

ORIGINAL RESEARCH

PEDIATRIC ANESTHESIA

Influence of psychological factors on emotional and behavioral outcomes among children with hearing impairment compared to hearing peers

Nabaa Hussein Eidan ¹, Nuhad Mohammed Aldoori ²

Authors affiliations;

1. Nabaa Hussein Eidan, Ph.D. Department of Pediatric Nursing, Babylon Health Directorate, College of Nursing, University of Babylon, Iraq;

Email: nur710.a.hussien@student.uobabylon.edu.iq

2. Nuhad Mohammed Aldoori, Professor of Pediatric Nursing, College of Nursing, University of Babylon, Iraq; Email:

nur.nuhad.mohammad@uobabylon.edu.iq ;

Corresponding: Nabaa Hussein Eidan; Email: nur710.a.hussien@student.uobabylon.edu.iq

ABSTRACT

Background & objective: Children with hearing impairment face multiple challenges affecting their behavioral development due to limitations in communication and social integration. Hearing impairment may lead to increased emotional symptoms and withdrawal or aggression compared to hearing children. This study compares the impact of psychological factors on emotional and behavioral outcomes in children with hearing impairment and their hearing peers.

Methods: A comparative study was conducted on a sample of 309 participants, including children and their parents. The sample was divided into two groups: the first group consisted of 100 children with hearing impairments enrolled in hearing and speech centers, and the second group consisted of 209 children with normal hearing enrolled in mainstream schools. The study used modified and developed questionnaire for the purpose of study. Data was collected through interviews and analyzed electronically by using SPSS 27.

Results: The study results indicated statistically significant differences in the levels of psychological factors between the two groups. A high percentage of children with normal hearing (88.5%) demonstrated good levels of psychological factors, while 59% of children with hearing impairments showed moderate levels. Furthermore, the emotional and behavioral outcomes were good for 79.4% of children with normal hearing and moderate for 55% of those with hearing impairments.

Conclusions: This study confirms that psychological factors play a crucial role in shaping the emotional and behavioral outcomes of hearing-impaired children compared to their hearing peers. It highlights the urgent need to develop psychosocial intervention programs aimed at improving self-esteem and enhancing self-efficacy.

Key-words: Hearing impairment, psychological factors, emotional outcomes, behavioral problems and children.

Citation: Eidan NH, Aldoori NM. Influence of psychological factors on emotional and behavioral outcomes among children with hearing impairment compared to hearing peers. *Anaesth. pain intensive care* 2026;30(3):335-341.

DOI: [10.35975/apic.v30i3.3172](https://doi.org/10.35975/apic.v30i3.3172)

Received: January 31, 2026; **Revised:** February 06, 2026; **Accepted:** February 10, 2026

1. INTRODUCTION

Hearing is one of the primary senses that enables humans to interact with and adapt to their environment. Auditory input facilitates learning, identity formation, and the development of social and emotional skills from early

childhood (Ajayi & Azanor, 2021). The American Academy of Pediatrics emphasizes the importance of the period from birth to age five as a critical stage in neurolinguistic development, during which the brain is most sensitive to auditory input. ¹

This stage plays a pivotal role in the formation of neuroplasticity, emotional regulation, and the development of interpersonal relationships, making hearing a fundamental factor in children's psychosocial development. Conversely, hearing impairment is one of the most common developmental disorders, affecting a wide range of children and directly impacting their mental health and social behavior. Evidence suggests that children with hearing loss are more prone to anxiety, depression, and difficulties in social interaction compared to their peers with normal hearing. ²

Psychological factors are particularly important for children with hearing impairment, given the challenges they face in communicating and understanding the world around them. Hearing loss is not merely a sensory impairment; it also impacts psychological and emotional adjustment, as it is linked to difficulties in managing emotions, forming relationships, and social integration. Studies have shown that these psychological aspects are key determinants of behavioral and emotional outcomes in this group, such as anxiety, isolation, and difficulties in regulating emotions. ³

In contrast, children with normal hearing exhibit more stable patterns of psychological and emotional adjustment. Normal auditory communication contributes to increased self-confidence, facilitates social interaction, and reduces the likelihood of behavioral disorders. Recent reviews indicate a strong correlation between auditory and linguistic competence and lower rates of psychosocial difficulties in this group. ⁴

Globally, the World Health Organization estimates that approximately 430 million people suffer from disabling hearing loss, including 34 million children. This number is projected to reach 700 million by 2050, particularly in low- and middle-income countries (WHO, 2025). In the Arab world, the prevalence of hearing loss varies among countries, ranging from 1.2 to 18 cases per 1,000 live births. The highest rate was recorded in Iraq at 76.3% (Ghannam et al., 2024; Sidenna et al., 2020). Studies indicate that children with hearing loss face linguistic and social challenges that negatively influence their mental health and adaptive behavior. ^{5,6}

Many factors affect the mental health of children with hearing impairment, including the degree of hearing loss, the timing of intervention, the role of the family, and the extent of their integration into the educational and social environment. Children with mild or unilateral hearing loss may experience subtle psychological symptoms, making diagnosis difficult and complicating the provision of appropriate support. ⁷

Recent systematic reviews indicate that the absence of inclusive learning environments increases the risk of psychological and behavioral disorders in these children

(Khalid et al., 2025). Therefore, comparative studies are needed to determine the influence of psychological factors on the emotional and behavioral outcomes of hearing-impaired children and their hearing peers, with the aim of understanding the psychosocial gaps and developing effective educational and health interventions. ⁸

2. METHODOLOGY

A comparative study was conducted on a sample of 309 participants, including children and their parents. The sample was divided into two groups: the first group consisted of 100 children with hearing impairments enrolled in hearing and speech centers, and the second group consisted of 209 children with normal hearing enrolled in mainstream schools at Babylon Governorate/ Middle of Iraq.

The questionnaire is one of the means to help collect data that contribute to achieving the results expected by the study, so the researcher designed this questionnaire, which aims to clarify the study objectives and significance by obtaining answers to the study's questions.

This questionnaire consists of three parts, which includes the following:

Part I: This section composed of socio-demographic information, which include child age, sex, parent education level, occupation, income/month, and residency.

Part II: This section deals with psychological factors consist of (15-items) ten of them ask about self-esteem and five of them about self-efficacy.

Part III: this section deal with psychological outcomes consist of (15-items) five of them about emotional symptoms, five of them about behavioral problems and five of them ask about hyperactivity.

Validity was assigned to each of the study questionnaire's components based on linguistic appropriateness, correlation with the dimension of study variables to which it was assigned, and fit for the study population.

Data was obtained from children and their parents to assess the questionnaire's reliability, and the test was delivered to 10 children with hearing impairment and 20 normal hearing children from the study population who were not part of the initial sample. The Cronbach's alpha was found to be 0.902 for psychological factors and 0.926 for psychological outcomes.

The SPSS version 27 was used for statistical analysis (descriptive and inferential). Results were considered statistically significant if the p-value was less than 0.05.

3. RESULTS

The finding study the socio-demographic data of the study sample (N=309) reveal that mostly of children (56.9%) in normal hearing and (46%) in hearing impairment were between (10-11) years. Both genders had almost equal ratio of hearing impairment. Regarding to the child order among his siblings, (81.8%) in normal hearing and (57%) in hearing impairment were within (1-3) child, about mothers' education (46.4%) normal hearing were college graduate and (35%) in hearing impairment were high school graduate, while (45.9%) of fathers' education in normal hearing were college graduate and (29%) in hearing impairment were high school graduate. 59.8% mothers in normal hearing group were employed; and (92%) in hearing impairment were unemployed, while (71.3%) of fathers' occupation in normal hearing were employed and (55%) in hearing impairment were unemployed. Regarding to residence, (91.4%) in normal hearing were urban and (52%) in hearing impairment were rural. Finally, (64.6%) in normal hearing having enough economic status and (41%) in hearing impairment having enough economic status to some extent.

Normal hearing children had a good overall psychological status (88.5%); and in hearing impairment child 59% had a moderate overall psychological status with a significant difference between the two groups (Table 2).

Psychological outcomes between two groups, resulted in (79.4%) in normal hearing child having a good overall

psychological outcomes and (55%) in hearing impairment child having a moderate overall psychological outcomes with a significant difference between the two groups (Table 3).

4. DISCUSSION

Children with hearing impairment often face unique psychosocial challenges that impact their emotional development, peer relationships, and behavioral adjustment. Recent studies highlights that early detection and intervention such as the use of hearing aids or cochlear implants can mitigate emotional and behavioral difficulties. However, many children continue to

Table 1: Demographic characteristics of the participants

Parameters		Normal hearing (n = 209)		Hearing impairment (n = 100)	
		f	%	f	%
Age of child	8-9	32	15.3	18	18.0
	10-11	119	56.9	46	46.0
	12	58	27.8	36	36.0
	Mean \pm SD	10.7 \pm 1.1		10.81 \pm 1.22	
Gender of child	Male	100	47.8	46	46.0
	Female	109	52.2	54	54.0
Child order among his siblings	1-3	171	81.8	57	57.0
	4-6	37	17.7	37	37.0
	More than 6	1	.5	6	6.0
Mothers' Education	Unable to read / write	5	2.4	0	0
	Read or write	2	1.0	13	13.0
	Primary graduate	16	7.7	14	14.0
	High school graduate	61	29.2	35	35.0
	Institute or college graduate	97	46.4	27	27.0
	Postgraduate	28	13.4	11	11.0
Fathers' Education	Unable to read / write	6	2.9	10	10.0
	Read or write	7	3.3	10	10.0
	Primary graduate	16	7.7	27	27.0
	High school graduate	66	31.6	29	29.0
	Institute or college graduate	96	45.9	20	20.0
	Postgraduate	18	8.6	4	4.0
Mothers' occupation	Employed	84	40.2	8	8.0
	Unemployed	125	59.8	92	92.0
Fathers' occupation	Employed	149	71.3	45	45.0
	Unemployed	60	28.7	55	55.0
Residence	Rural	18	8.6	52	52.0
	Urban	191	91.4	48	48.0
Economic status for Family	Enough	135	64.6	23	23.0
	Enough to some extent	59	28.2	41	41.0
	Not enough	15	7.2	36	36.0

Domains		Normal hearing (n = 209)		Hearing impairment (n = 100)		P-value
		f	%	f	%	
Self Esteem	Low	0	0	20	20.0	.001
	Moderate	17	8.1	48	48.0	
	Good	192	91.9	32	32.0	
	Mean ± SD	2.75 ± .26		2.15 ± .4		
Self-Efficacy	Low	7	3.3	58	58.0	.001
	Moderate	68	32.5	28	28.0	
	Good	134	64.1	14	14.0	
	Mean ± SD	2.43 ± .36		1.65 ± .5		
Overall Psychological	Low	3	1.4	27	27.0	.001
	Moderate	21	10.0	59	59.0	
	Good	185	88.5	14	14.0	
	Mean ± SD	2.59 ± .27		1.90 ± .4		

Data presented as n (%); P < 0.05 considered as significant

experience internalizing symptoms such as anxiety and social withdrawal during their school years.⁹

The study results in Table 1 showed that 10-11 age group represented the highest percentage of hearing-impaired and normal-hearing children. In addition, sex female is slightly higher than male between two groups. These finding supported with the result of study conducted by Mungan Durankaya et al. (2025) to compare oral health among children with cochlear implants and normal-hearing children they found the highest percentage age was 10-11 years between two groups, and female was slightly highest than male.¹⁰

The results of the current study, as shown in Table 1, the educational level of the parents that the highest percentage of mothers and fathers of normal hearing children who had an institute or college degree, while the mothers and fathers from the hearing-impaired children was higher school graduate. The results of the current study are consistent with a comparative study conducted by Al-Saeed and Al-Dobooni (2020) on 123 hearing-impaired children and 86 children with normal hearing. The study found that highest percent of parent of children with normal hearing had a university education, and highest percent of parent with hearing-impaired children with a high school graduate. The researchers believe that the educational level of parents, especially the mother, plays a pivotal role in health awareness, access to medical services, and making appropriate decisions regarding the child's health.¹¹

The study results related to parents' occupation in Table 1 indicate that the vast majority of mothers in the hearing-impaired group were unemployed, compared to more than half in the normal-hearing group. As for fathers, less than three quarters of those in the normal-hearing group were employed, while more than half of those in the hearing-impaired group were unemployed. These findings are consistent with the study by Cheng and Li (2024), which showed that parents of children with hearing impairments experience greater occupational and psychological stress, which may lead to their withdrawal from the labor market or reduced participation in it.¹²

The existing study results regarding residency indicate that the vast majority of children with normal hearing live in urban areas, while more than half of children with hearing loss

live in rural areas. These findings are consistent with the study conducted by Pilka et al. (2021), which showed that children in rural areas suffer from higher rates of hearing loss than their urban peers. This is due to poor health services, the prevalence of middle ear infections, and the lack of regular hearing screening programs.¹³

The results of the current study indicate that less than two thirds of children with normal hearing belong to families with adequate economic status, while two fifth of children with hearing loss belong to families with somewhat adequate economic status. The study by Eyalati et al. (2013) showed that the family's economic status directly affects parents' needs in dealing with their children's hearing loss, as low-income families require greater support in the areas of awareness, rehabilitation, and access to health services. The researchers believe that the disparity in economic status between the two groups reflects an important demographic determinant that may later influence a child's chances of receiving appropriate hearing care. Economic status may affect a family's ability to afford early screening, purchase hearing aids, or access rehabilitation services, but it is not the only factor influencing the development of hearing loss.¹⁴

The results of Table 2 reveal clear differences in psychological determinants between children with normal hearing and those with hearing impairments.

Table 3: Overall emotional and behavioral outcomes						
Domains		Normal hearing (n = 209)		Hearing impairment (n = 100)		P-value
		f	%	f	%	
Emotional Symptoms	Low	23	11.0	45	45.0	.001
	Moderate	52	24.9	43	43.0	
	Good	134	64.1	12	12.0	
	Mean ± SD	2.38 ± .45		1.8 ± .45		
Behavioral problems	Low	5	2.4	25	25.0	.001
	Moderate	27	12.9	29	29.0	
	Good	177	84.7	46	46.0	
	Mean ± SD	2.59 ± .32		2.1 ± .5		
Hyperactivity	Low	1	.5	34	34.0	.001
	Moderate	29	13.9	32	32.0	
	Good	179	85.6	34	34.0	
	Mean ± SD	2.68 ± .36		2.02 ± .53		
Overall Psychological outcomes	Low	2	1.0	24	24.0	.001
	Moderate	41	19.6	55	55.0	
	Good	166	79.4	21	21.0	
	Mean ± SD	2.55 ± .31		1.97 ± .42		

Data presented as n (%); P < 0.05 considered as significant

Majority of children with normal hearing demonstrated good psychological factors, reflecting a high level of self-esteem and sense of self-efficacy. In contrast, more than half of children with hearing impairments demonstrated moderate responses, while nearly to one third of them recorded poor results, a worrying percentage indicating a fragility in psychological structure, particularly in aspects of self-image and confidence in personal abilities.

These findings are consistent with the study conducted by Aanonsen et al. (2023), is a comparative study that included deaf, hard-of-hearing children and children with normal hearing, it was found that hearing-impaired children suffer from higher rates of psychological problems, such as anxiety and poor quality of life, compared to their hearing peers. The study also demonstrated that communicative competence plays a crucial role in improving mental health, which states that hearing-impaired children face greater psychological challenges.¹⁵

Furthermore, Kumari & Gupta (2023) conducted a comparative study of adjustment between normal hearing and hearing-impaired as equal number of primary school students showed statistically significant differences in social and emotional adjustment, with

hearing-impaired children scoring lower in psychosocial adjustment.¹⁶

This result is consistent with the findings of current study on the weakness of psychological determinants in hearing-impaired children.

The researchers believe that psychological elements, represented by self-esteem and self-efficacy, are the most important indicators reflecting the mental health of school-age children. The study results indicate that children with hearing disabilities face multiple challenges in building a positive self-image, due to several factors, including poor verbal communication with peers and teachers, leading to feelings of isolation and ineffectiveness. Lack of societal appreciation for their abilities, which negatively impacts their self-esteem. In addition, lack of specialized psychological support in public

schools. Therefore, strengthening these determinants requires multi-level interventions that include family, school, and educational policies.

Table 3 showed that the majority of children with normal hearing had good overall emotional and behavioural outcomes. In contrast, more than half of children with hearing impairment had moderate overall psychological outcomes, and a quarter of them had a low overall psychological outcomes. This finding is consistent with the findings of Hameed et al., (2023) they found that hearing-impaired children experienced a higher degree of emotional and behavioural problems, hyperactivity, and greater difficulties interacting with their peers. A systematic review by Awan et al. (2024) also found that adolescents and children with hearing loss had a higher prevalence of behavioural problems than their hearing peers.¹⁷

The researchers believe that the results of the contemporary study indicate significant differences in psychological health between the two groups, reflecting the impact of hearing impairment on children's psychological and behavioural adjustment. This is due to a lack of family and school support, delayed therapeutic intervention, or poor quality rehabilitation services, impaired verbal and social communication, which leads to difficulty expressing emotions and understanding

others. This is in addition to children with hearing impairments may be marginalized or bullied, which increases psychological problems.

5. Limitation

Lack of national studied underlying of study.

6. CONCLUSION

Children with hearing impairments may face greater psychological challenges, which is reflected in their moderate levels of psychological adjustment compared to their peers.

7. Data availability

The numerical data generated during this research is available with the authors.

8. Conflict of interest

All authors declare that there was no conflict of interest.

9. Funding

The study utilized the hospital resources only, and no external or industry funding was involved.

10. Authors' contribution

N.H.E: Conceptualization of the study, literature search, data collection, statistical analysis, manuscript writing and editing.

N.M.A: contributed to the conceptualization of the study, assisted in data collection and analysis, participated in drafting and revising the manuscript, provided critical feedback throughout the research process and helped shape the final version of the article.

11. REFERENCES

1. Bower C, Reilly BK, Richerson J, Hecht JL. Hearing assessment in infants, children, and adolescents: recommendations beyond neonatal screening. *Pediatrics*. 2023 Sep 1;152(3):e2023063288. <https://doi.org/10.1542/peds.2023-063288>
2. Li D, Lin K, Cen X, Fan Y, Hong L, Wu Z, Chen W, Zhong X. Psychological burden of hearing-impaired children and their parents through the COVID-19 pandemic. *Frontiers in Public Health*. 2024 Sep 17;12:1403729. doi: 10.3389/fpubh.2024.1403729
3. Aanonsen CM, Jozefiak T, Lydersen S, Heiling K, Rimehaug T. Deaf and hard-of-hearing children and adolescents' mental health, quality of life and communication. *BMC psychiatry*. 2023 Apr 28;23(1):297. <https://doi.org/10.1186/s12888-023-04787-9>
4. de Jong TJ, van der Schroeff MP, Stapersma L, Vroegop JL. A systematic review on the impact of auditory functioning and language proficiency on psychosocial difficulties in children and adolescents with hearing loss. *International Journal of Audiology*. 2024 Sep 1;63(9):675-85. <https://doi.org/10.1080/14992027.2023.2261074>
5. Ghannam AN, Dashash M, Darjazini Nahhas L. Assessment of oral health status and quality of life in hearing-impaired children from Syria. *BDJ open*. 2024 Jul 7;10(1):57. <https://doi.org/10.1038/s41405-024-00242-3>
6. Sidenna M, Fadl T, Zayed H. Genetic epidemiology of hearing loss in the 22 Arab countries: a systematic review. *Otology & Neurotology*. 2020 Feb 1;41(2):e152-62. <https://doi.org/10.1097/MAO.0000000000002489>
7. Ong JJ, Smith L, Shepherd DA, Xu J, Roberts G, Sung V. Emotional behavioral outcomes of children with unilateral and mild hearing loss. *Frontiers in Pediatrics*. 2023 Oct 4;11:1209736. <https://doi.org/10.3389/fped.2023.1209736>
8. Khalid U, Majeed N, Chovaz CJ, Choudhary FR, Munawa K. Psychological well-being and mental health risks in deaf and hard of hearing youth: a systematic review. *European Child & Adolescent Psychiatry*. 2025 Jun 26:1-5. <https://doi.org/10.1007/s00787-025-02795-6>
9. Fahim DF, Sayed SI, Abdelrazic MI, Abuelela IS. Emotional and behavioral problems in children and adolescents with hearing impairment. *BMC pediatrics*. 2025 May 9;25(1):369. <https://doi.org/10.1186/s12887-025-05696-4>
10. Mungan Durankaya S, Kılınç G, Evin Eskicioğlu H, Güneri EA, Olgun Y, Kırkım G. Exploring disparities in oral health: a comparative study of cochlear implanted and normal-hearing children. *BMC Oral Health*. 2025 Jul 16;25(1):1170. <https://doi.org/10.1186/s12903-025-06532-y>
11. Al-saeed HA, Al-dobooni RM. Effect of Hearing Impairment on Behavior and Communication of Children in Schools and Special Education Centers in Mosul City. *Medico-Legal Update*. 2020 Jul 1;20(3). <https://doi.org/10.37506/mlu.v20i3.1543>
12. Cheng S, Li X. Career Burnout in Parents of Deaf and Hard-of-Hearing Children: Do Self-Regulation and Resilience Matter?. *Journal of Developmental*

- and Physical Disabilities. 2024 Oct;36(5):903-19. <https://doi.org/10.1007/s10882-024-09950-y>
13. Pilka E, Jedrzejczak WW, Kochanek K, Pastucha M, Skarzynski H. Assessment of the hearing status of school-age children from rural and urban areas of mid-eastern Poland. *International Journal of Environmental Research and Public Health*. 2021 Apr 18;18(8):4299. <https://doi.org/10.3390/ijerph18084299>
 14. Eyalati N, Jafari Z, Ashayeri H, Salehi M, Kamali M. Effects of parental education level and economic status on the needs of families of hearing-impaired children in the aural rehabilitation program. *Iranian journal of otorhinolaryngology*. 2013;25(70):41. <https://europepmc.org/article/MED/24303418>
 15. Aanonsen CM, Jozefiak T, Lydersen S, Heiling K, Rimehaug T. Deaf and hard-of-hearing children and adolescents' mental health, quality of life and communication. *BMC psychiatry*. 2023 Apr 28;23(1):297.
 16. Chakraborty A, Kaushik A, Ramachandran V. Teachers' perceptions of formative assessment for students with disability: A case study from India. *Australasian Journal of Special and Inclusive Education*. 2024 Dec;48(2):122-35. <https://www.educationjournal.info/article/139/3-2-10-520.pdf>
 17. Awan NU, Malik U, Azam M, Nasrullah A, Tahir F, Zulfiqar R, Awais A. Behavioral And Emotional Difficulties In Hearing Impaired Children And Adolescents: A Systematic Review. *Kurdish Studies*. 2024 May;12(4):544-54. DOI: <https://doi.org/10.52337/pjer.v6i2.842>