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Understanding the Barrier of Childhood Vaccination Uptake Among Internally Displaced Populations (IDPs) in Bosaso, Puntland, Somalia

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Abstract*: Background: Childhood vaccination is a critical public health intervention that prevents morbidity and mortality from vaccine-preventable diseases. However, in conflict-affected and resource-limited settings like Bosaso, Puntland, Somalia, particularly among internally displaced populations (IDPs), vaccination coverage remains alarmingly low. This study aimed to assess the barriers to childhood vaccination uptake within IDP communities in Bosaso, Puntland, Somalia. Methods: A cross-sectional, community-based survey was conducted among caregivers of children under five years residing in IDP camps. Structured questionnaires collected data on socio-demographic characteristics, cultural beliefs, healthcare access, and perceptions regarding vaccination. Descriptive statistics and thematic analysis were used to interpret the findings. Results: The study revealed that 49% of respondents had no formal education, and 49% earned less than $50 per month, limiting their health-seeking capacity. Time constraints and domestic responsibilities affected 59.8% of caregivers, while only 22.5% reported full immunization of their children. Cultural and religious beliefs were significant barriers, with 70.1% acknowledging cultural misconceptions against vaccines and 75% consulting religious or community leaders before vaccinating. Additionally, 55.9% believed traditional medicine was more effective than vaccines. Logistical barriers were prevalent, with 73.5% walking to health centers and 63.2% facing transportation challenges. Vaccine availability was poor, reported consistently by only 5.9% of respondents. Although 63.7% were satisfied with service quality, 92.6% indicated healthcare workers did not explain vaccine benefits. Trust in government efforts was low, with only 17.6% expressing confidence. Conclusion: Multiple, intersecting barriers hinder vaccination uptake among IDP populations in Bosaso, Puntland, Somalia, including low education levels, cultural beliefs, economic constraints, logistical issues, and limited health education. Addressing these challenges requires integrated interventions targeting healthcare accessibility, community awareness, healthcare provider communication, and consistent vaccine supply.

***Keywords*: Childhood vaccination, internally displaced populations, healthcare access.**

1. Introduction

Childhood immunisation remains one of the most effective and life-saving public health interventions globally, preventing an estimated 2–3 million deaths annually by protecting children against vaccine-preventable diseases such as measles, diphtheria, and pertussis [1]. However, global immunisation efforts have recently stagnated. In 2023, coverage for the third dose of diphtheria, tetanus, and pertussis (DTP3) vaccine plateaued at 84%, leaving approximately 14.5 million children unvaccinated, a worrying increase from 13.9 million in 2022 [2]. Concurrently, measles cases surged by 20% worldwide, with the World Health Organization (WHO) estimating 10.3 million infections and over 107,500 deaths globally in 2023. Notably, nearly half of these outbreaks occurred in Africa, where low immunisation coverage continues to threaten child survival [3].

In Africa, barriers to childhood vaccination uptake are multifactorial, encompassing parental, systemic, and sociocultural challenges. Studies reveal that lack of awareness, misinformation, financial limitations, and distrust in health services are prevalent barriers among caregivers [4]. Simultaneously, systemic factors such as inadequate infrastructure, unreliable cold chain systems, and shortages of trained healthcare personnel undermine effective vaccine delivery [5]. Cultural and religious beliefs also play a significant role in vaccination decisions; for example, in Northern Nigeria, negative perceptions and religious resistance have historically contributed to some of the lowest immunisation rates on the continent [6].

Somalia, situated in the Horn of Africa, faces a particularly complex immunisation landscape. Decades of armed conflict, political instability, and recurrent natural disasters have led to approximately 2.9 million internally displaced persons (IDPs), representing around 19% of the national population [7]. These IDPs, predominantly from marginalized clans, experience heightened vulnerabilities linked to poverty, forced evictions, poor housing, and restricted access to basic services, including healthcare. Childhood immunisation coverage in Somalia remains alarmingly low, with only 30–40% of children fully vaccinated. Measles continues to be a leading cause of death

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among children under five, exacerbated during humanitarian crises such as the 2011 famine and the 2017 drought-induced food shortage [8].

In Bosaso, Puntland, Somalia, a semi-autonomous region in northeastern Somalia immunisation challenges closely mirror those observed nationwide. Although region-specific data on vaccination uptake among IDPs in Bosaso, Puntland, Somalia, are limited, existing studies indicate similar patterns of displacement-related health vulnerabilities, insufficient healthcare infrastructure, and sociocultural obstacles [9]. Addressing these barriers requires a deeper understanding of the unique determinants affecting IDP communities in Bosaso, Puntland, Somalia, to design effective, context-specific public health strategies.

Accordingly, this study seeks to explore and understand the barriers to childhood vaccination uptake among internally displaced populations in Bosaso, Puntland, Somalia. By identifying multifaceted individual, community, and systemic challenges, the research aims to inform evidence-based interventions that can enhance immunisation coverage and protect vulnerable children in this region.

2. Materials and Methodology

A. Study Design and Setting

This study employed a cross-sectional survey design aimed at identifying the key barriers to childhood vaccination uptake among internally displaced populations (IDPs) in Bosaso, Bosaso, Puntland, Somalia. The research was conducted in three displacement camps within Bosaso, specifically in the city of Bosaso. were selected based on the significant presence of IDPs and varying levels of vaccination coverage, which provided a broad view of the vaccination barriers across different IDP settings.

B. Study Population

The target population of this study included parents or guardians of children under the age of five living in the selected displacement camps. The inclusion criteria focused on households where children had not completed the full vaccination schedule as recommended by the World Health Organization (WHO) and the Somali Ministry of Health. Exclusion criteria included individuals who had already been vaccinated through private health channels or those unable to provide informed consent due to cognitive impairments or language barriers.

A sample size of 300 households was calculated using a confidence level of 95% and a margin of error of 5%. The households were selected using a stratified random sampling technique to ensure proportional representation from each displacement camp.

C. Data Collection Methods

Primary data was collected using a structured questionnaire that was developed based on existing literature on vaccination barriers, cultural beliefs, and healthcare access issues. The questionnaire was divided into four main sections:

1. *Demographic Information*: Socioeconomic data, including educational level, Primary source of income, and monthly income
2. *Knowledge and Awareness*: Questions to assess participants' awareness of vaccine-preventable diseases (VPDs), the recommended vaccination schedule, and the importance of vaccinations for child health.
3. *Vaccination Practices and Perceptions*: Data on vaccination history, including the number of vaccinations received, reasons for incomplete vaccinations, and perceptions of vaccine safety and efficacy.
4. *Barriers to Vaccination*: Inquiries about logistical, financial, and social barriers preventing vaccination, including distance to vaccination centers, vaccine availability, cost, and attitudes toward healthcare providers.

The questionnaire was pre-tested with a smaller sample of 30 households in a sampled area to check for clarity, cultural appropriateness, and reliability. Modifications were made where necessary based on feedback from the pre-test.

D. Data Management and Analysis

Data collected from the questionnaires was coded and entered into SPSS version 25 for analysis. Descriptive statistics, including frequencies and percentages, were used to summarize demographic characteristics, vaccination rates, and perceived barriers.

E. Ethical Considerations

Ethical approval for the study was obtained from the Ethics Review Board of the University of Bosaso. Informed consent was sought from all participants prior to data collection, with assurances of confidentiality and anonymity. Participants were also informed of their right to withdraw from the study at any time without any negative consequences. Special care was taken to ensure that vulnerable groups, such as mothers and children, were treated with respect and consideration during the interviews.

F. Limitations

Despite efforts to ensure broad participation, there were some limitations in this study. First, the cross-sectional nature of the study limits the ability to infer causality. Second, the reliance on self-reported data may have introduced recall bias, particularly with regards to vaccination history. Additionally, the findings may not be generalizable to other IDP populations outside of Bosaso, Puntland, Somalia, as vaccination barriers may vary depending on regional differences and local healthcare infrastructure.

3. Result

A. Demographic Characteristics of Respondents

The data from table 1 details the majority of respondents (49%) reported having no formal education, which may influence their awareness and understanding of vaccination.

Primary education was the next most common level (23%),

while only 7.4% had attained university education. Regarding income sources, small businesses were the main livelihood for 47.5%, followed by humanitarian aid and other informal jobs. Additionally, 49% earned less than $50 per month, reflecting low-income status, which could hinder access to health services.

Table 1
Profile of the research participant in terms of educational level, Primary source of income, and monthly income

Table 1: profile of the respondents		
Variable	**Frequency**	**Percent**
Level of education		
Primary education	47	23.0
University education	15	7.4
No formal education	100	49.0
Secondary education	24	11.8
Other	18	8.8
Total	204	100.0
Primary source of income		
Small business	97	47.5
Other	77	37.7
Humanitarian aid	23	11.3
Farming	7	3.4
Total	204	100.0
Monthly income		
$50–$100	55	27.0
$100–$200	32	15.7
Less than $50	100	49.0
More than $200	17	8.3
Total	204	100.0

Table 2
Have you ever delayed or missed vaccinating your child due to work or household responsibilities?

Vaccine Delayed	Frequency	Percent
Yes	122	59.8
No	82	40.2
Total	**204**	**100.0**

Table 2 shows that a significant portion (59.8%) reported delaying or missing vaccinations for their child due to work or household duties.

Table 3
Have you received all the vaccines for your child

Vaccine Received	Frequency	Percent
Yes	46	22.5
No	158	77.5
Total	**204**	**100.0**

Table 3 highlights that Only 22.5% of respondents confirmed their child received all vaccinations, indicating low vaccine coverage 77.5% not fully vaccinated, a major public health concern.

Table 4
Are there cultural practices in your community that discourage vaccination?

Vaccine Discourages	Frequency	Percent
Yes	143	70.1
No	61	29.9
Total	**204**	**100.0**

Table 4 illustrates About 70.1% acknowledged that cultural practices in their community discourage vaccination, highlighting how traditional beliefs remain a strong influence and barrier.

Table 5
Have you ever discus with your husband or partner to vaccinate your child?

husband or partner vaccine discussion	Frequency	Percent
Yes	55	27.0
No	149	73.0
Total	**204**	**100.0**

Table 5 presents only 27% of respondents had discussed child vaccination with their husband or partner, suggesting that family decision-making around health is often not shared, potentially affecting uptake.

Table 6
Do you consult religious or community leaders before deciding to vaccinate your child?

Consultation religious or community leaders before deciding vaccination	Frequency	Percent
Yes	153	75.0
No	51	25.0
Total	**204**	**100.0**

Table 6 displays a high 75% consult religious or community leaders before vaccinating their children, showing how these figures significantly influence parental decisions regarding healthcare.

Table 7
Do you believe that traditional medicine is more effective than vaccination for protecting children from diseases?

Traditional Medicine and Vaccine	Frequency	Percent
Yes	114	55.9
No	57	27.9
Total	**33**	**16.2**

Table 7 shows more than half (55.9%) believed traditional medicine is more effective than vaccines, which reflects misconceptions and mistrust in modern medicine.

Table 8
Have you ever been adverse reaction of vaccine?

Adverse Reaction of Vaccine	Frequency	Percent
Yes	154	75.5
No	50	24.5
Total	**204**	**100.0**

Data from table 8 reports a large majority (75.5%) reported experiencing adverse reactions, which may contribute to fear or hesitation about continued or future vaccinations.

Table 9
What transportation do you use to get to the vaccination center?

Transportation	Frequency	Percent
Public transportation	15	7.4
Privet transportation	39	19.1
Walking	150	73.5
Total	**204**	**100.0**

Table 9 summarizes that, the Most respondents (73.5%) reached vaccination centers on foot, indicating limited access to private or public transport, potentially affecting consistency in vaccination.

Table 10 outlines Nearly two-thirds (63.2%) faced

transportation difficulties, reinforcing the need for mobile clinics or closer health facilities to enhance access.

Table 10
Have you faced difficulties accessing vaccination services due to transportation issues?

Transportation Accessing Difficulties	Frequency	Percent
Yes	129	63.2
No	75	36.8
Total	**204**	**100.0**

Table 11
Are vaccines always available when you visit the health facility?

Vaccine availability	Frequency	Percent
Yes	12	5.9
No	192	94.1
Total	**204**	**100.0**

Table 11 shows a striking 94.1% reported that vaccines were not always available during their visits, indicating serious supply chain or facility readiness issues.

Table 12
Have you experienced long waiting times at the vaccination center?

Waiting at the Vaccination Center?	Frequency	Percent
Yes	115	56.4
No	89	43.6
Total	**204**	**100.0**

Table 12 presents about 56.4% experienced long waiting times, which may discourage return visits and reduce overall uptake.

Table 13
Does the cost of travel prevent you from taking your child to get vaccinated?

Traveling to the Vaccination Centers	Frequency	Percent
Yes	134	65.7
No	70	34.3
Total	**204**	**100.0**

Table 13 displays 65.7% of respondents said travel costs prevent them from vaccinating their child, emphasizing the need for free or subsidized transportation.

Table 14
How satisfied are you with the quality of vaccination services in your area?

Vaccine Quality Satisfaction	Frequency	Percent
Dissatisfied	54	26.5
Very satisfied	130	63.7
Satisfied	19	9.8
Total	**204**	**100.0**

Table 14 highlights While 63.7% were very satisfied, a notable 26.5% expressed dissatisfaction, possibly due to access, wait time, or provider interaction challenges.

Table 15
Does healthcare workers explained to educated you on the importance of vaccines?

Healthcare workers explanation to educated you	Frequency	Percent
Yes	15	7.4
No	189	92.6
Total	**204**	**100.0**

Table 15 presents an overwhelming 92.6% said they were not educated by healthcare workers, pointing to a critical gap in awareness and communication from the health sector.

Table 16
Do you think that the government and health authorities are doing enough to ensure all children are vaccinated?

Government and Health Authorities	Frequency	Percent
Yes	36	17.6
No	87	42.6
Not sure	81	39.7
Total	**204**	**100.0**

Table 16 shows only 17.6% believe authorities are doing enough, while 42.6% say no and 39.7% are unsure—reflecting low confidence in public health initiatives.

Table 17
What do you think is the most significant challenge preventing parents from vaccinating their children?

Government and Health Authorities	Frequency	Percent
Financial challenges	14	6.9
Lack of awareness	21	10.3
Distance to health facility	117	57.4
Lack of trust in healthcare workers	12	5.9
Cultural/religious beliefs	25	12.3
Other	15	7.4
Total	**204**	**100.0**

Table 17 presents the top challenge reported was distance to health facilities (57.4%), followed by cultural/religious beliefs (12.3%) and lack of awareness (10.3%), showing that logistical and informational barriers dominate.

Table 18
What do you think is the most significant challenge preventing parents from vaccinating their children?

Government and Health Authorities	Frequency	Percent
Benefits for my children	4	2.0
Effectiveness	62	30.4
Safety of vaccines	99	48.5
Benefits for the community	21	10.3
Other	18	8.8
Total	**204**	**100.0**

Table 18 presents when asked about what they believe about vaccines, 48.5% mentioned safety concerns, while 30.4% focused on effectiveness. Only 2% mentioned benefits to their children, suggesting misunderstanding or distrust around vaccine purpose and benefits.

4. Discussion

The findings reveal that the majority of respondents (49%) had no formal education, which aligns with similar studies indicating that low literacy levels negatively affect vaccine uptake due to limited health knowledge and reduced ability to understand vaccine schedules or health communication [6]. The economic profile further complicates access, with 49% earning less than $50 per month and 47.5% relying on small businesses for income. Low income, as reported in previous research [7], often constrains health-seeking behaviors, including vaccination.

Time and domestic responsibilities were cited by 59.8% of

participants as reasons for delaying or missing their child's vaccinations. This finding is consistent with results from a study in Nigeria where maternal workload significantly affected immunization completion [8] Only 22.5% reported that their children received all vaccines, which signifies alarmingly low coverage. This low rate mirrors findings in other conflict-affected or underserved populations, where displacement and weak health infrastructure hamper full immunization [9].

Cultural beliefs remain a significant barrier, with 70.1% acknowledging that such practices in their community discourage vaccination. Prior studies have shown that cultural misconceptions, including beliefs in harmful vaccine effects or preference for traditional healing, reduce vaccine uptake [10]. In addition, only 27% of caregivers discussed vaccination with their partners, indicating limited shared decision-making. Family dynamics, particularly male-dominated decision-making in certain cultures, have been noted as key influences on child health decisions [11]. A notable 75% of respondents reported consulting religious or community leaders before vaccinating their children, highlighting their role as gatekeepers of health behavior. Religious influence on immunization has been well documented, including both positive and negative impacts depending on leaders' perspectives [12]. More than half (55.9%) believed traditional medicine is more effective than vaccination. This aligns with existing evidence that traditional beliefs and mistrust in biomedical interventions limit vaccine acceptability [13].

Reported adverse vaccine reactions were high (75.5%), potentially reinforcing fear and reluctance. Although most vaccines are safe, adverse event myths often spread in communities and are exacerbated by lack of clear communication from health authorities [14]. The reliance on walking (73.5%) and the 63.2% who reported transportation challenges suggest logistical barriers, commonly cited in low-resource settings [15].

Only 5.9% said vaccines were always available when visiting health centers, indicating serious supply chain issues. Long waiting times (56.4%) and cost of travel (65.7%) further discourage vaccine-seeking behavior. This is in line with studies indicating that health system inefficiencies are among the leading deterrents to immunization in marginalized populations [16].

Although 63.7% were very satisfied with the service quality, 92.6% said healthcare workers had not explained vaccine importance, revealing a gap in health education. Effective provider communication has been shown to significantly improve vaccination rates [17]. Trust in the government was also low—only 17.6% believed that authorities are doing enough, and 39.7% were unsure—suggesting a confidence deficit that needs to be addressed through transparency and improved public engagement.

The most significant challenges identified were the distance to health facilities (57.4%), cultural and religious beliefs (12.3%), and lack of awareness (10.3%). These factors highlight the multidimensional barriers to vaccine uptake, consistent with the socio-ecological framework of health behavior. Lastly, safety concerns (48.5%) and doubts about effectiveness (30.4%) dominated perceptions about vaccines, suggesting the need for clear, evidence-based health communication to correct misinformation and build community trust.

5. Conclusion

In conclusion, this study highlights significant barriers to childhood vaccination uptake in Bosaso, Puntland, Somalia, particularly among internally displaced populations. Low education levels, cultural beliefs, economic challenges, and logistical issues, such as transportation and vaccine availability, are key factors hindering vaccination coverage. Additionally, misconceptions regarding vaccine safety and efficacy, coupled with limited healthcare provider education, further contribute to vaccine hesitancy. Addressing these challenges requires targeted interventions, including improved access to healthcare, better community education, and enhanced healthcare worker communication, alongside stronger government efforts to build trust and ensure vaccine availability.

6. Recommendations

1. *Enhance Community Education and Awareness*: Develop targeted, culturally sensitive health education campaigns to address misconceptions about vaccine safety and efficacy, using local languages and accessible media platforms.
2. *Improve Healthcare Accessibility*: Establish mobile clinics and outreach vaccination services within IDP settlements to reduce distance and transportation challenges for caregivers.
3. *Engage Religious and Community Leaders*: Actively involve respected religious and community leaders in vaccination advocacy efforts to help counter cultural and religious misconceptions that hinder vaccine uptake.
4. *Strengthen Healthcare Provider Communication*: Train healthcare workers in effective, empathetic communication skills to explain the importance, safety, and benefits of vaccines, and address parental concerns directly during immunization visits.
5. *Ensure Consistent Vaccine Availability*: Strengthen the vaccine supply chain to guarantee continuous vaccine availability at all health facilities and outreach points, minimizing stockouts and long waiting times.

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