

Social communication and quality of life among Saudi children using hearing aids

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ABSTRACT

This research study focuses on understanding the social communication skills and quality of life of Saudi youngsters who use hearing aids. The study aims to fill the gap in knowledge regarding how hearing aid technology impacts the social communication abilities and well-being of Saudi children. Currently, there is a scarcity of research addressing this specific demographic, hindering the development of personalized support networks and interventions. The diverse cultural heritage and social transformation in Saudi Arabia make it an ideal setting to study the challenges faced by youngsters using hearing aids. The research design used a descriptive approach, gathering quantitative data through self-administered surveys. The sample consisted of twenty-seven Saudi Arabian children aged five to ten who have bilateral SNHL and use hearing aids from the Makkah Institute for Speech and Hearing (MISH). The findings indicate that most children reported a high quality of life when using hearing aids. The study recommends solutions to further enhance the benefits of hearing aids and improve the lives of children with hearing impairments. In conclusion, hearing aids have shown promise in improving speech and language skills, social communication and well-being for Saudi children with hearing impairments. However, more research, policy intervention, and cultural sensitivity are needed to address the complex interplay between technology, culture, family, education, and healthcare systems. Taking a holistic approach can enhance the effectiveness of hearing aid technology and create a better life for children with hearing impairments.

Keywords: *hearing impairments, Hearing aids, Saudi youngsters, social communication, quality of life.*

INTRODUCTION

Hearing loss in children is a widespread and complex issue that has far-reaching consequences for their development and wellbeing. It is estimated that approximately 1 to 4 per 1000 infants are born with significant hearing impairment in Saudi Arabia, making it a matter of public health concern (Alkahtani et al., 2019). While hearing loss poses unique challenges for individuals of all ages, it is particularly critical to address in children, given its potential impact on their social communication and overall quality of life. Hearing is fundamental to human communication and is pivotal in a child's early development. Hearing loss in children can be congenital (Korver et al., 2017), arising at birth, or acquired later in life due to various factors such as infections, exposure to loud noise, or genetic predisposition (Kenna, 2015). In Saudi Arabia, the causes of hearing loss in children are multifaceted, encompassing both genetic and environmental factors. Therefore, understanding the prevalence and causes of hearing loss in this context is crucial for developing effective interventions and support systems. Social communication is essential to human interaction, and children with hearing loss often face unique challenges in this domain. Communication difficulties can lead to delays in language development, hinder academic progress, and result in social isolation (Scherer et al., 2023). Additionally, the quality of life in hearing loss children extends beyond their communication ability. It encompasses their physical, emotional, and social wellbeing, which their hearing impairment can profoundly affect (Roland et al., 2016). Therefore, understanding and addressing

these challenges is essential for children with hearing loss to lead fulfilling lives. Hearing aids are a common and effective intervention for managing hearing loss, including in children. They are designed to amplify sound and improve the audibility of speech and environmental sounds (Said, 2017). Technological advancements have led to the development of sophisticated hearing aids that can cater to the specific needs of children. However, the accessibility and utilization of hearing aids in Saudi Arabia, as in many other countries, are areas of concern (Alshehri et al., 2019).

This research paper aims to investigate the profound impact of hearing aids on social communication and the overall quality of life of Saudi children with hearing loss. It also explores how hearing aids affect these children's ability to communicate socially and engage with their environment. Additionally, it aims to identify the various cultural, social, and practical barriers and facilitators influencing the effective employment of hearing aids in this demographic. To achieve a comprehensive understanding, the research will include an analysis of the prevalence and causes of hearing loss in Saudi children, evaluate the role of hearing aids in language development and social interaction, and consider the cultural and contextual factors that might impact the use of hearing aids among these children.

Literature Review

Saudi Arabia has witnessed a growing awareness of hearing loss and its prevalence among children. According to a study, about 1.5% of children born in Saudi Arabia suffer from a permanent of sensorineural hearing loss (Alkahtani et al., 2019). The

investigation of the prevalence of either hearing impairment or hearing loss has also revealed a slightly greater propensity towards male children compared to their female counterparts (Mulwafu et al., 2016). Genetic factors, including consanguinity, contribute significantly to hereditary hearing loss in Saudi children, making genetic counseling and early screening imperative (Sanyelbhaa et al., 2017). Additionally, environmental factors such as neonatal jaundice and bacterial meningitis have been identified as non-genetic causes of hearing loss (Deklerck et al., 2015; Wroblewska-Seniuk et al., 2018).

Hearing loss in children can have profound effects on their social communication skills, language development, and academic performance. Research conducted in Saudi Arabia has shown that children with hearing loss often exhibit delays in speech and language development, impacting their ability to communicate effectively (Almutairi et al., 2022). These communication challenges can lead to social isolation, difficulties in building peer relationships, and limited participation in classroom activities. Further, hearing impairment also has a profound effect on the quality of life, which may encompass various dimensions, including physical, emotional, and social wellbeing. Research found that children with hearing loss experience lower quality-of-life scores than their hearing peers. These lower scores were particularly evident in domains related to social and emotional wellbeing, highlighting the need for interventions that address the psychosocial aspects of hearing loss (Roland et al., 2016). Even though hearing aids are essential devices that can significantly improve the auditory experiences of children with hearing loss, there is still some

ambiguity regarding their effects on social communication and the quality of life of children in Saudi Arabia. In Saudi Arabia, the accessibility and utilization of hearing aids have improved over the years, yet challenges remain, particularly in terms of education and awareness (Alshehri et al., 2019). Cultural factors also play a significant role in hearing loss experiences in Saudi children. The stigma surrounding hearing loss persists in many communities, impacting families' decisions regarding hearing aid use (Sindi et al., 2023). Cultural beliefs and practices may influence when and how hearing aids are sought and accepted as a solution. Studies conducted globally have demonstrated the effectiveness of hearing aids in enhancing the social communication skills and overall quality of life of children with hearing loss (Haukedal et al., 2022).

However, the specific impact of hearing aids on Saudi children's social communication and quality of life requires further investigation within the local context. While research on hearing loss and hearing aids in Saudi children exists, there is a need for more comprehensive investigations into the specific effects of hearing aid use on social communication and quality of life. Existing studies provide valuable insights into the prevalence and causes of hearing loss in Saudi children. Still, there is a gap in research examining the impact of hearing aids on their daily lives and wellbeing.

METHOD

Aim of the study

The research methodology utilized in this study will be a descriptive research design, primarily emphasizing the systematic gathering and examination of quantitative data. Using an explanatory study strategy is appropriate for examining the social communication skills and quality of life of Saudi children who utilize hearing aids.

Inclusion criteria

The inclusion criteria were children in Saudi Arabia who use hearing aids, with ages five to ten who comprised the study's sample, gathering those from Makkah Institute for Speech and Hearing (MISH). On the contrary, participants who did not meet the specified inclusion criteria were excluded from the study.

Study design

Data was gathered between September and November 2023. The research methodology utilized in this study was a descriptive research design, primarily emphasizing the systematic gathering and examination of quantitative data. Using an explanatory study strategy is appropriate for examining the social communication skills and quality of life of Saudi children who utilize hearing aids and was performed to assess the QoL of children with HL and who implemented hearing loss aids and determine if sociodemographic or clinical factors have an influence on the perceived QoL among these children.

Sample size and sampling technique

The calculated sample size for our study was 27 children with hearing loss and who implemented the hearing aids, in order to detect the difference between means with a detection power of 0.95. A sample size of 27 toddlers with hearing loss aids was found to be enough to perform correlation analysis with a detection power of 0.95. The sample size was calculated by a software program (G*Power, version 3.1.9.4) recommended by Bonett and Wright.

Participants

The study population included children 5-10 years old in Saudi Arabia who use hearing aids. Children of this age were solicited for participation through preexisting programs at speech and audiology clinics and schools for disabled students. This age group was selected based on availability and possibility to reach this age group in the hospital. The expectation was that children in this age group can not read independently, their parents played a key role to transfer of their kids their attitude and feelings. The criteria for inclusion was as follows: (1) all paediatric patients with HL with ages between 5 and 10 years. The exclusion criteria were: (1) children with other medical or psychological problems (either acute or chronic); (2) children with cognitive impairment; (3) any patient whose questionnaire was filled-up with their caregivers than the patients (children). At the start of the questionnaire, parents responded to five questions represented in 5 points Likert scale. These questions were derived from the most commonly asked inquiries during clinic visits and follow-ups with the child. They were included as important elements to address the research questions.

This study was approved by the ethical committee of the Makkah institute for speech and hearing (MISH). Written consent was obtained from parents of participants and written, or verbal assent was obtained from all child participants. Parents completed a demographic form, and the specialists continued gathering data by asked children during clinic and filled out from medical records that belongs to the participants. Three weeks following return of the completed questionnaires to complete the data analysis.

Questionnaire

A self-administered questionnaire was built by google form covering all aspects of the research. This questionnaire included two parts. The first part about demographic details included age, gender, nationality, educational level of parents, severity of HL of the child and parent's marital status. The second part of the questionnaire contains 15 items, represented as 5 points Likert scale (Nee & Yunus, 2020). The questions were represented as 5 points Likert scale and the parents of the participant rated each item. The last report contained 4 subscales (Physical, Emotional, Social, and School), and it actually considering on 4 main dimensions: difficulty hearing in certain physical places, impact of HL school activities, and impact of HL on child's feelings and social communication. This was based on focus groups with children with HL and their parents according to the objective of the study. The items focused on situations affecting interactions with family and friends (e.g., "Do you participate in sports activity or exercise?"), participation in social and school activities (e.g., "Do you keep up when playing with other children?"), and impact of HL on the child's emotional well being (e.g.,

"Do you feel angry when new people see that you wear hearing aids?"), using the response choices. Parents of children with hearing aids were asked to rate how frequently each item was a problem for them in the past, using the following response choices: "never", "almost never", "sometimes", "often", or "always". A mean of total items means in each subscale was computed. Higher scores indicate higher perceived good impact of hearing aids. Children with HL were instructed to answer the questions as if they were wearing their hearing aid(s). Parents reported information about the child's HL, including laterality severity (mild hearing to profound HL).

Figure 1.

Questionnaire of this study

File No. of Patient. Gender of patient. Nationality. Educational Level of parents. Severity of HL of the child. Parent's marital status.
<p>Rate the following regarding 5 points Likert scale. (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree).</p> <p>1- How do you rate your child's social communication ability in comparison to children with normal hearing?</p> <p>2- provide an evaluation on the importance of providing hearing aids for children who rely on them for social communication.</p> <p>3- Provide an opinion as a parent of a child with hearing loss on the best interventions and support systems for improving social communication skills and quality of life for youngsters who use hearing aids: (Auditory Perception, Comprehension, Sound Discrimination and Locating or identifying the source of sounds.)</p> <p>4- Did you notice that there is a direct association between the time of hearing aid intervention and your child's acquisition of language skills (Cognitive- Receptive- Expressive)? Please Rate this association?</p> <p>5. Do you believe that familial support and communication approaches influence children with hearing loss?</p>
<p>Rate the following regarding 5 points Likert scale. (Never, Almost Never, Sometimes, Often, Almost Always).</p> <p>1- PHYSICAL FUNCTIONING (problems with...) a- Participating in sports activity or exercise, b- Lifting something heavy & c- Taking a bath or shower by him or herself.</p> <p>2- EMOTIONAL FUNCTIONING (problems with...) a- Feeling afraid or scared, b- Trouble sleeping</p> <p>3- SOCIAL FUNCTIONING (problems with...) a- Getting along with other children, b- Keeping up when playing with other children.</p> <p>4- SCHOOL FUNCTIONING (problems with...) a- Paying attention in class, b- Keeping up with schoolwork & c- Missing and forgetting things.</p>

Data Analysis

The statistical analysis achieved the objectives of the study, the data analysis begun with appropriate manual coding for data collection. Data are analyzed using IBM Statistical Software (SPSS) Version 26. Descriptive statistics were used to analyze frequencies and percentages, means and standard deviations were used for describing the categorical variables (e.g., gender, nationality) and quantitative variables. Basic descriptive statistical analysis of 5 points Likert-type items is performed by calculating means and standard deviations. The chi-square test was used to assess the association between the level of perception or satisfactions and the categorical variable, gender. Statistical tests like Pearson's chi-squared test, ANOVA, Pearson correlation coefficient, were used to perform the correlation analysis. A p-value of ≤ 0.05 and a 95% confidence interval were used to report the statistical significance and precision of results.

Ethical considerations

The study was conducted after the approval of the Makkah Institute for Speech and Hearing (MISH). All participants were informed about the purpose of the study and were given a written electronic informed consent, which was printed on the first page of the survey. The study ensured that the participant's data was confidential, private, and only used for research purposes. The survey results were stored on a secure Research Centre server, access was restricted to the researchers involved in this study, and data was destroyed when it was deemed irrelevant by the researchers. Data obtained from this study may be used by researchers in academic publications and presentations.

RESULTS

This section examines parent' patient responses to a survey of fifteen questions about their hearing aids experience.. The sample size is twenty-seven (response rate: 7%) with 95% of children with hearing aids. These are mainly the children who had been diagnosed and follow-up in center of Makkah. In the study, a total of 27 parents completed the questionnaires that were sent to them. These questionnaires aimed to gather information about their children. The results provide an overview of the demographic characteristics of the participants in the study. The analysis revealed no statistically significant differences in terms of age, gender, race/ethnicity, income, mother's education, insurance, or marital status between children with different levels of hearing loss. It was found that 55.6% of the children were female, and 73.1% were Saudis. Most of the children who participated in the study had a moderate level of hearing loss. Additionally, the majority of the parents (96.3%) were married, and 63% had completed their post-graduate education. Only level of HL, shows statistically significant $p < 0.05$. (See Table 1)

This survey uses a 5-point Likert scale with "1" Strongly Disagree, "2" Disagree, "3" Neutral, "4" Agree, and "5" Strongly Agree. Firstly, Table 2 to Table 6 provided the descriptive statistics of responses to all five questions which shows that participants are satisfied and positive about the importance of hearing aids for social communication for children with HL (Question 2), providing them with more flexibility (Question 1), knowing about their parents' satisfaction of the hearing loss aids (Questions 3 & 4), helping them deeply understand to their perception (Questions 5).

Table 1.

Participant characteristics.

	n=27 (%)	p value
Age m±SD	7±2.14	
Gender		0.44
Female	15(56%)	
Male	12(44%)	
Nationality		0.65
Saudi	19 (70%)	
Non-Saudi	8(30%)	
Severity of HL of the child		<0.05
Severe	3(6.5%)	
Mild	10(37%)	
Moderate	11(41%)	
Profound	3(6.5%)	
Parent educational level		0.81
Postgraduate	17(63%)	
Diploma	10(37%)	
Parent's marital status		0.47
Married	26(96%)	
Divorced	1(4%)	

The five questions below were developed to notify and measure the perceptions and obstacles that occurred to children with hearing loss diagnoses: the reliability of these questions was 0.70, and the correlation factor between these items was r factor =.554**, indicating an acceptable relationship. (See Table 2)

Answering these questions will reveal the key to the answers to the research questions, making these five questions developed from the research questions extremely useful in the questionnaire and for the study. (See Table 3, Table 4)

Table 2 shows that when parents were asked whether their children with hearing disabilities who use hearing aids enjoyed social communication as in terms of flexibility of speech sounds, and distinguishing sounds around them, and if they are aware of this communication in the same way that children with normal hearing are, the percentage of responses were higher in rating with strongly agree and agree. On the other hand, about 30% answered neutral, So, it is necessary to deeply understand why they chose this answer. P value >0.05 means parents didn't observe any flexibility with hearing aids.

Question 2 in **Table 3** focuses on the significant importance of the effectiveness of hearing aids. By answering this question it was clarified the respondents' opinions about hearing aids for children with hearing disabilities and the importance in facilitating social communication. Question 2 showed a positive experience where the percentage of Strongly Agree 63% and agree is 34.4%. However, 11% respondents with neutral and there were no answers recorded on (Disagree), The percentages were statistically significant p<0.05.

Table 2.

Respondents of Q1: How do you rate your child's social communication ability in comparison to children with normal hearing? (flexibility)

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
No.of respondents	5 (19%)	8 (30%)	8 (30%)	5 (18%)	1 (3%)
Chi square	22.332				
p value	0.43				

Table 3.

Respondents of Q2: Your assessment of the significance of providing hearing aids to children who depends on them for social communication (Importance)

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
No. of respondent	17 (63%)	7 (26%)	3 (11%)	-	-
Chi square	26.78				
p value	<0.05				

Table 4.

Respondents of Q3: Your estimate of how far the youngster has progressed since using hearing aids in the following aspects of auditory skills (Satisfaction)

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
No. of respondent	-	-	-	-	-
Auditory perception	14 (31%)	8 (23%)	-	5 (15%)	14 (31%)
Comprehension	14 (57%)	6 (22%)	1 (4%)	2 (7%)	-
Discrimination of sounds	15 (56%)	7 (25%)	-	5 (19%)	-
Identify the source and location of the sounds	15 (56%)	6 (22%)	-	6 (22%)	-
Chi square	16.993				
p value	<0.05				

Table 4: Q3 showed that social communication is made up of numerous components. These factors are taken into account in this question based on the guardian's satisfaction and evaluation of their child, with the strongly agree and agree receiving the highest rate of respondents 60%, 22% respectively on the four elements, these elements or factors are Auditory perception, Comprehension Discrimination of sounds and Identify the source and location of the sounds, Discrimination of sounds and identify the source and location of the sounds comparing with 22% and less that responded on the four components of question 3 with disagree (unsatisfied). A total of 31% of respondents answered strongly disagree on Auditory perception.

Table 5.

Respondents of Q4: Do you believe there is a direct relationship between the timing of hearing aid intervention and your child's development of language skills (cognitive – receptive – expressive) ? Please rate this association. (Perception)

	Strongly Agree	Agree	undecided	disagree	strongly disagree
No. of respondent	20 (74%)	7 (26%)	-	-	-
Chi square	3.920				
p value	<0.05				

As represented on **Table 5 Q4**, the perception of benefit and utmost importance of providing hearing aids to children with hearing disabilities, as well as their strong relationship in developing the child's language skills, will be known by answering this question, strongly agree and agree were answered, 74% and 26% respectively of parents participating in this study with their children's data agreed that there is a strong, positive relationship with these hearing aids in language development. On the other hand, no results were obtained on how these tools are associated to an improvement in language skills development. The answer to the option four was statistically significant, $p < 0.05$.

Table 6.

Respondents of Q5: Do you believe that support and communication approaches influence children with hearing aids' social communication abilities? (Perception)

	Strongly Agree	Agree	undecided	disagree	strongly disagree
No. of respondent	23 (87%)	3 (13%)	-	-	-
Chi square	0.950				
p value	0.66				

Based on the data presented in **Table 6 Q5**, it is evident that a majority of the respondents strongly agreed with the notion

that family support and social communication methods have a significant and positive impact on the development of social communication in children using hearing aids. The findings suggest that these factors play a crucial role in stimulating social communication abilities among this particular group of children.

Table 7 displays the responses provided by parents in relation to their children's functioning. Specifically, the table focuses on children between the ages of 5 and 10, as they are too young to complete the questionnaire themselves. The parents' input is valuable in collecting data about their children, given their constant presence and close relationship with them. The table covers four main areas: physical aspects, emotional aspects, social aspects, and school activities. Each of these areas includes specific questions, and the parents' responses reflect their perspective on their children's experiences.

Table 8 summarizes one of four factors (dimensions), physical, emotional, social, and school functioning of children with hearing loss aids, which is over 80% in the never, almost never and sometimes ranges. Furthermore, according to 5 points Likert scale, the participant's responses included the four dimensions of the parent report, the overall of the scale (8 questions) equaled to the 4.15 which mean the participants were answered directed to never (that mean there are high quality of life for children had a hearing loss and used the hearing loss aids). Total percent of the answer with often were 15% and it's the lowest percentage. These results were statistically significant ($p < 0.05$).

Table 7.

Anova analysis test to comparison between means of respondents for the previous question

Items	Q1	Q2	Q3	Q4	Q5
M±S	3.45	4.17	4.10	4.88	4.80
D	±4.2	±6.9	±8.3	±10.	±9.1
	0	1	0	55	2
Sum of squares between groups					2.9
F statistic					3.5
mean square					1.7
Sig					0.006

Table 8.

Parent report for children (ages 5-10)

	No. % of respondents				
PHYSICAL FUNCTIONING	Never	Almost Never	sometimes	Often	Almost Always
Participating in sports activity or exercise	17(63%)	2 (7%)	7 (26%)	-	1(4%)
Lifting something heavy	21(78%)	1 (4%)	5 (18%)	-	-
Taking a bath or shower by him or herself	17(63%)	4(15%)	5 (18%)	1(4%)	-
Average Percentage	68%	8.7%	20.7%	4%	4%
chi-square	21.55				
<i>p</i> value	<0.05				
EMOTIONAL FUNCTIONING	Never	Almost Never	sometimes	Often	Almost Always
Feeling afraid, sad or angry	9 (43%)	5(22%)	7 (30%)	1 (5%)	-
Trouble sleeping	15(56%)	4(14%)	7 (26%)	1 (4%)	-
Average Percentage	49.5%	18%	28%	4.5%	-
chi-square	10.70				
<i>p</i> value	<0.05				
SOCIAL FUNCTIONING	Never	Almost Never	sometimes	Often	Almost Always
Getting along with other children	10(37%)	6(22%)	10(37%)	1(4%)	-
Keeping up when playing with other children	11(41%)	7(26%)	7(26%)	2(7%)	-
Average Percentage	39%	24%	31%	3.5%	
chi-square	9.45				
<i>p</i> value	0.25				
SCHOOL FUNCTIONING	Never	Almost Never	sometimes	Often	Almost Always
Paying attention in class	11(41%)	4(15%)	9(33%)	3(11%)	-
Keeping up with schoolwork	12(44%)	6(22%)	4(15%)	5(19%)	-
Missing school because of not feeling well or missing go to school	22(81%)	-	5(19%)	-	-
Average Percentage	55.4%	18.5%	21.4%	15%	
chi-square	13.24				
<i>p</i> value	<0.05				

DISCUSSION

The comprehensive examination of the influence of hearing aid technology on the social communication abilities and overall well-being of Saudi children, as addressed in this research, is of paramount importance. As highlighted by various research studies, there exists a significant gap in the understanding of how these technological aids impact the lives of children within the unique cultural context of Saudi Arabia (Alrasheed et al., 2023; Fageeh et al., 2023; Yousef et al., 2023). This discussion integrates findings from the current study with existing literature to elaborate on the implications and potential pathways for future research and policy development. The positive correlation between the use of hearing aids and improved social communication skills in Saudi children, as revealed in this study, is a significant finding. It supports the propositions of Alrasheed et al. (2023), who emphasized the potential benefits of hearing aids in enhancing communication abilities. This improvement is crucial, considering the social-communicative challenges faced by children with hearing impairments. Additionally, effective communication is fundamental to social integration, educational achievement, and overall quality of life, as highlighted by numerous studies (Brinia et al., 2022). However, the implementation of hearing aid technology does not occur in a vacuum. Cultural factors play a significant role in how this technology is received and utilized. In Saudi Arabia, with its unique social and cultural dynamics, the acceptance and effective usage of hearing aids are influenced by societal perceptions and familial attitudes (Alshawi et al., 2019). The stigma associated with disability, including hearing impairment, can affect the

willingness of families to seek and continue the use of hearing aids for their children. Therefore, this societal aspect necessitates a culturally sensitive approach to promote hearing aid adoption.

The Role of Family and Education

The family unit in Saudi culture holds a central role in the development and well-being of children. As such, the attitudes and involvement of family members are critical in the successful integration of hearing aids into the lives of children with hearing impairments. Family education and counseling, as part of the hearing aid program, can significantly enhance the effectiveness of these interventions. The educational system, too, plays a pivotal role. The current study's findings echo the concerns raised by Fageeh et al. (2023) about the lack of specialized support in educational settings for children using hearing aids. Schools must be equipped not only with the necessary resources but also with trained personnel who understand the specific needs of these children. Inclusion policies and practices should be strengthened to ensure that children with hearing impairments receive the support they need to fully participate and succeed in educational environments.

Psychological and Social Dimensions

The influence of hearing aid technology on the psychological well-being of children cannot be understated. Hearing loss can lead to social isolation, communication difficulties, and emotional distress (Niazi et al., 2020). The use of hearing aids can mitigate these issues to some extent, but the psychological impact extends beyond the scope of technological solutions. As Yousef

et al. (2023) suggest, comprehensive care for children with hearing impairments should include psychological support to address issues of self-esteem, identity, and social integration. The social dimension, particularly peer relationships, is another critical area. The ability to communicate effectively with peers is essential for the social development and emotional well-being of children. The current study's findings indicate that while hearing aids improve communication abilities, there is still a need for social skills training and peer integration programs to fully support these children in navigating their social environments.

Healthcare System and Policy Implications

The Saudi healthcare system's role in managing hearing impairment in children is a point of significant concern. The lack of comprehensive studies and tailored interventions, as pointed out by Alrasheed et al. (2023) and Yousef et al. (2023), indicates a need for systemic change. This change should involve enhanced training for healthcare professionals, the development of specialized educational programs, and increased awareness campaigns to reduce stigma and foster a supportive environment. Policy implications are vast and multifaceted. Policymakers should consider developing national guidelines for the screening, diagnosis, and management of hearing impairments in children. There is also a need for policies that ensure equitable access to hearing aids and related services, regardless of socioeconomic status. Furthermore, integrating hearing health into broader health and educational policies could significantly improve the outcomes for children with hearing impairments.

Future Research Directions

Future research should aim to understand the long-term impacts of hearing aid use on the social, educational, and psychological outcomes of Saudi children with hearing impairments. Longitudinal studies could provide valuable insights into the efficacy of different intervention strategies. Additionally, exploring the effectiveness of various support mechanisms, such as family counseling and school-based interventions, in enhancing the quality of life for these children is crucial.

CONCLUSION

The introduction of hearing aids has shown promising results in improving the language and auditory skills, social communication abilities and overall well-being of Saudi children with hearing impairments. However, there is still a substantial need for targeted research, policy intervention, and cultural sensitivity. The interplay between technology, culture, family, education, and healthcare systems is complex and demands a holistic approach. By addressing these multifaceted needs, it is possible to not only enhance the efficacy of hearing aid technology but also to foster a more inclusive and supportive environment for children with hearing impairments in Saudi Arabia.

REFERENCES

- Alkahtani, R., Rowan, D., Kattan, N., & Alwan, N. A. (2019). Age of identification of sensorineural hearing loss and Characteristics of affected children: Findings from two cross-sectional studies in Saudi Arabia. *International Journal of Pediatric Otorhinolaryngology*, 122, 27-34. <https://doi.org/https://doi.org/10.1016/j.ijporl.2019.03.019>
- Almutairi, A. N., Altuaysi, A. M., Alwhaid, M. S., Alhasson, M. A., Alharbi, M. A., Alsalam, H. A., Almazyadi, H. A., & Almuqbil, A. A. (2022). Knowledge and attitude of the general population regarding infant hearing loss in Saudi Arabia. (2), 644-652. https://doi.org/10.4103/jfmpc.jfmpc_1399_21
- Alrasheed, A. M., Junaid, M., Ardi, K. T., Ebraheem, F. A. M., & Alaidaroos, O. Z. (2023). *Quality of Life Among Adults With Hearing Loss Who Were Prescribed Hearing Aids in Aseer Province, Saudi Arabia: A Cross-Sectional Tertiary Center-Based Study*. *Cureus*, 15(9), e45922. <https://doi.org/10.7759/cureus.45922>
- Alshawi, Y. A., Al-Gazlan, N., Alrawaf, F., & Almuhawwas, F. (2019). Value of Newborn Hearing Screening on Early Intervention in the Saudi Population and Review of International Records. *Cureus*, 11(10), e5990. <https://doi.org/10.7759/cureus.5990>
- Alshehri, K. A., Alqulayti, W. M., Yaghmoor, B. E., & Alem, H. (2019). Public awareness of ear health and hearing loss in Jeddah, Saudi Arabia. *S Afr J Commun Disord*, 66(1), e1-e6. <https://doi.org/10.4102/sajcd.v66i1.633>
- Brinia, V., Selimi, P., Dimos, A., & Kondea, A. (2022). *The Impact of Communication on the Effectiveness of Educational Organizations*. *Education Sciences*, 12(3).
- Deklerck, A. N., Acke, F. R., Janssens, S., & De Leenheer, E. M. R. (2015). The etiological approach in patients with unidentified hearing loss. *International Journal of Pediatric Otorhinolaryngology*, 79(2), 216-222. <https://doi.org/https://doi.org/10.1016/j.ijporl.2014.12.012>
- Fageeh, Y. A., Alghoribi, M. H., Albishi, M. M., Alshanbari, A. A., Alqethami, A. A., Altowairqi, T. M., & Alosaimi, N. K. (2023). Parent Awareness and Perceived Barriers Regarding Hearing Impairment among School Age Children in Taif Region of Saudi Arabia. *J Pharm Bioallied Sci*, 15(Suppl 1), S403-s408. https://doi.org/10.4103/jpbs.jpbs_527_22
- Haukedal, C. L., Wie, O. B., Schaubert, S. K., Lyxell, B., Fitzpatrick, E. M., & von Koss Torkildsen, J. (2022). Social communication and quality of life in children using hearing aids. *Int J Pediatr Otorhinolaryngol*, 152, 111000.

- <https://doi.org/10.1016/j.ijporl.2021.111000>
- Kenna, M. A. (2015). *Acquired Hearing Loss in Children*. *Otolaryngol Clin North Am*, 48(6), 933-953. <https://doi.org/10.1016/j.otc.2015.07.011>
- Korver, A. M., Smith, R. J., Van Camp, G., Schleiss, M. R., Bitner-Glindzicz, M. A., Lustig, L. R., Usami, S. I., & Boudewyns, A. N. (2017). *Congenital hearing loss*. *Nat Rev Dis Primers*, 3, 16094. <https://doi.org/10.1038/nrdp.2016.94>
- Mulwafu, W., Kuper, H., & Ensink, R. J. H. (2016). *Prevalence and causes of hearing impairment in Africa*. *Tropical Medicine & International Health*, 21(2), 158-165. <https://doi.org/https://doi.org/10.1111/tmi.12640>
- Napier, N. P., Dekhane, S., & Smith, S. (2011). *Transitioning to Blended Learning: Understanding Student and Faculty Perceptions*. *Online Learning*, 15(1). <https://doi.org/10.24059/olj.v15i1.188>
- Niazi, Y., Ejaz, B., & Muazzam, A. (2020). *Impact of hearing impairment on psychological distress and subjective well-being in older adults*. *Pak J Med Sci*, 36(6), 1210-1215. <https://doi.org/10.12669/pjms.36.6.2457>
- Roland, L., Fischer, C., Tran, K., Rachakonda, T., Kallogjeri, D., & Lieu, J. E. (2016). *Quality of Life in Children with Hearing Impairment: Systematic Review and Meta-analysis*. *Otolaryngol Head Neck Surg*, 155(2), 208-219. <https://doi.org/10.1177/0194599816640485>
- Said, E. A.-F. (2017). *Factors impacting hearing aid performance outcomes for Egyptian hearing impaired children*. *Egyptian Journal of Ear, Nose, Throat and Allied Sciences*, 18(3), 207-216. <https://doi.org/https://doi.org/10.1016/j.ejenta.2017.05.002>
- Sanyelbhaa, H., Kabel, A., Abo El-Naga, H. A. E.-R., Sanyelbhaa, A., & Salem, H. (2017). *The risk ratio for development of hereditary sensorineural hearing loss in consanguineous marriage offspring*. *International Journal of Pediatric Otorhinolaryngology*, 101, 7-10. <https://doi.org/https://doi.org/10.1016/j.ijporl.2017.07.020>
- Scherer, N., Smythe, T., Hussein, R., Wapling, L., Hameed, S., Eaton, J., Kabaja, N., Kakuma, R., & Polack, S. (2023). *Communication, inclusion and psychological wellbeing among deaf and hard of hearing children: A qualitative study in the Gaza Strip*. *PLOS Glob Public Health*, 3(6), e0001635. <https://doi.org/10.1371/journal.pgph.0001635>
- Sindi, A., Hanbazazah, K., Alamoudi, M. M., Al-Harbi, A., Aljuhani, M., & Zawawi, F. (2023). *The Hearing Aid Effect in the 2020s: Where Do We Stand?* *Cureus*, 15(4), e38302. <https://doi.org/10.7759/cureus.38302>

Wroblewska-Seniuk, K., Dabrowski, P., Greczka, G., Szabatowska, K., Glowacka, A., Szyfter, W., & Mazela, J. (2018). *Sensorineural and conductive hearing loss in infants diagnosed in the program of universal newborn hearing screening*. *International Journal of Pediatric Otorhinolaryngology*, *105*, 181-186.
<https://doi.org/https://doi.org/10.1016/j.ijporl.2017.12.007>

Yousef, M. F., Dhayan, Z. I., Islam, T., Alotabi, F. Z., & Hajr, E. A. (2023). Potential barriers to the daily use of hearing aids in children. *Saudi Med J*, *44*(4), 406-412