EAHRC
EAST AFRICAN HEALTH RESEARCH COMMISSION
Research for Health and Prosperity

ORIGINAL ARTICLE

Factors Associated with Parental Knowledge and Attitudes Toward Childhood Hearing Loss: A Cross-Sectional Study at a Tertiary Hospital in Tanzania

Aveline Aloyce Kahinga[a*] and Raymond Chamecha Mlay[a]

[a]Department of Otorhinolaryngology, School of Clinical Medicine, Muhimbili University of Health and Allied Sciences, Dar es Salaam, Tanzania.
Correspondence to Aveline Aloyce Kahinga (avelynek@yahoo.co.uk)

ABSTRACT

Background: In Tanzania, childhood hearing loss prevalence among school-aged children ranges from 7.1% to 16.7%, primarily driven by treatable conditions. However, the country lacks a mandatory universal newborn hearing screening policy, leaving the burden of early detection entirely on parental vigilance. This study aimed to assess baseline knowledge, specific thematic domain insights, and attitudes towards paediatric hearing loss among caregivers attending a tertiary clinic in Tanzania, and to identify associated key sociodemographic factors to inform public health frameworks.

Methods: This cross-sectional study used consecutive sampling to recruit 201 caregivers at a tertiary paediatric outpatient clinic. Data were collected via a validated, structured questionnaire. Overall knowledge levels were categorised using a Modified Bloom's cut-off point of 60%, where 'good knowledge' was defined as a score of ≥60% and 'poor knowledge' as <60% across cumulative items. Furthermore, the attitude subscale was a multidimensional instrument spanning four distinct conceptual domains: cultural stigma, treatment-seeking behaviour, traditional beliefs in causes, and willingness to adopt universal screening. Internal consistency was evaluated using Cronbach's alpha (α). Bivariate associations were analysed using Pearson's chi-square and Fisher's exact tests. A P value of <.05 was considered statistically significant. Practical strength was quantified using Cramer's V (V), with cell differences isolated via post-hoc adjusted standardised residuals.

Results: Overall, 124 (61.7%) caregivers demonstrated poor knowledge. Asymmetries existed across domains: 154 (76.6%) lacked adequate knowledge of risk factors/causes, and 137 (68.2%) lacked knowledge of signs/symptoms. Conversely, 153 (76.1%) understood the consequences of hearing loss. Neonatal jaundice 28 (13.9%) and speech milestones 56 (27.9%) were poorly recognized, while 61 (30.3%) attributed hearing loss to bewitchment. Crucially, 186 (92.5%) maintained positive attitudes, though 82 (40.8%) cited prohibitive costs as a major healthcare barrier. Poor knowledge was statistically significant but moderately associated with primary education (V=.280; adjusted residual=3.4) and farming occupations (V=.268; adjusted residual=3.0). Informal peer networks 149 (74.1%) were the predominant source of information, while healthcare workers accounted for 13 (6.5%). The multidimensional attitude scale yielded a low alpha (α=.534).

Conclusion: Caregivers exhibited a profound clinical knowledge deficit regarding perinatal risk factors and speech milestones, driven primarily by lower educational attainment and agricultural occupations. While positive attitudes prevail, healthcare utilisation remains threatened by severe financial constraints and a lack of formal medical information channels. Healthcare frameworks must urgently integrate targeted maternal ear and hearing care education alongside subsidised newborn screening pathways.

BACKGROUND

Childhood hearing loss remains a significant public health challenge globally. It negatively impacts the speech, language, academic, and socioemotional development of children.[1,2] An estimate of 34 million children worldwide have disabling hearing loss and majority resides in low-and middle – income countries (LMIC).[3] The Joint Committee on Infant Hearing (JCIH) endorses early detection and intervention in infants with hearing loss. It emphasises on screening before one-month, diagnostic evaluation before three months, and intervention enrolment before six months of age with the goal of maximising linguistic competence and literacy development for children who are deaf or hard of hearing.[4]

Parental decisions regarding the early identification of hearing loss and the provision of appropriate interventions have lifelong consequences for hearing-impaired children. Such decisions are often predicated on parental knowledge and attitudes towards hearing loss and available management options.[5,6] Lack of accurate information and stigmatising attitudes to ear diseases and hearing loss often limit people from accessing care for these conditions.[7,8] Even among

healthcare providers, there is often a shortage of knowledge about prevention, early identification and management of hearing loss and ear diseases, hampering their ability to provide the care required.[9]

In sub-Saharan Africa, the pooled prevalence of childhood hearing loss from a systematic review was 10%.[2] In Tanzania, the overall childhood hearing loss prevalence is not known but it remains a significant public health challenge, with prevalence rates among school-aged children ranging from 7.1% to 16.7%, often driven by treatable conditions like chronic otitis media and impacted cerumen.[10] Also, children who have congenital hearing loss are not timely diagnosed, as majority are diagnosed at 2 to 3 years of age.[11] Despite this burden, Tanzania does not currently have a mandatory or universal newborn hearing screening (UNHS) policy implemented across public health tiers. Specialized paediatric audiology services, hearing aid fittings, and recent advancements like cochlear implantation are largely centralized at major national tertiary hospitals. Because systematic screening does not exist at the primary care level, the burden of early detection falls entirely on the home environment and parental vigilance. Understanding the baseline knowledge and attitudes of Tanzanian parents/caregivers within a tertiary setting is therefore essential, as their health-seeking behaviours dictate whether a child receives timely intervention during critical windows of speech development.

Due to the paucity of baseline data in our setting, this study aimed to assess the knowledge and attitudes towards paediatric hearing loss among parents and caregivers attending the Paediatrics and Child Health clinic at a tertiary hospital in Tanzania. Additionally, the study sought to identify the variables associated with participants' sociodemographic characteristics. The findings of this study will provide an empirical foundation for developing targeted health education programs to enhance public awareness. Furthermore, this evidence will serve as a critical instrument for designing and implementing a successful universal newborn hearing screening program within this healthcare context.

METHODS

Study Design and Setting

This was a hospital-based analytical cross-sectional study which was conducted at the outpatient clinic of the Paediatrics and Child Health Department of the Muhimbili National Hospital (MNH), located in Dar es Salaam, Tanzania, which serves as a national referral and university teaching hospital. The Paediatrics and Child Health Department has a total of 13 units which are Pulmonology and critical care, Neurology, Nephrology, Adolescent, Acute care unit (APCU), Infectious or diarrhoea unit, Malnutrition unit, Oncology/Haematology unit, Neonatal unit, Gastroenterology, Dermatology, Diabetes and Endocrinology. Although the hospital hosts an independent Ear, Nose and Throat (ENT) Department operating separately from paediatrics, the Paediatric and Child Health Department was strategically selected as the data collection site. This approach allowed the study to capture a larger and more generalized population of parents and caregivers, avoiding the potential selection bias that would arise from sampling within a specialized ENT clinic where parents might already possess higher awareness due to pre-existing ear-related conditions.

Study Population and Sampling Technique

This study involved parents and caregivers who brought their children to various units of the Paediatrics and Child Health clinic. A consecutive sampling technique was employed during the data collection period. All individuals who met the inclusion criteria and provided written informed consent were sequentially invited to participate.

Inclusion Criteria

Parents or caregivers who attended the Paediatrics and Child Health clinic at MNH, had previously heard about childhood hearing loss and provided written informed consent.

Exclusion Criteria

Caregivers under 18 years of age.

Sample Size Estimation

The sample size was calculated using Cochran's formula for cross-sectional studies, as shown below:

$$n = \frac{z^2 \times p(1-p)}{\varepsilon^2}$$

Where;

n=sample size

z=standard normal deviate=1.96 for 95% confidence level

p=Prevalence, P=10%, which was estimated prevalence of hearing loss in children in Sub-Sahara Africa[2]

ε = margin of error, which is approximately 5%

Therefore $n=\frac{1.96^2 \times 0.1\ (1-0.1)}{0.05^2}=138$

Based on power analysis, a minimum sample size of 138 was required, which was adjusted to 154 to account for an anticipated 10% non-response rate. To ensure an adequate buffer against incomplete questionnaires during fieldwork, a total of 201 participants were ultimately recruited.

Data Collection Tool and Procedure

Data were collected over a three-month period (March to May 2022) through structured, face-to-face quantitative interviews. Medical students and the second author administered a standardised questionnaire featuring closed-ended questions. The questionnaire had three sections: items that assessed the sociodemographic characteristics of the participants, knowledge, and attitudes toward hearing loss in children. The questions were adapted from various existing studies on the knowledge and attitudes of parents toward infant and childhood hearing loss and were contextualised for the Tanzanian population.[5,12–15] Specific risk factors, such as measles, were consolidated under the broader term "maternal infections" to encompass other congenital conditions like cytomegalovirus, rubella, syphilis, and toxoplasmosis, as well as infections that could necessitate the use of ototoxic medications during pregnancy. Additionally, regarding non-biomedical beliefs, the phrase "blood impurities" in

the statement "Blood impurities can cause hearing loss" was replaced with "ancestral sins." Furthermore, current advocacy for newborn hearing screening and ongoing interventions such as cochlear implantation prompted the inclusion of specific attitude statements, including "I would like my baby to be tested after birth" and "Hearing loss treatment and management is expensive; parents don't take their children to the hospital."

Content validity was formally assessed and confirmed via expert review conducted by a panel of Otorhinolaryngologists. The final modified tool was forward-translated from English into Swahili to ensure easy administration and clear comprehension by both interviewers and participants; a back-translation was then performed to ensure semantic equivalence. A pilot study with a sample size of ten participants was conducted to evaluate the clarity and flow of the Swahili version, resulting in minor adjustments to some questions based on pilot feedback.

The internal reliability of the questionnaire was determined by conducting Cronbach's alpha analysis. Because knowledge and attitude represent distinct theoretical constructs with different scoring mechanisms, internal consistency was assessed separately for each subscale. The knowledge subscale demonstrated good internal consistency with a coefficient of 0.812 while attitude subscale scored 0.534 which is below the recommended threshold of 0.70. This low internal consistency is attributed to multidimensional nature of the construct measured and small number of items.

Data Analysis

Data were analysed using the Statistical Package for Social Sciences (SPSS) software version 23 by IBM Corp. Armonk, NY, USA. Descriptive statistics were used to summarise baseline sociodemographic characteristics including age, sex, level of education, marital status, and occupational status as frequencies and percentages. The sources of information on childhood hearing loss were identified and summarized in a figure.

Knowledge Assessment and Categorisation

Parental knowledge was evaluated across 35 items divided into four thematic domains: risk factors or causes (14 items), subjective symptoms and observable behavioural signs of hearing loss (11 items), effects of hearing loss (3 items), and prevention and treatment availability (7 items). Correct answers were awarded 1 point, while incorrect or "not sure" responses received 0 points (with items 13 and 14 reverse-scored). To standardize the evaluation, knowledge levels were determined for each individual domain as well as for the overall score using a Modified Bloom's cut-off point of 60%. Scores representing ≥60% of the total possible points in a category were classified as good knowledge, while scores <60% were classified as poor knowledge. Consequently, overall knowledge was categorized as poor for scores of 0 to 20 points and good for scores of 21 to 35 points.

Attitude Assessment and Categorisation

Attitude was assessed using 11 statements, both positive and negative. Assessment was done using Likert's scale, whereby for the positive statement, the choice of strongly agree had a score of 5, while strongly disagree had a score of 1; for the negative statement, the choice of strongly agree had a score of 1 and strongly disagree had a score of 5. The score varied from 11 to 55. Using a range score of 44 (55 to 11), attitudes were classified as positive and negative at intervals of 22 (after dividing 44 by 2). Thus, a score of 34 to 55 was considered to indicate a positive attitude, while a score of 11 to 33 was considered to indicate a negative attitude.

Measures of Associations

To determine the association between independent sociodemographic characteristics and categorical dependent variables (overall knowledge levels and attitudes), Pearson's chi-square test of independence was performed. The Fisher's exact test, or Fisher-Freeman-Halton exact test was applied where expected cell counts were fewer than five. To address potential over-reliance on p-values and assess the practical strength of observed relationships, Cramer's V was calculated as an effect size indicator for all statistically significant omnibus tests. The magnitude of Cramer's V was interpreted based on standard thresholds for multi-categorical tables, where a value between 0.1 and 0.3 indicates a moderate association. For significant omnibus tests, post-hoc testing was performed using adjusted standardized residuals; values exceeding an absolute value of 1.96 were utilized to identify the specific cell proportions driving the statistically significant differences. For all tests, a two-tailed P value<.05 was considered statistically significant.

Ethical Considerations

The Ethical clearance was obtained from the Muhimbili University of Health and Allied Sciences (MUHAS) Directorate of Research and Publications under approval number DA25/111/01B/83. Permission to conduct this study was obtained from the head of the Training, Research, and Consultancy of MNH. All participants were provided with all the necessary information about the study before voluntarily signing a consent form to participate in the study. The information collected was kept confidential and used only for the study purposes.

RESULTS

Distribution of Sociodemographic Characteristics of the Participants

A total of 201 parents/caregivers participated in the study. Their ages ranged from 18 to 82 years, with a mean age of 33 ±9.5 years, and a median of 31 years (IQR: 26.5 – 38 years). Most of them 96 (47.8%) were in the age group of 25-34 years and 171 (85.1%) were females. Majority of them 152 (75.6%) were married, 88 (43.8%) had primary education level and 95 (47.3%) were self-employed (Table 1).

Overall Level of Knowledge and Attitude

Of the 201 participants involved in this study, 124 (61.7%) demonstrated poor overall knowledge regarding the assessed aspects of childhood hearing loss. Analysis of the specific thematic domains revealed that 154 participants (76.6%) had poor knowledge of the risk factors and causes, while 137 (68.2%) lacked adequate knowledge regarding the signs and symptoms of hearing loss. Conversely, the majority demonstrated good

knowledge of both the effects of hearing loss (153, 76.1%) and the availability of prevention and treatment options (105, 52.2%). Remarkably, despite these poor baseline knowledge levels, the vast majority of participants (186, 92.5%) exhibited an overall positive attitude (Table 2).

Distribution of Responses to Knowledge Statements

The descriptive distribution of cumulative knowledge items among caregivers are presented in Table 3. Regarding the risk factors and causes, a high proportion of caregivers correctly recognized physical and environmental elements; specifically, head trauma was identified by 163 (81.1%) participants and prolonged noise exposure was recognized by 150 (74.6%). Conversely, awareness regarding traditional biological risk factors was low; only 61 (30.3%) were aware that hereditary factors contribute to hearing impairment, with exact same proportion recognizing preterm birth or low birth weight as a risk factor, and just 28 (13.9%) identified neonatal jaundice as a cause. Notably, non-biomedical misconceptions were prevalent, with 61 (30.3%) agreeing that bewitchment could cause childhood hearing loss.

When evaluating the identification of subjective symptoms and observable behavioural signs, caregivers demonstrated the highest awareness regarding a baby not startling at loud noises 159 (79.1%), and turning the head only upon visual cues rather than vocal calls 152 (75.6%). However, developmental speech delays were poorly recognized; only 56 (27.9%) were aware that a failure to utter single words by one year of age is an early indicator of a potential hearing impairment.

In terms of consequences, 159 (79.1%) of the sample agreed that childhood hearing loss restricts future educational and employment opportunities. Regarding prevention and treatment availability, knowledge was robust concerning immediate interventions, as 184 (91.5%) acknowledged the value of early diagnosis for ear infections. Furthermore, a substantial majority 134 (66.7%) were aware that clinical treatment for hearing loss is available in Tanzania.

Distribution of Responses to Attitude Statements

The comprehensive breakdown of parent/caregiver attitudes utilizing the Likert scale is detailed in Table 4. Caregivers demonstrated overwhelmingly positive inclinations toward early screening and professional support. A significant majority 128 (63.7%) strongly agreed that they would welcome post-birth hearing tests for their newborns, and 106 (52.7%) strongly agreed that affected children should be evaluated by a physician for speech therapy.

Furthermore, the rejection of negative cultural stigmas was strong, with 157 (78.1%) of participants strongly disagreeing with the notion that childhood hearing loss is a divine or supernatural punishment. Despite these positive trends, financial concerns presented a notable barrier to healthcare utilization: 59(29.4%) participants strongly agreed, and 23 (11.4%) agreed, that the prohibitive cost of care prevents parents from seeking hospital management for their children. Finally, there was a nearly universal demand for health education, with 174 (86.6%) of caregivers strongly expressing a desire to receive more clinical information regarding childhood hearing loss.

TABLE 1: Sociodemographic Characteristics of Study Participants (N=201)

Variables	Males n (%) n=30 (14.9)	Females n (%) n=171 (85.1)	Total n (%) N=201 (100)
Age group(years)			
18-24	4 (13.3)	28 (16.4)	32 (15.9)
25-34	10 (33.3)	86 (50.3)	96 (47.8)
35-44	9 (30.0)	40 (23.4)	49 (24.4)
45-54	5 (16.7)	14 (8.2)	19 (9.5)
≥55	2 (6.7)	3 (1.8)	5 (2.5)
Marital status			
Married	23 (76.6)	129 (75.4)	152 (75.6)
Single	2 (6.7)	26 (15.2)	28 (13.9)
Divorced	3 (10.0)	4 (2.3)	7 (3.5)
Cohabiting	2 (6.7)	9 (5.3)	11 (5.5)
Widow/Widower	0 (0.0)	3 (1.8)	3 (1.5)
Level of education			
No formal education	1 (3.3)	16 (9.4)	17 (8.5)
Primary	13 (43.3)	75 (43.9)	88 (43.8)
Secondary	6 (20.0)	52 (30.4)	58 (28.9)
Certificate/diploma/degree	10 (33.3)	28 (16.4)	38 (18.9)
Occupational status			
Unemployed	2 (6.7)	35 (20.5)	37 (18.4)
Peasant/farmer	5 (16.7)	38 (22.2)	43 (21.4)
Employed	8 (26.7)	18 (10.5)	26 (12.9)
Self employed	15 (50.0)	80 (46.8)	95 (47.3)

TABLE 2: Participants' Knowledge Levels Across Specific Thematic Domains, Overall Knowledge, and Attitude Levels (N=201)

Knowledge domain /Attitudes (No. Items)	Score Range	Classification	Frequency (n)	Percentage (%)
Risk factors & causes (14 items)	0-8	Poor	154	76.6
	9-14	Good	47	23.4
Symptoms and signs of hearing loss (11 items)	0-6	Poor	137	68.2
	7-11	Good	64	31.8
Effects of hearing loss (3 items)	0-1	Poor	48	23.9
	2-3	Good	153	76.1
Prevention & treatment (7 items)	0-4	Poor	96	47.8
	5-7	Good	105	52.2
Overall, knowledge (35 items)	0-20	Poor	124	61.7
	21-35	Good	77	38.3
Overall, attitude (11 items)	11-33	Negative	15	7.5
	34-55	Positive	186	92.5

TABLE 3: Distribution of Responses to Knowledge Statements Among Study Participants. (N=201)

Knowledge Item Statement	Yes n (%)	No n (%)	Not Sure n (%)
Risk factors/causes			
1. Hereditary	61 (30.3)	83 (41.3)	57 (28.4)
2. Maternal infections	60 (29.9)	60 (29.9)	81 (40.3)
3. Pre-term/ low birth weight	61 (30.3)	62 (30.8)	78 (38.8)
4. Delay in crying at birth	78 (38.8)	55 (27.4)	68 (33.8)
5. Consanguinity	31 (15.4)	109 (54.2)	61 (30.3)
6. High fever	101 (50.2)	41 (20.4)	59 (29.4)
7. Convulsion	98 (48.8)	38 (18.9)	65 (32.3)
8. Drugs/Medications	92 (45.8)	44 (21.9)	65 (32.3)
9. Prolonged noise exposure	150 (74.6)	21 (10.4)	30 (14.9)
10. Jaundice	28 (13.9)	64 (31.8)	109 (54.2)
11. Recurrent ear infections	129 (64.2)	32 (15.9)	40 (19.9)
12. Head trauma	163 (81.1)	15 (7.5)	23 (11.4)
Non-biomedical beliefs			
13. Bewitchment	61 (30.3)	101 (50.2)	39 (19.4)
14. Ancestral sins	31 (15.4)	107 (53.2)	63 (31.3)
Symptoms and signs of hearing loss			
15. The baby does not startle at loud noises	159 (79.1)	22 (10.9)	20 (10.0)
16. The baby does not turn to sound source after 6 months	151 (75.1)	18 (9.0)	32 (15.9)
17. Does not say single words by 1 year	56 (27.9)	71 (35.3)	74 (36.8)
18. Turns head when sees you but not if called	152 (75.6)	18 (9.0)	31 (15.4)
19. Seems to hear some sounds but not others	66 (32.8)	44 (21.9)	91 (45.3)
20. There is limited, poor, or no speech	57 (28.4)	77 (38.3)	67 (33.3)
21. The child is frequently inattentive	38 (18.9)	113 (56.2)	50 (24.9)
22. Child has difficulty in learning	79 (39.3)	73 (36.3)	49 (24.4)
23. Child seems to need higher TV volume	133 (66.2)	30 (14.9)	38 (18.9)
24. Fails to respond to conversation level speech or answers inappropriately to speech	142 (70.6)	22 (10.9)	37 (18.4)
25. Fails to respond to name or easily frustrated in background noise	100 (49.8)	36 (17.9)	65 (32.3)
Effects of hearing loss			
26. Fewer educational/job opportunities due to impaired communication	159 (79.1)	36 (17.9)	6 (3.0)
27. Social withdrawal due to reduced access to services and communication difficulties	149 (74.1)	44 (21.9)	8 (4.0)
28. Emotional problems caused by drop in self-esteem and confidence	129 (64.2)	42 (20.9)	30 (14.9)
Prevention and treatment availability in the country			
29. Childhood vaccines	88 (43.8)	37 (18.4)	76 (37.8)
30. Antenatal screening for infections and treatment	108 (53.7)	32 (15.9)	61 (30.3)
31. Keep the child away from high noise levels	157 (78.1)	18 (9.0)	26 (12.9)
32. Healthy nutrition during pregnancy	107 (53.2)	28 (13.9)	66 (32.8)
33. Exclusive breastfeeding first 6 months	95 (47.3)	33 (16.4)	73 (36.3)
34. Early diagnosis and treatment of ear infections and others	184 (91.5)	3 (1.5)	14 (7.0)
35. Treatment of hearing loss is available in Tanzania	134 (66.7)	18 (9.0)	49 (24.4)

Association Between Sociodemographic Characteristics and Knowledge Levels

The bivariate analysis evaluating the relationship between sociodemographic characteristics and overall knowledge levels revealed significant associations for education level and occupation (Table 5).

A statistically significant association was observed between participants' level of education and their knowledge of childhood hearing loss ($\chi^2_{(3)}$ = 15.77, P=.001, Cramer's V=.280). Post-hoc testing using adjusted standardized residual indicated that participants with a primary education had a significantly higher proportion of poor knowledge (75.0%; adjusted residual=3.4), whereas those holding a certificate, diploma, or degree demonstrated a significantly higher proportion of good knowledge (57.9%; adjusted residual=2.8).

Occupational status was also significantly associated with knowledge levels ($\chi^2_{(3)}$ = 14.49, P=.002, Cramer's V=.268). Post-hoc testing showed that peasant/farmers exhibited significantly poorer knowledge (81.4%; adjusted residual=3.0), while employed individuals demonstrated significantly better knowledge levels (61.5%; adjusted residual=2.6). Unemployed (67.6%) and self-employed (56.8%) individuals did not contribute considerably to the observed differences. No statistically significant associations with knowledge levels were found for age group (P=.267), sex (P=.307), or marital status (P=.875).

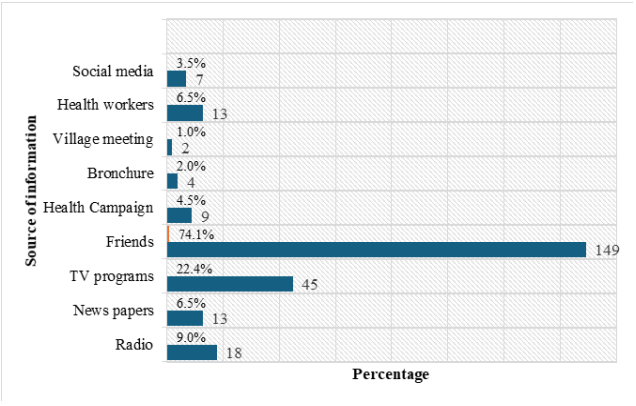
Association Between Sociodemographic Characteristics and Attitudes

In contrast to knowledge, overall positive attitudes toward childhood hearing loss were consistently high across all groups, and no sociodemographic factors were statistically significantly associated with attitude levels (Table 5). There were no statistically significant differences in attitudes based on age group (P=.325), sex (P=.704), marital status (P=.435), educational level (P=.156), or occupational status (P=.076).

Sources of information

The predominant source of information on hearing loss in children was informal peer networks 149 (74.1%), followed by television programs 45 (22.4%), whereas village meetings 2 (1.0%) constituted the least frequent source (Figure 1).

FIGURE 1: Distribution of Sources of Information on Childhood Hearing Loss (N=201)



Note: Multiple responses were permitted.

TABLE 4: Distribution of Responses to Attitude Statements Among Study Participants (N=201)

Statements	Strongly Disagree n (%)	Disagree n (%)	Neutral n (%)	Agree n (%)	Strongly Agree n (%)
Babies can be born with hearing loss	19 (9.5)	10 (5.0)	24(11.9)	38 (18.9)	110 (54.7)
Detection is possible soon after birth	43 (21.4)	21(10.4)	61 (30.3)	19(9.5)	57 (28.4)
Hearing impaired child can still hear & speak	26 (12.9)	28 (13.9)	23 (11.4)	55 (27.4)	69 (34.3)
I would like my baby to be tested after birth	16 (8.0)	8 (4.0)	11 (5.5)	38 (18.9)	128(63.7)
Can pursue education in mainstream (regular) schools	73 (36.3)	29 (14.4)	14(7.0)	41 (20.4)	44(21.9)
Children with hearing loss or their families are being punished (by fate or God, for example)	157 (78.1)	20 (10.0)	15(7.5)	4 (2.0)	5 (2.5)
Can be as intelligent as peers	21(10.4)	16 (8.0)	33 (16.4)	57 (28.4)	74 (36.8)
Children with hearing loss are emotionally disturbed	28 (13.9)	6 (3.0)	51 (25.4)	44 (21.9)	72 (35.8)
Children with hearing loss should go to a doctor for speech help	8(4.0)	5 (2.5)	17 (8.5)	65 (32.3)	106 (52.7)
Hearing loss treatment and management is expensive, parents don't take their children to hospital	29(14.4)	30 (14.9)	60 (29.9)	23 (11.4)	59 (29.4)
I would like to get more information on childhood hearing loss	3 (1.5)	5 (2.5)	2 (1.0)	17 (8.5)	174 (86.6)

TABLE 5: Association Between Sociodemographic Characteristics and Overall Knowledge Levels and Attitude (N=201)

Variable	Total	Level of Knowledge		Statistical test χ^2(df), Fisher's Exact test, Cramer's *V*, *p* value	Attitudes		χ^2(df), Fisher's Exact test, Cramer's *V*, *p* value
	n (%) 201 (100)	Poor n (%) 124 (61.7)	Good n (%) 77 (38.3)		Negative n (%) 15 (7.5)	Positive n (%) 186 (92.5)	
Age group(years)				FE = 5.140, *P* = .267[a]			
18-24	32 (15.9)	23 (71.9)	9 (28.1)		1 (3.1)	31 (96.9)	FE = 4.156, *P*= .325[a]
25-34	96 (47.8)	63 (65.6)	33 (34.4)		6 (6.3)	90 (93.8)	
35-44	49 (24.4)	25 (51.0)	24 (49.0)		6 (12.2)	43 (87.8)	
45-54	19 (9.5)	10 (52.6)	9(47.4)		1 (5.3)	18 (94.7)	
≥55	5 (2.5)	3 (60.0)	2 (40.0)		1 (20.0)	4 (80.0)	
Sex							
Male	30 (14.9)	16 (53.3)	14 (46.7)	χ^2 (1) =1.042, *P* = .307	1 (3.3)	29 (96.7)	*P* = .704[b]
Female	171 (85.1)	108 (63.2)	63 (36.8)		14 (8.2)	157 (91.8)	
Marital status							
Married	152 (75.6)	95 (62.5)	57 (37.5)	FE = 1.678, *P* = .875[a]	11 (7.2)	141 (92.8)	FE = 3.432, *P*=.435[a]
Single	28 (13.9)	15 (53.6)	13 (46.4)		2 (7.1)	26 (92.9)	
Divorced	7 (3.5)	4 (57.1)	3 (42.9)		0 (0.0)	7 (100.0)	

Continue

TABLE 5: Continued

Variable	Total	Level of Knowledge		Statistical test χ^2(df), Fisher's Exact test, Cramer's V, p value	Attitudes		χ^2(df), Fisher's Exact test, Cramer's V, p value
	n (%) 201 (100)	Poor n (%) 124 (61.7)	Good n (%) 77 (38.3)		Negative n (%) 15 (7.5)	Positive n (%) 186 (92.5)	
Cohabiting	11 (5.5)	8 (72.7)	3 (27.3)		1 (9.1)	10 (90.9)	
Widow	3 (1.5)	2 (66.7)	1 (33.3)		1 (33.3)	2 (66.7)	
Level of education							
No formal education	17 (8.5)	12 (70.6)	5 (29.4)	χ^2 (3) = 15.77, P = .001* v = 0.280	2 (11.8)	15 (88.2)	FE = 4.860, P=.156[a]
Primary	88 (43.8)	66 (75.0)	22 (25.0)		9 (10.2)	79 (89.8)	
Secondary	58 (28.9)	30 (51.7)	28 (48.3)		1 (1.7)	57 (98.3)	
Certificate/diploma/degree	38 (18.9)	16 (42.1)	22 (57.9)		3 (7.9)	35 (92.1)	
Occupation							
Unemployed	37 (18.4)	25 (67.6)	12 (32.4)	χ^2 (3) = 14.49, P = .002* v = 0.268	6 (16.2)	31 (83.8)	
Peasant/farmer	43 (21.4)	35 (81.4)	8 (18.6)		2 (4.7)	41 (95.3)	FE = 6.251, P=.076[a]
Employed	26 (12.9)	10 (38.5)	16 (61.5)		3 (11.5)	23 (88.5)	
Self employed	95 (47.3)	54 (56.8)	41 (43.2)		4 (4.2)	91 (95.8)	

Notes: χ^2, Chi-square; FE, Fisher's exact test; df=degree of freedom; P, P value; [a]P value from Fisher's exact test; [b]P value from Fisher-Freeman-Halton exact test; *significant at P<.05; v=Cramer's V.
Row percentages are reported except for the column total, which is a vertical percentage.

DISCUSSION

This study evaluated the baseline knowledge levels, specific thematic domain insights, and overall attitudes towards childhood hearing loss among parents and caregivers attending a tertiary paediatric clinic. A total of 201 participants were recruited; their ages ranged from 18 to 82 years, with a median of 31 years. The majority of participants were aged 25 to 34 years, females, educated to a primary school level, and self-employed. The predominance of female participants in this sample aligns with findings reported by Ayas and Yaseen, Alsudays et al as well as Khurayzi et al.[12,16,17]

Our study revealed that 61.7% of participants demonstrated poor overall knowledge regarding childhood hearing loss, yet an overwhelming 92.5% exhibited a positive attitude. These findings align with previous literature,[12,16] though the proportion of poor knowledge is higher compared to studies done in Egypt, the Kingdom of Saudi Arabia, and Pakistan.[17–19] The differences observed across these studies could be attributed to variations in study samples, the specific content of assessment tools, and the regional availability of hearing screening programmes. This stark divergence between poor clinical awareness and highly favourable health-seeking inclinations serves as the baseline foundation for our interpretations.

The breakdown of knowledge across specific thematic domains revealed profound gaps, with caregivers demonstrating starkly asymmetric knowledge. They successfully recognised overt physical or environmental risk factors, such as head trauma (81.1%) and prolonged noise exposure (74.6%), which is consistent with previous literature.[5,12,13,17] Yet, participants failed to recognise crucial biological and perinatal risk factors, including preterm birth (30.3%), hereditary factors (30.3%), and neonatal jaundice (13.9%), aligning with global trends.[6,12,13,15–18] Furthermore, only 29.9% of caregivers recognised maternal infections as an official risk factor. This represents a crucial missed window of opportunity for preventative counselling during routine antenatal care. Strikingly, 30.3% of participants retained the non-biomedical misconception that bewitchment causes childhood hearing loss. This directly mirrors public health findings within South African communities (29% to 31%),[15] emphasising that modern clinical perspectives continuously coexist alongside traditional cultural framework models.

A similar discrepancy was observed regarding developmental milestones. Caregivers readily recognised immediate behavioural indicators, such as a child not startling to loud noises (79.1%) or tracking exclusively via visual cues (75.6%). However, a mere 27.9% understood that a failure to utter single words by 12 months old represents an early indicator of hearing impairment, which is incongruent with the findings of Ayas and Yaseen.[16] This systemic failure to link pre-lingual speech delays to auditory deficits directly aligns with localized clinical observations showing that the vast majority of children with hearing impairments in our setting are not officially diagnosed until two years of age or older.[11] This late-stage identification permanently misses the optimal neuroplastic window for speech-language acquisition.

The high proportion of overall positive attitudes (92.5%) initially aligns with global trends reported across diverse socioeconomic settings.[5,6,12–20]. For instance, caregivers expressed near-universal willingness to adopt post-birth newborn hearing screening (63.7% strongly agreeing) and physician-led speech therapy evaluations (52.7% strongly agreeing).[5,12,15–17] However, this high percentage must be interpreted critically. In self-reported public health questionnaires administered within a tertiary facility, high positive scores frequently reflect social desirability bias. Participants routinely over-report compliant, progressive views to align with perceived clinical expectations or to please the interviewing medical staff.

This bias is exposed when cross-referencing progressive intent against structural and financial barriers. A combined 40.8% of caregivers openly admitted that the prohibitive cost of specialised ear and hearing care restricts them from seeking timely hospital management. This highlights a classic public health chasm: an individual's progressive, self-reported attitude does not automatically guarantee clinical utilisation if severe systemic and financial constraints remain unaddressed.

By shifting our analytical focus away from an exclusive reliance on arbitrary p values to robust magnitude indicators, we identified the precise socioeconomic drivers of knowledge. Level of education ($\chi^2 = 15.77$, $P = .001$, $V = 0.280$) and occupational status ($\chi^2 = 14.49$, $P = .002$, $V = 0.268$) both demonstrated statistically significant, moderate associations with overall knowledge.

Our post-hoc adjusted standardized residual analysis pinpoints exactly where these variations lie. Caregivers with only a primary education exhibited a significantly higher proportion of poor knowledge (75.0%; adjusted residual = 3.4), whereas those possessing a certificate, diploma, or degree demonstrated significantly better knowledge levels (57.9%; adjusted residual = 2.8). Education directly enhances health literacy, equipping individuals to comprehend complex biological risk factors. These findings align with global trends [6,16–18] but differ from two other studies.[12,19]

Similarly, occupational categorization revealed that peasant/farmers exhibited significantly poorer knowledge bases (81.4%; adjusted residual = 3.0), whereas formally employed caregivers maintained higher knowledge levels (61.5%; adjusted residual = 2.6). Formal employment often expands access to structured digital media and peer networks. Conversely, age, sex, and marital status demonstrated no significant associations with baseline knowledge. The lack of association with age is inconsistent with several global studies.[6,12,13,16–18] Furthermore, the lack of association with sex observed in this sample is inconsistent with two studies[18,19] but mirrors findings reported in other literature.[12,16,17]

Notably, positive attitudes remained high and statistically uniform across all demographic subgroups, confirming that the desire for clinical support is universal, irrespective of an individual's underlying educational background or income bracket. This trend is consistent with international observations.[6,12,16–19].

The primary source of information regarding childhood hearing loss was informal peer networks (friends: 74.1%), followed by mass media channels (television/

radio: 22.4%). In stark contrast, formal medical avenues such as frontline healthcare workers and structured public health campaigns were cited by fewer than 7% of participants which is inconsistent with prior literature.[21–24] This discrepancy may be attributed to differences in study population. While our sample reflects the general caregiving community, previous studies focused on parents whose children had already been diagnosed with hearing loss,[21–23] or were conducted in settings where ear and hearing care is widely accessible.[24] Ultimately, this low institutional engagement highlights a failure to integrate ear and hearing care (EHC) into primary healthcare services. Relying on informal peer networks perpetuates biological misconceptions (such as the 30.3% bewitchment belief), underscore the urgent need for structured, evidence-based institutional health education.

Strengths and Limitations

This study provides foundational information about parental knowledge and attitudes toward childhood hearing loss in our setting which was not explored before. These findings may help inform policy decisions and guide public health programs related to improving early detection and intervention of childhood hearing loss in our setting.

However, this study has certain limitations that should be considered when interpreting the findings. First, the scale used to evaluate attitudes toward childhood hearing loss demonstrated a relatively low internal consistency ($\alpha = 0.534$). While this value falls below standard reliability thresholds, it likely reflects the broad, multidimensional nature of the construct measured. The attitude subscale simultaneously assessed factual knowledge, social stigma, and behavioural intentions. Because respondents may hold progressive views regarding healthcare access while maintaining traditional or superstitious beliefs regarding the origins of disability, low inter-item correlation is statistically expected. Furthermore, the brief nature of the scale may have contributed to the depressed alpha value. Future research focus on developing expanded, multi-factor instruments that separate knowledge, stigma, and proactive intent into distinct subscales to achieve higher psychometric reliability.

Also, the findings may not be fully generalizable to the wider community because data collection was restricted to a single tertiary facility over a specific timeframe reflecting the demographics of that subpopulation. Future studies should draw sample from the community for generalizability of the study findings.

Furthermore, this study did not capture the proportion of mothers who currently have a child with diagnosed hearing loss. While this experiential factor could significantly influence knowledge and attitude scores, our sampling from a paediatric outpatient clinic meant that the vast majority of participants represented the general caregiving population. Future studies should compare public health awareness against the specific insights of parents enrolled in specialized audiology clinics.

CONCLUSION AND RECOMMENDATIONS

This study demonstrates a critical public health misalignment: a profound deficit in clinical knowledge regarding childhood hearing loss coexists alongside an exceptionally high, positive willingness to adopt biomedical interventions among caregivers. While caregivers readily identify macro-behavioral signs like a lack of a startle reflex, they remain largely unaware of critical perinatal risk factors (neonatal jaundice, preterm birth) and early speech developmental milestones.

Bivariate magnitude models verify that low educational attainment and rural agricultural occupations are the primary socioeconomic drivers of these persistent knowledge deficits. High positive attitude figures must be interpreted with caution due to underlying social desirability bias, especially given that a large proportion of caregivers face severe financial barriers to accessing actual treatment. Ultimately, the near-total absence of healthcare professionals as primary information sources reveals a missed opportunity within institutional health education.

To translate these findings into actionable public health outcomes, we propose three SMART recommendations. First, by Q4 2027, the Ministry of Health and hospital directorates should integrate a mandatory 5-minute EHC educational brief into all routine antenatal and reproductive child health clinics to close the identified 28.7% maternal knowledge gap regarding perinatal risk factors. Second, hospital public health units should launch targeted radio and village-level educational campaigns within the next 12 months, specifically designed in local languages for primary-educated individuals and peasant/farmers to debunk non-biomedical misconceptions and clarify the 12-month single-word milestone. Finally, academic hospitals should partner with the Ministry of Health to establish a subsidised UNHS pilot programme within 24 months, offering free post-birth auditory testing to capitalise on the community's 63.7% baseline readiness while directly bypassing the 40.8% financial barrier reported by vulnerable caregivers.

REFERENCES

1. Lieu JEC, Kenna M, Anne S, Davidson L. Hearing Loss in Children: A Review. JAMA - Journal of the American Medical Association. 2020;324(21):2195-2205. doi:10.1001/jama.2020.17647
2. Desalew A, Feto Gelano T, Semahegn A, Geda B, Ali T. Childhood hearing impairment and its associated factors in sub-Saharan Africa in the 21st century: A systematic review and meta-analysis. SAGE Open Med. 2020;8. doi:10.1177/2050312120919240
3. World Health Organization. Deafness and hearing loss. https: www. who. int/news-room/fact-sheets/detail/deafness-and-hearing-loss. Published March 3, 2026. Accessed July 29, 2026.
4. The Joint Committee on Infant Hearing. Year 2019 Position Statement: Principles and guidelines for early hearing detection and intervention programs. J Early Hearing Detect Interv. 2019;4(2):1-44.
5. Ravi R, Yerraguntla K, Gunjawate DR, Rajashekhar B, Lewis LE, Guddattu V. Knowledge and attitude (KA) survey regarding infant hearing loss in Karnataka, India. Int J Pediatr Otorhinolaryngol. 2016; 85:1-4. doi:10.1016/j.ijporl.2016.03.012
6. Wong YA, Mukari SZMS, Harithasan D, Mazlan R.

Knowledge and attitude on childhood hearing loss among mothers and mothers-to-be in urban and rural areas in Malaysia. Int J Pediatr Otorhinolaryngol. 2019; 124:79-84. doi:10.1016/j.ijporl.2019.05.040

7. Frisby C, Manchaiah V, Dawood N, Nieman C, Swanepoel DW. Hearing loss and hearing aid stigma in low- and middle-income settings: a scoping review. Disabil Rehabil. 2025. doi:10.1080/09638288.2025.2540506

8. Aldè M, Ambrosetti U, Barozzi S, Aldè S. The Ongoing Challenges of Hearing Loss: Stigma, Socio-Cultural Differences, and Accessibility Barriers. Audiol Res. 2025;15(3). doi:10.3390/audiolres15030046

9. Hearing loss and the role of health care providers: fact sheet. https://www.who.int/.

10. Iselin Ertzgaard S, Kristin N, Sofie T, et al. Prevalence of hearing impairment among primary school children in the Kilimanjaro region within Tanzania. Int J Pediatr Otorhinolaryngol. 2020; 130:109797. doi:10.1016/j.ijporl.2019.109797

11. Kahinga AA, Abraham ZS, Mawala S, Liyombo E. Cochlear implantation and outcomes in a resource–limited setting: experience from Tanzania. South Sudan Med J. 2022;15(2):50-53. doi:10.4314/ssmj.v15i2.3

12. Alsudays AM, Alharbi AA, Althunayyan FS, et al. Parental knowledge and attitudes to childhood hearing loss and hearing services in Qassim, Saudi Arabia. BMC Pediatr. 2020;20(1). doi:10.1186/s12887-020-02080-2

13. Olusanya BO, Luxon LM, Wirz SL. Maternal views on infant hearing loss in a developing country. Int J Pediatr Otorhinolaryngol. 2006;70(4):619-623. doi:10.1016/j.ijporl.2005.08.004

14. Kaspar A, Newton O, Kei J, Driscoll C, Swanepoel DW, Goulios H. Parental knowledge and attitudes to childhood hearing loss and hearing services in the Solomon Islands. Int J Pediatr Otorhinolaryngol. 2017; 103:87-92. doi:10.1016/j.ijporl.2017.10.003

15. Swanepoel DW, Almec N. Maternal views on infant hearing loss and early intervention in a South African community. In: International Journal of Audiology. Vol 47; 2008: S44-S48. doi:10.1080/14992020802252279

16. Ayas M, Yaseen H. Knowledge and attitudes of parents towards childhood hearing loss and pediatric hearing services in Sharjah, United Arab Emirates. Int J Environ Res Public Health. 2021;18(12). doi:10.3390/ijerph18126188

17. Khurayzi TA, Gadi WH, Alandijani HA, et al. Parental Knowledge and Attitudes to Childhood Hearing Loss and Hearing Services in the Kingdom of Saudi Arabia. Saudi Journal of Otorhinolaryngology Head and Neck Surgery. March 2024. doi:10.4103/sjoh.sjoh_78_23

18. Mazlan R, Dar HM. Evaluating parental knowledge and attitudes toward childhood hearing loss: a cross-sectional study in Rawalpindi, Pakistan. BMC Pediatr. 2024;24(1). doi:10.1186/s12887-024-05230-y

19. Elbeltagy R, Bakry HM, Waly EH. Hearing loss-related knowledge and attitude toward neonatal hearing screening among Egyptian parents. The Egyptian Journal of Otolaryngology. 2019;35(2):207-212. doi:10.4103/ejo.ejo_112_18

20. Dudda R, Muniyappa HP, Puttaraju S, Lakshmi MS. A qualitative study on knowledge and attitude towards risk factors, early identification and intervention of infant hearing loss among puerperal mothers-a short survey. Journal of Clinical and Diagnostic Research. 2017;11(7):MC01-MC05. doi:10.7860/JCDR/2017/25837.10238

21. Shezi ZM, Joseph LN. Parental views on informational counselling provided by audiologists for children with permanent childhood hearing loss. South African Journal of Communication Disorders. 2021;68(1). doi:10.4102/sajcd.v68i1.799

22. Scarinci N, Erbasi E, Moore E, Ching TYC, Marnane V. The parents' perspective of the early diagnostic period of their child with hearing loss: information and support. Int J Audiol. 2018;57: S3-S14. doi:10.1080/14992027.2017.1301683

23. Decker KB, Vallotton CD, Johnson HA. Parents' communication decision for children with hearing loss: Sources of information and influence. Am Ann Deaf. 2012;157(4):326-339. doi:10.1353/aad.2012.1631

24. Alghamdi M, Almohammdi SS, Alharbi NS, et al. Knowledge and Attitudes Regarding Childhood Hearing Loss Among Parents in Western Saudi Arabia. Cureus. September 2025. doi:10.7759/cureus.91644

Peer Reviewed

Competing Interests: Authors declare no competing interests.

Funding: The study did not receive any funding.

Received: 31 March 2026; **Accepted:** 12 August 2026

Cite this article as Kahinga AA & Mlay CR. Factors Associated with Parental Knowledge and Attitudes Toward Childhood Hearing Loss: A Cross-Sectional Study at a Tertiary Hospital in Tanzania. *East Afr Science J.* 2026: 8(2): 240-250. https://doi.org/10.24248/easci.v8i2.128

© The East Africa Science Journal 2026. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are properly cited. To view a copy of the license, visit http://creativecommons.org/licenses/by/4.0/. When linking to this article, please use the following permanent link: https://doi.org/10.24248/easci.v8i2.128