (4) showed similar results to this.

Conclusion

In conclusion, the present study found that immunization coverage of under five years children in very low (45.2%), steps to promote population awareness and community mobilization should under taken urgently.

Being Older and single marital status of caregivers, low fathers’ educational level, low Monthly family income, early birth orders, younger age of children, vaccine unavailability at the health centre, vaccine related cost unaffordability, delivered at home and caregivers low knowledge, low attitude and low practice on immunization were found to be the barriers for complete vaccination coverage among under five children in Mogadishu.

Declarations

Competing interests

The authors declare that they have no competing interests.

Authors’ contribution

Authors contributed equally. All authors read and approved the manuscript.

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References

1. Maman K, Zöllner Y, Greco D, Duru G, Sendyona S, Remy V, et al. The value of childhood combination vaccines: from beliefs to evidence. *Human vaccines & immunotherapeutics*. 2015;11(9):2132–41.
2. Control C for D, Prevention. Global routine vaccination coverage—2012. *MMWR Morbidity and mortality weekly report*. 2013;62(43):858.
3. Uwizihwe JP, Bock H. 40th anniversary of introduction of Expanded Immunization Program (EPI): a literature review of introduction of new vaccines for routine childhood immunization in sub-Saharan Africa. *Int J Vaccines Vaccin*. 2015;1(1):4.
4. Sanou A, Simboro S, Kouyaté B, Dugas M, Graham J, Bibeau G. Assessment of factors associated with complete immunization coverage in children aged 12–23 months: a cross-sectional study in Nouna district, Burkina Faso. *BMC International Health and Human Rights*. 2009 Oct;9(S1).
5. UNICEF. UNICEF Somalia - About us - Immunization Equity Assessment Consultant [Internet]. 2017 [cited 2019 Dec 10]. Available from: https://www.unicef.org/somalia/about_19568.html
6. EPI team of Somalia. Expanded Programme on Immunization: A Comprehensive Multi-Year Plan 2011–2015. 2011.
7. WHO, UNICEF. WHO and UNICEF estimates of immunization coverage. 2011;1–22.
8. Save the Children. Strengthening demand creation for immunization. 2018;(June):1–2. Available from: [https://somalia.savethechildren.net/sites/somalia.savethechildren.net/files/library/FS11 Immunization coverage.pdf](https://somalia.savethechildren.net/sites/somalia.savethechildren.net/files/library/FS11%20Immunization%20coverage.pdf)
9. Mohamed A, Karanja S, Udu R. Barriers to Full Immunization Coverage of Under Five Years Children in Benadir Region, Somalia. *Journal of Chemical, Biological and Physical Sciences*. 2016;6(4):1–39.
10. COCHRAN W. Sampling techniques [Internet]. 2nd ed. New York: John Wiley and Sons Inc; 1963 [cited 2019 Dec 26]. Available from: <https://www.coursehero.com/file/p4cchnk/COCHRAN-W-G-1963-Sampling-techniques-2nd-Ed-John-Wiley-and-Sons-Inc-New-York/>
11. Save the Children. Strengthening demand creation for immunization [Internet]. 2018 [cited 2019 Dec 26]. Available from: http://www.who.int/immunization/monitoring_surveillance/who-immuniz-2015.pdf?ua=1
12. Al-Lela OQB, Bahari MB, Baderden SK, Basher AY, Kareem H. Factors Affecting on Immunization Compliance: Iraq. *Journal of Pharmacy Practice and Community Medicine*. 2017;3(4).

13. Obasohan PE, Anosike BU, Etsunyakpa MB. Determinant of Full Immunization Coverage and Reasons for its Failure for Children in Bida Emirate Area, Niger State, Nigeria. *Merit Research Journal of Medicine and Medical Sciences*. 2015;3(10):476–83.
14. Mukungwa T. Factors associated with full immunization coverage amongst children aged 12–23 months in Zimbabwe. *African Population Studies*. 2015;29(2).
15. Adokiya MN, Baguune B, Ndago JA. Evaluation of immunization coverage and its associated factors among children 12–23 months of age in Techiman Municipality, Ghana, 2016. *Archives of Public Health*. 2017;75(1):28.
16. Wanjala S. DETERMINANTS OF IMMUNIZATION COVERAGE IN KENYA. SCHOOL OF ECONOMICS, UNIVERSITY OF NAIROBI; 2014.
17. Ibnouf A, Van den Borne H, Maarse J. Factors influencing immunisation coverage among children under five years of age in Khartoum State, Sudan. *South African Family Practice*. 2007;49(8):14–14f.
18. Adedire EB, Ajayi I, Fawole OI, Ajumobi O, Kasasa S, Wasswa P, et al. Immunisation coverage and its determinants among children aged 12–23 months in Atakumosa-west district, Osun State Nigeria: a cross-sectional study. *BMC public health*. 2016;16(1):905.
19. Landoh DE, Ouro-Kavalah FF, Yaya I, Kahn A-LL, Wasswa P, Lacle A, et al. Predictors of incomplete immunization coverage among one to five years old children in Togo. *BMC public health [Internet]*. 2016;16(1):968. Available from: <http://dx.doi.org/10.1186/s12889-016-3625-5>
20. Etana B, Deressa W. Factors associated with complete immunization coverage in children aged 12–23 months in Ambo Woreda, Central Ethiopia. *BMC public health [Internet]*. 2012;12(1):566. Available from: BMC Public Health
21. Vonasek BJ, Bajunirwe F, Jacobson LE, Twesigye L, Dahm J, Grant MJ, et al. Do maternal knowledge and attitudes towards childhood immunizations in rural Uganda correlate with complete childhood vaccination? *PLoS ONE*. 2016;11(2):1–16.
22. Habib RF, Alsubhi RA, Saadawi DW, Hatim RFLAL, Saleh A, Alrashidi AA, et al. Assessment of knowledge, attitude and practice of parents towards immunization of children in Saudi Arabia, 2018. *The Egyptian Journal of Hospital Medicine*. 2018;71(2):2585–90.

Tables

Table 1 Immunization coverage and Confirmation Method

Vaccination Status	Frequency (%)	Confirmation	
		By Card (%)	By Recall (%)
Fully Vaccinated	335 (45.2)	127 (38)	208(62)
Not fully Vaccinated	40 (654.8)		

Table 2 Multivariate logistic regression of socio-demographic factors and vaccination coverage

Variable	B	P-Value	AOR for 95% CI
Age of caregiver	-0.024	0.019	0.976 (0.957-0.996)
Sex of caregiver			
Male		0.952	0.976(0.437-2.177)
Female			1
Marital status of caregiver			
Widowed		0.611	1.490(0.320-6.940)
Single		0.041	0.244(0.063-0.94)
Divorced		0.200	1.344(0.855-2.114)
Married			1
Educational level of caregiver			
No formal education		0.248	0.749 (0.459-1.222)
Primary education		0.165	0.706(0.432-1.154)
Secondary and above			1
Educational level of child's father			
Non-formal education		0.008	0.570(0.377-0.862)
Primary education		0.009	0.577(0.382-0.871)
Secondary and above			1
Employment of caregiver			
Employed		0.310	0.823(0.566-1.198)
Unemployed			1
Household monthly income	0.003	0.000	1.003(1.001-1.004)
Age of child	-0.018	0.011	0.982(0.968-0.996)
Birth order of child			
First/ second		0.044	0.650(0.427-0.989)
Third/ fourth		0.030	0.639(0.426-0.957)
Fifth/ above			1
KEY: β (Beta), AOR (Adjusted Odd Ratio), CI (Confidence Interval=95%), P-value <0.05 is significant			

Table 3 Multivariate logistic regression of health centre related factors and vaccination coverage

Variable	P-Value	AOR for 95% C.I
Distance to health center		
<1km	0.127	0.754(0.524-1.084)
1km	0.465	0.850 (0.549-1.316)
>1km		1
Health care provider availability		
Yes	0.813	1.167(0.324-4.209)
No		1
Vaccine availability		
Yes	0.002	6.147(1.943-19.441)
No		1
Cost affordability		
Yes	0.004	1.951(1.238-3.076)
No		1
Vaccine acceptance		
Yes	0.141	2.074(0.786-5.476)
No		1
Place of delivery of child		
Health facility	0.010	1.517(1.104-2.086)
Home		1
KEY: AOR (Adjusted Odd Ratio), CI (Confidence Interval=95%) P-value <0.05 is significant		

Table 4 Multivariate logistic regression of socio-cultural factors towards vaccination coverage

Variable	B	P-Value	AOR For 95% C.I
Knowledge	0.117	0.000	1.125(1.070-1.181)
Practice	1.014	0.000	2.756(2.233-3.402)
Perception			
Useful		0.000	4.976(2.183-11.340)
Harmful		0.998	0.000
Neutral			1
KEY: β (Beta), AOR (Adjusted Odd Ratio), CI (Confidence Interval=95%), P-value <0.05 is considered as significant			