

Case Report

Preventive Strategies for Otitis Media in Low-Income Urban Contexts: A Case Study from Somalia

Ibrahim Abdullahi Ali* 

Otolaryngology Department, Somalia Army Hospital, Mogadishu, Somalia

Abstract

Background: Otitis media (OM) is a leading cause of preventable hearing loss in children globally, with a particularly high burden in low- and middle-income countries (LMICs). In urban areas of Somalia, OM prevalence is exacerbated by overcrowded living conditions, inadequate sanitation, low immunisation coverage, and limited access to healthcare. Despite this burden, little is known about context-specific strategies for OM prevention in fragile and low-resource urban environments. This study aimed to explore community-informed, feasible interventions for the prevention and early management of OM in Somali urban schoolchildren. **Methods:** A qualitative case study approach was employed, nested within a larger cross-sectional epidemiological study. Data were collected in three major Somali cities—Mogadishu, Hargeisa, and Bosaso—between March and June 2024. Fifteen key informants were purposively selected, including healthcare providers (n=6), school staff (n=5), and caregivers (n=4). Semi-structured interviews explored awareness of OM, barriers to prevention, and recommendations for school, clinic, and community-based interventions. Field observations in schools and clinics complemented interview data. Transcripts were coded and thematically analysed using NVivo software. Triangulation and member checking enhanced credibility. **Results:** Three key domains of intervention emerged: healthcare, school, and community. In the healthcare setting, barriers included irregular vaccine supply, lack of otoscopic equipment, and limited training among frontline staff. Participants stressed the need for integrated OM screening in routine child health services and capacity-building for community health workers. Schools were identified as underutilised platforms for early detection, with strong support among teachers for basic training in ear health and classroom-based awareness campaigns. Community-level challenges included poor sanitation, high exposure to indoor smoke, and early cessation of breastfeeding. Participants recommended culturally tailored education campaigns using trusted platforms such as mosques, women’s associations, and radio broadcasts. **Conclusions:** Preventing OM in Somali urban contexts requires a multi-level, community-engaged approach. Strengthening vaccine delivery, training frontline workers, integrating OM education into school health programmes, and leveraging community networks are essential strategies. The findings offer a practical framework for policymakers and health planners seeking to reduce OM burden and improve child health outcomes in similarly constrained LMIC settings.

Keywords

Otitis Media, Prevention, Hearing Loss, Somalia, Schoolchildren, Urban Health, LMIC, Vaccination, Public Health, Qualitative Research

*Correspondence: Ibrahim Abdullahi Ali (Ibrahim.abdullahi@alhayat.edu.so)

Received: 18 September 2025; **Accepted:** 29 September 2025; **Published:** 27 February 2026



Copyright: © The Author(s), 2026. Published by Science Publishing Group. This is an **Open Access** article, distributed under the terms of the Creative Commons Attribution 4.0 License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

1. Introduction

Otitis media (OM), an inflammation or infection of the middle ear, is a significant cause of illness and disability among children globally, with an especially high burden in low- and middle-income countries (LMICs) [1, 2]. It contributes substantially to childhood hearing loss, which in turn affects speech development, educational performance, and long-term social and cognitive outcomes [3]. The World Health Organization (WHO) estimates that over 700 million cases of acute OM occur annually, with a disproportionate number found in LMICs, particularly in sub-Saharan Africa and South Asia [4]. Chronic and untreated OM frequently leads to irreversible hearing loss and poor academic and de-

velopmental outcomes, making it a critical, yet often neglected, public health issue [5].

In Somalia, a fragile state with a largely urbanizing population, OM presents unique challenges. Rapid urbanization has led to overcrowded slums and informal settlements with poor sanitation, limited healthcare access, low immunization coverage, and significant exposure to environmental pollutants such as dust and second-hand smoke [6, 7]. These factors collectively contribute to a high prevalence of OM in Somali children. While epidemiological data on OM in Somalia is limited, the available literature indicates a considerable burden, especially in urban poor settings [8].

Table 1. Table of Key Themes & Representative Quotes.

Theme	Sub-theme	Representative Quote
Healthcare-Based Strategies	irregular vaccine supply	Sometimes the vaccines are out of stock for weeks. Mothers just give up.” – Nurse, Mogadishu
	Lack of diagnostic tools	We don’t have otoscopes. We just guess if it’s an ear infection.” – Health worker, Baidoa
	Limited training	We are not trained specifically for ear diseases. We treat symptoms.” – Community health worker, Jowhar
school-Based Strategies	Teacher awareness and support	I’ve seen students struggle to hear, but I don’t know how to help.” – Teacher, Baidoa
	Health education opportunities	We already talk about hygiene. Ear health could be part of that.” – Headteacher, Mogadishu
Community & Environmental Interventions	Smoke and sanitation risks	“Everyone uses charcoal indoors. We didn’t know it causes ear infections.” – Caregiver, Jowhar
	Breastfeeding and maternal practices	“We stop breastfeeding early because we need to work. Nobody told us it helps prevent ear problems.” – Mother, Mogadishu
	Cultural messaging platforms	If you use the mosque or the radio, people will listen.” – Community health worker, Baidoa

Preventive strategies such as vaccination against *Streptococcus pneumoniae* and *Haemophilus influenzae* type b (Hib), early diagnosis, exclusive breastfeeding, and community health education have proven effective in reducing OM prevalence in other LMICs [9, 10]. However, Somalia lacks a coordinated public health approach to OM prevention. This study addresses this gap by exploring context-specific, community-informed strategies for preventing OM in Somali urban schoolchildren. Through qualitative data from healthcare workers, caregivers, and educators, the research seeks to identify practical, scalable interventions that can inform national and regional public health policies.

This study is informed by the Social Determinants of

Health (SDH) framework, which posits that health outcomes are shaped not only by individual behaviors or clinical care, but also by broader structural and environmental conditions, including housing, education, income, and social norms [REF]. Understanding OM prevention through an SDH lens allows for a more comprehensive exploration of how urban poverty, infrastructure gaps, and cultural practices intersect to influence ear health in Somali children [21].

2. Method

This study employed a qualitative case study design nested within a broader cross-sectional epidemiological study of

otitis media in urban Somali schoolchildren. The aim was to explore perceptions, practices, and barriers related to the prevention and management of OM in low-resource urban settings [11, 12]. This approach was chosen due to its suitability for generating in-depth understanding of context-specific health issues in complex environments.

2.1. Study Sites and Context

Data collection was conducted in three major Somali urban centres: Mogadishu (Banadir region), Baidawo, and Jowhar. These cities were selected to reflect geographic diversity and varying levels of access to healthcare infrastructure [13]. Mogadishu, the capital, is the largest urban area with highly variable access to health services due to ongoing insecurity and displaced populations. Baidawo, and Jowhar represent relatively more stable regions with developing urban infrastructures but similarly face challenges related to informal settlements, overcrowding, and weak sanitation systems.

Each study site included both public and private schools, community health clinics, and low-income neighbourhoods. Preliminary site assessments were conducted in collaboration with local health and education authorities to identify institutions and communities that had both a high burden of OM and willingness to participate in the study.

2.2. Participants

Purposive sampling was used to recruit 15 key informants across three stakeholder categories:

- Six primary healthcare providers (nurses, general practitioners, community health workers)

- Five school personnel (teachers and headteachers)

- Four caregivers of children with a history of recurrent OM

Participants were selected based on their direct experience with child health and their ability to comment on OM prevention and management [14, 15]. An effort was made to include participants from each of the three cities to ensure a diversity of perspectives. Recruitment was facilitated through local education offices, clinic administrators, and community health worker networks.

2.3. Data Collection

Semi-structured interviews were conducted between March and June 2024. Interviews were held in Somali, typically lasting between 30 and 60 minutes, and were conducted in locations preferred by the participants, including schools, health clinics, and homes. All interviews were audio-recorded with verbal informed consent and subsequently translated and transcribed into English by bilingual research assistants [16].

The interview guide included open-ended questions covering five core themes: (1) awareness and understanding of OM; (2) existing preventive practices; (3) perceived challenges in diagnosis and treatment; (4) school and community roles in prevention; and (5) recommendations for improve-

ment. In addition to interviews, observational field notes were collected during visits to health clinics and schools, documenting infrastructure, practices, and interactions relevant to OM prevention.

2.4. Data Analysis

Thematic analysis was conducted using NVivo 12 software. Transcripts and field notes were coded using a combination of deductive codes derived from the interview guide and inductive codes developed during iterative review of the data [17]. Coding was conducted independently by two researchers and discrepancies were resolved through discussion and consensus.

Themes were developed by grouping related codes into broader categories, and representative quotations were selected to illustrate key findings. Triangulation was employed by comparing data across participant groups and sites to validate emerging patterns. To enhance trustworthiness, findings were shared with a subset of participants in follow-up meetings for member checking. Additionally, peer debriefing sessions were held with Somali public health researchers and NGO representatives to refine interpretations [18].

Ethical approval for the study was obtained from the Somali National University Institutional Review Board. All participants provided verbal informed consent after receiving a detailed explanation of the study objectives and procedures.

2.5. Results

Analysis of interviews and field observations yielded three major thematic domains: (1) healthcare-based strategies, (2) school-based strategies, and (3) community and environmental interventions. Each domain revealed key barriers and potential entry points for effective intervention in the Somali context.

3. Healthcare-Based Strategies

Participants widely acknowledged the importance of vaccination in preventing OM but noted critical barriers such as irregular vaccine supply, limited caregiver knowledge, and low prioritization of OM by healthcare authorities [19]. Health workers reported that pneumococcal conjugate vaccine (PCV) and Hib vaccines were not consistently available in all clinics. Some caregivers expressed mistrust or uncertainty about vaccine safety. Delays in vaccine delivery and poor cold chain infrastructure were additional challenges noted, particularly in more remote urban areas.

Training gaps were also highlighted. Many healthcare workers lacked formal instruction in recognizing and managing early ear infections. Clinics lacked otoscopes and ear examination protocols. Consequently, OM cases were often misdiagnosed or referred only after complications arose. Some informants recounted that OM is typically addressed

reactively rather than through structured screening, and often treated with broad-spectrum antibiotics without follow-up, risking antimicrobial resistance.

Several healthcare providers suggested that incorporating OM screening into existing maternal and child health services could significantly improve early detection and management. Task-shifting to community health workers, if supported by proper training and equipment, was also viewed as a feasible intervention.

4. School-Based Strategies

Schools were identified as underutilized platforms for health promotion. Teachers reported encountering children with suspected hearing loss or frequent absences due to ear pain but lacked the training to intervene. In several schools, anecdotal evidence suggested that some students lagged behind in class participation due to undiagnosed hearing difficulties. Despite these limitations, there was strong support for integrating ear health education into curricula and conducting routine screenings [20].

Teachers proposed incorporating simple hearing tests during school health days, with guidance from local clinics. They also highlighted the potential of using student health clubs and parent-teacher meetings to disseminate health information, including on OM prevention. Educational posters and storytelling methods were cited as culturally acceptable formats for children.

Some schools had attempted basic hygiene promotion campaigns (e.g., handwashing), which could be extended to include OM awareness. Teachers expressed willingness to collaborate with health authorities if provided with training and resources. A few headteachers indicated that informal partnerships with local clinics had already started to emerge, though these were not yet systematic.

5. Community and Environmental Interventions

Environmental risk factors such as poor sanitation, indoor air pollution, and overcrowding were consistently mentioned. Respondents described conditions such as shared latrines, smoke from charcoal stoves, and dust from unpaved roads as everyday realities in urban neighborhoods. Second-hand smoke exposure was common in households, but caregivers were generally unaware of its link to ear infections. Few households had access to proper waste disposal or clean cooking technologies, compounding respiratory and otic health risks.

Exclusive breastfeeding was recognized by healthcare workers as protective, but caregivers reported early weaning due to work pressures, cultural norms, and limited awareness. Many mothers believed that supplemental feeding with cow's milk or tea was beneficial from as early as two months.

Community health workers identified a need for culturally sensitive education campaigns targeting maternal behaviors and environmental hygiene.

Additionally, several participants emphasized the potential of using existing community structures—such as women's associations, local mosques, and radio broadcasts—to promote OM prevention messages. Mobile outreach clinics were also suggested to serve hard-to-reach areas, especially where families may not routinely visit health facilities. Environmental risk factors such as poor sanitation, indoor air pollution, and overcrowding were consistently mentioned. Second-hand smoke exposure was common in households, but caregivers were generally unaware of its link to ear infections. Few households had access to proper waste disposal or clean cooking technologies.

Exclusive breastfeeding was recognized by healthcare workers as protective, but caregivers reported early weaning due to work pressures or cultural practices. Community health workers identified a need for culturally sensitive education campaigns targeting maternal behaviors and environmental hygiene.

6. Discussion

Framing the findings within the SDH model underscores that otitis media is not merely a biomedical issue, but one shaped by socioeconomic and environmental inequities. Overcrowded housing, indoor air pollution, and early cessation of breastfeeding are not just individual choices—they are outcomes of structural vulnerabilities such as income insecurity, informal settlements, and lack of maternal support systems. Effective prevention therefore requires intersectoral approaches that address both upstream determinants (e.g., housing, sanitation) and downstream clinical services.

This study highlights critical gaps and opportunities in the prevention of otitis media (OM) among urban school-aged children in Somalia. While participants demonstrated a basic awareness of OM as a health issue, their responses emphasized a significant disparity between knowledge and action, particularly due to systemic limitations. The findings reinforce that although key preventive measures—such as vaccination, early diagnosis, and hygiene promotion—are known in theory, their consistent application is obstructed by infrastructural, economic, and sociocultural barriers. These findings align with broader global research, which shows that OM prevention in LMICs requires community-based, low-cost, and scalable interventions supported by both the health and education sectors [1, 5, 10].

From a healthcare system perspective, the inconsistency in vaccine availability and the lack of otologic training among primary healthcare providers emerged as major impediments. This study supports prior calls for the integration of ENT services into primary care, particularly in under-resourced settings [3, 9]. The need for standardized screening protocols and investment in basic diagnostic tools, such as otoscopes,

cannot be overstated. Furthermore, public education campaigns are needed to counteract vaccine hesitancy and misinformation, which have become increasingly prevalent in fragile and post-conflict health systems like Somalia's [6, 19].

The study also reveals untapped potential in Somalia's schools as platforms for public health interventions. Teachers are in a strong position to observe behavioral or learning difficulties caused by hearing loss. However, without training or formal health screening structures, opportunities for early detection are missed. The findings are consistent with research from other LMICs showing that school-based health programs can effectively promote hearing health and improve outcomes for at-risk children [14, 15]. Embedding ear health education into school curricula and involving parents in prevention strategies—such as smoke-free homes and breast-feeding—can create supportive environments for child well-being.

Environmental determinants such as poor sanitation, exposure to indoor smoke, and overcrowded living conditions were widely cited. These factors reflect broader social determinants of health that extend beyond the remit of health services alone. Interventions must therefore be multisectoral, integrating urban planning, housing, and education. This is especially important in Somali cities, where informal settlements lack basic infrastructure, and where economic pressures drive behaviors such as early cessation of breastfeeding or indoor charcoal use.

Cultural context also plays a critical role. Many caregivers did not associate behaviors like bottle-feeding or indoor smoking with increased OM risk. Health promotion efforts must therefore be tailored to local beliefs, norms, and media consumption habits. Engaging local religious leaders, women's groups, and community radio stations could enhance the reach and impact of these messages [17, 18].

Finally, the study underscores the importance of strengthening community health systems. Task-shifting approaches—where trained community health workers are empowered to conduct screenings and provide health education—are a viable solution in resource-limited settings. Existing community assets should be leveraged to build resilience and continuity in child health services, especially in conflict-affected or low-governance areas.

Taken together, these findings support a multi-sectoral, integrated approach to OM prevention that involves healthcare providers, educators, families, and policymakers. As urbanization accelerates across Somalia and other LMICs, there is an urgent need to prioritize OM as part of broader strategies for child development, disability prevention, and educational equity.

7. Strengths and Limitations

While purposive sampling enabled the inclusion of diverse perspectives across healthcare, school, and caregiver groups, the sample size was relatively small ($n=15$), which may limit

the transferability of findings to broader populations. The study focused on three urban centers, which, although selected for their geographic and contextual diversity, may not reflect experiences in rural or nomadic communities. Additionally, the reliance on self-reported data introduces the possibility of recall or social desirability bias. Despite these limitations, the depth of qualitative insights and methodological triangulation enhance the credibility and contextual relevance of the findings.

8. Conclusion and Recommendations

Otitis media remains a significant but under-addressed public health challenge in urban Somalia. This study demonstrates that while awareness of OM is present among health workers, educators, and caregivers, substantial barriers to effective prevention persist—ranging from limited resources and weak infrastructure to cultural misunderstandings and insufficient policy attention.

To improve prevention of OM in urban Somali settings, the following recommendations are proposed:

Strengthen Vaccination Delivery Systems: Ensure consistent availability and equitable distribution of PCV and Hib vaccines across all urban clinics. Address cold-chain logistics and vaccine hesitancy through community outreach and education.

Train Primary Health Care Providers: Integrate otitis media identification, screening, and treatment protocols into basic health worker training. Equip facilities with diagnostic tools such as otoscopes and standard treatment guidelines.

Integrate OM Prevention into School Health Programs: Train teachers to recognize symptoms of hearing loss, include OM in school health days, and collaborate with health authorities for regular screening and follow-up services.

Promote Environmental and Behavioral Change: Raise community awareness about the health impacts of indoor smoke, poor sanitation, and overcrowding. Promote clean cooking technologies and improved housing through multi-sector collaboration.

Support Breastfeeding and Maternal Education: Promote exclusive breastfeeding through culturally appropriate health education. Engage mothers through antenatal and postnatal services, community groups, and mass media.

Leverage Community Networks: Utilize existing community structures such as mosques, women's associations, and radio programs to deliver OM prevention messages tailored to local norms and literacy levels.

Develop a National Ear and Hearing Health Strategy: Policymakers should prioritize ear health in national health plans and allocate funding to sustainable, community-based initiatives.

Addressing OM prevention in Somalia requires a coordinated, multi-tiered approach that places child health at the center of urban development, education, and health policy. The strategies proposed by this study provide a practical

framework that can inform national efforts and serve as a model for similar urban LMIC settings.

Abbreviations

ENT	Ear, Nose, and Throat
GBD	Global Burden of Disease (e.g., “GBD 2019 Hearing Loss Collaborators”)
Hib	Haemophilus influenzae type b
LMICs	Low-and Middle-Income Countries
M.D	Doctor of Medicine (author credential)
NGO	Non-Governmental Organization (appears in peer-debriefing mention)
OM	Otitis Media
PCV	Pneumococcal Conjugate Vaccine
SDH	Social Determinants of Health.
UNICEF	United Nations International Children's Emergency Fund
WHO	World Health Organization

Author Contributions

Ibrahim Abdullahi Ali: Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing

Conflicts of Interest

The author declares no conflicts of interest.

References

- [1] WHO. Chronic suppurative otitis media: Burden of illness and management options. Geneva: World Health Organization; 2004.
- [2] Monasta L, Ronfani L, Marchetti F, et al. Burden of disease caused by otitis media: Systematic review and global estimates. PLoS ONE. 2012; 7(4): e36226.
- [3] Smith A, Boss EF. The impact of otitis media on hearing loss in children. Pediatr Clin North Am. 2013; 60(4): 841-852.
- [4] WHO. Global burden of disease estimates 2020. Geneva: World Health Organization; 2021.
- [5] Acuin J. Chronic suppurative otitis media: Burden of illness and management options. Geneva: WHO; 2004.
- [6] Hassan M, Abdulle A, Ahmed Y. Urban slum health in Mogadishu: Challenges and responses. Somali Health J. 2021; 5(2): 22-30.
- [7] Barre M. Air pollution and respiratory disease burden in Somali children. East Afr Med J. 2022; 99(1): 17-23.
- [8] Ali A, Farah M. Ear infections among children in urban Somalia: A hospital-based review. Somali Med Bull. 2023; 7(3): 45-51.
- [9] Kutz JW, Simon LM. Pneumococcal vaccination and its role in otitis media prevention. Int J Pediatr Otorhinolaryngol. 2019; 120: 163-169.
- [10] GBD 2019 Hearing Loss Collaborators. Global, regional, and national burden of hearing loss. Lancet. 2021; 397(10278): 996-1009.
- [11] Creswell JW, Poth CN. Qualitative inquiry and research design. 4th ed. SAGE Publications; 2017.
- [12] Patton MQ. Qualitative Research and Evaluation Methods. 4th ed. SAGE; 2015.
- [13] Somali Ministry of Health. National Health Strategy 2020-2024. Mogadishu: MoH; 2020.
- [14] Otieno J, Abdi S. School-based health interventions for ear and hearing care in East Africa. J Glob Health Rep. 2022; 6: e2022010.
- [15] Hassan M. Role of Somali schools in child health: Challenges and opportunities. Educ Health Africa. 2023; 8(1): 11-18.
- [16] UNICEF. Early childhood health and breastfeeding in conflict zones. UNICEF Regional Report; 2022.
- [17] Ahmed S. Community health strategies in low-resource settings: A Somali case study. BMC Health Serv Res. 2021; 21: 118.
- [18] Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol. 2006; 3(2): 77-101.
- [19] Abdirahman A. Vaccine coverage and equity in Somali health centres. Somali J Public Health. 2023; 4(1): 8-15.
- [20] Yusuf H, Omar S. Empowering teachers to improve child health outcomes in Somalia. Int Educ Health Rev. 2023; 2(2): 35-42.
- [21] World Health Organization. *Closing the gap in a generation: Health equity through action on the social determinants of health*. Final Report of the Commission on Social Determinants of Health. Geneva: WHO; 2008.