Emotional-Behavioral Problems in Hearing-Impaired Children and Caregiver Burden: A Correlational Study

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ABSTRACT

Background: Hearing impairment (HI) can significantly affect children's communication, education, and social interactions. These challenges, in turn, increase caregivers' stress and anxiety, leaving caregivers emotionally drained and exhausted from managing the child's needs. **Aim of the study:** To examine the correlation between emotional-behavioral problems (EBPs) in hearing-impaired children and caregiver burden. **Subjects and methods: Research design:** A descriptive correlational design was utilized. **Setting:** The current study was performed at the Phoniatrics Unit, Audio-Vestibular Unit, and ENT Outpatient Clinic at Zagazig University Hospitals. **Subjects**: A purposive sample of 110 caregivers of hearing-impaired children was recruited. **Tools of data collection:** Three tools were utilized to collect the required data: (1) A structured interview questionnaire covering demographic and clinical characteristics of studied participants; (2) the Strengths and Difficulties Questionnaire (SDQ); and (3) the Zarit Caregiver Burden Interview (ZBI). **Results:** The findings showed that 72.7% of hearing-impaired children had abnormal EBPs (mean SDQ score = 21.08 ± 5.81). More than half (52.7%) of caregivers experienced moderate to severe burden (mean ZBI score = 47.61 ± 13.63). A statistically significant positive correlation was found between children's EBPs and caregiver burden. **Conclusion:** Emotional-behavioral problems are prevalent in hearing-impaired children and are accompanied by moderate to severe caregiver burden. **Recommendation:** Early intervention programs, alongside communication training, social and financial support, and behavioral therapy, are essential to improve the outcomes for both children and their caregivers.

Keywords: Caregiver burden, Emotional-behavioral problems, Hearing-impaired children.

Introduction

Adequate hearing is critical for healthy psychosocial development, as it enables children to effectively communicate their thoughts, feelings, and needs, also facilitates learning from daily experiences **(Kumar et al., 2019).** Preschoolers (3-5 years) are in a crucial stage of acquiring foundational social, emotional, and cognitive skills, whereas school-aged children (6-12 years) continue to develop these skills

and achieve greater independence **(Thomas and Lewis, 2022).**

Hearing impairment (HI), defined as the inability of one or both ears to function normally, can significantly disrupt this developmental trajectory **(Şafak and Türkmen, 2022).** HI negatively affects children's speech, language acquisition, social interaction, and emotional regulation. Affected children may appear more sensitive and energetic and often face additional academic challenges **(Gana et al., 2024) .**

According to the World Health Organization **(WHO) (2025),** over 34 million children worldwide suffer from hearing loss. In **Egypt**, the prevalence of hearing loss is approximately 9.2% in primary school children **(Morgan, 2021).**

Emotional and behavioral problems are broad terms that refer to a range of conditions used to describe difficulties in emotional regulation and behavior, typically in school-aged children **(Jacob, 2023).** Children with hearing loss (HL) are at higher risk of developing EBPs, including hyperactivity, inattention, peer relationship difficulties, and conduct problems, key indicators of broader behavioral issues **(Mattingly et al., 2023).** These difficulties can negatively impact their long-term quality of life and adaptability **(Pathak and Gaire, 2019) .**

Caregiver burden refers to a state of physical, emotional, and mental exhaustion experienced by caregivers who provide care for chronically ill or disabled children **(Liu et al., 2020).** It often manifests through physical health problems like fatigue and stress, social consequences like withdrawal or missed engagements, and financial difficulties **(Kaur et al., 2018).** Raising a child with hearing loss presents multifaceted challenges, including navigating healthcare services, managing the financial demands of assistive devices and ongoing care, and coping with stress related to the child's behavioral and emotional problems **(Zaidman-Zait et al., 2023) .**

Parents of children with EBPs face additional stressors beyond typical parenting responsibilities. Mothers, in particular, often experience frustration due to heightened social and familial pressures, which can increase their vulnerability to anxiety, sadness, and hopelessness **(Continisio et al., 2023) .**

Pediatric nurses play a vital role in preventing hearing loss by helping in treating and reducing recurrent infections, encouraging families to learn sign language, and supporting parental involvement in multimodal speech-language therapy **(John, 2019).**

Significance of the study

Hearing impairment is the most prevalent disability worldwide, particularly in developing nations **(WHO, 2024).** It profoundly impacts children's behavioral, emotional, and social development, often leading to peer difficulties, social isolation, and increased feelings of loneliness and exclusion **(Patel et al., 2021).** These challenges place a considerable burden on caregivers. Parents often encounter various financial, emotional, and physical stressors, and they frequently feel overwhelmed by the added responsibilities of caring for their children during regular daily activities **(Kaur et al., 2018).** Therefore, this study will be conducted to examine the correlation between emotional-behavioral problems in hearing-impaired children and caregiver burden.

Aim of the study

This study aimed to examine the correlation between emotional-behavioral problems in hearing-impaired children and caregiver burden.

Research questions

- Are emotional-behavioral problems (EBPs) prevalent among hearing-impaired children?
- What is the level of caregiver burden experienced by caregivers of hearing-impaired children?
- What are the factors that determine the level of caregiver burden among caregivers of hearing-impaired children?
- Is there a significant correlation between emotional-behavioral problems in HI children and the caregiver burden among their caregivers?

Subjects and methods

Research design

A descriptive correlational design was utilized. This design describes variables and examines the relationship among them; it also facilitates the identification of multiple interrelationships **(Rentala, 2018).**

Study setting

The study was conducted at the Phoniatrics Unit, Audio-Vestibular Unit, and ENT Outpatient Clinic affiliated with Zagazig University Hospitals.

Study subjects

A purposive sample composed of 110 caregivers of hearing-impaired children was recruited from the Audio-Vestibular Unit (92), Phoniatrics Unit (11), and ENT Outpatient Clinic (7) at Zagazig University Hospitals. Eligible children met the following criteria: aged between 4 and 12 years, of both sexes, using hearing aids (HA) and/or cochlear implants (CI), and free from any additional disabilities.

Sample Size

The required sample size was calculated based on a regression coefficient ($\beta = 0.19$) retrieved from **van Driessche et al. (2014)**. With a test power of 95% and a confidence level of 95% ($\alpha = 0.05$).

Tools for data collection:

Tool (I): A structured interview questionnaire

It was developed by researchers following a revision of recent relevant scientific publications along with articles in periodicals to gather the required data. It was divided into three main sections:

Section A: Demographic characteristics of HI children, including age, gender and birth order.

Section B: Clinical characteristics of HI children, such as cause and degree of hearing loss, age at initiation of hearing aid or cochlear implant use, and type of therapeutic support received.

Section C: Demographic characteristics of caregivers (age, educational level, occupation, residence, and family income).

Tool (II): The Strengths and Difficulties Questionnaire (SDQ)

The parent-report, single-sided version of the SDQ, developed by **Goodman (1997)** and translated into Arabic by **Alyahri et al. (2020)**, was utilized to assess emotional-behavioral problems (EBPs) in hearing-impaired children. It comprises 25 items distributed across five subdomains: emotional, conduct, hyperactivity, peer problems, and prosocial behavior.

Scoring system

Every subscale contains 5 items, evaluated on a 3-point Likert scale: Not True (0), Somewhat True (1), and Certainly True (2), with five items negatively keyed across the hyperactivity, conduct, and peer-problems subdomains. The first four subscales' values are added together to create the "total difficulties score" (excluding prosocial behavior), yielding a score between 0 and 40 that

can be categorized as normal (0 - 13), borderline (14 - 16), and abnormal (17 - 40). Higher scores reflect more severe EBPs.

Tool (III): The Zarit Caregiver Burden Interview (ZBI)

It is a self-administered scale utilized to assess the level of care burden experienced by caregivers, which was adopted from **Zarit et al. (1980).** It contains 22 items designed to evaluate the impact of physical and psychological health, economic status, the caregiver-child relationship, and social life on caregivers.

Scoring system

The items were evaluated using a 5-point Likert-type scale with 5 response options: Never (0), Rarely (1), Sometimes (2), Quite often (3), and Almost always (4). The overall score ranges from 0 to 88 and is interpreted as no to mild burden (0–21), mild to moderate (21–40), moderate to severe burden (41–60), and ≥ 61 severe burden. Higher scores signify a greater caregiver burden.

Content validity and reliability

A jury consisting of a panel of three experts assessed and revised the tools for content and face validity: a professor of pediatric nursing, an assistant professor of community health nursing at the Faculty of Nursing, and a professor of biostatistics from the Faculty of Medicine, Zagazig University. No modifications were recommended.

The internal consistency of scales was investigated by Cronbach's alpha values from a previous study for the SDQ scale Arabic version, which showed good reliability (α = 0.83) **(Al-Hendawi, 2023)**, and was examined for the ZBI scale, which demonstrated excellent reliability (α = 0.88).

Field work

Data was gathered over an interval of four months, from August to November 2024, three days a week (Sunday to Tuesday) between 9 a.m. and 2 PM. Each caregiver was interviewed separately. In order to secure informed consent and guarantee data confidentiality, the researchers began by introducing themselves and outlining the purpose of the study for the chosen caregivers. The researchers read and clarified all questionnaire items. Completion of each sheet required approximately 30 to 45 minutes.

Pilot study

A pilot of eleven (10%) studied caregivers was carried out before starting the data gathering to test the applicability, uniformity, clarity, and viability of the study tools and to ascertain the average time required for completion. No modifications were made, so they were included in the final sample.

Administration and ethical consideration

Ethical consent was granted from the Research Ethics Committee, Faculty of Nursing, Zagazig University (M.D.ZU.NUR/229/10/6/2024).

Additionally, formal authorization letters were issued by the Dean of the Faculty of Nursing, Zagazig University, and submitted to the heads of the ENT Outpatient Clinic, Phoniatrics Unit, and Audio-Vestibular Unit at Zagazig University Hospitals to request their institutional permission to gather data.

Then, each participant was informed of the study's purpose prior to participation, and informed consent was obtained. Caregivers were guaranteed the freedom to stop participating at any time, and

involvement was entirely optional. Total anonymity and confidentiality were strictly maintained, and participants were reassured that the information collected during the study would only be utilized for research purposes.

Statistical analysis

The SPSS version 20.0 for Windows (SPSS Inc., Chicago, IL, USA, 2011) was used to schedule and statistically analyze all the data. Qualitative variables were displayed as frequencies and percentages, whereas quantitative variables were presented as means ± SD. One-way Analysis of Variance (ANOVA): used to compare normally distributed quantitative variables across more than two groups. The "student" t-test was employed to compare the means between two independent groups when data are normally distributed.

To evaluate the link between the continuous variables under consideration, the "Pearson correlation coefficient" was computed; a positive (+) sign denotes a direct association, a negative (-) sign denotes an opposite association, values approaching 1 suggest a strong correlation, and those close to 0 indicate a weak correlation. "Stepwise Multiple Linear Regression Analysis": conducted to foresee significant predictors of overall difficulties and caregiver burden scores.

P-values below 0.01 were regarded as highly significant, $p \geq 0.05$ as non-statistically significant, and p less than 0.05 as statistically significant.

Results

Table 1 shows that 79.1% of children aged 6-12 years (mean 7.33±4.16), 58.2 % were males, and 32.7% were the first-born. Congenital causes accounted for 79.1%, and 54.5% had severe hearing loss, with 59.1% beginning to use HA or CI between ages 3 and less than 6 years. Notably, 75.5% received health insurance support. Regarding caregivers, 81.8% were mothers, with a mean age of 33.91 (mothers) and 39.47 (fathers). More than half of the caregivers finished secondary education. While 44.5% of the fathers were handicrafts, and 85.5% were from rural areas. Family income was insufficient for 71.8%.

Figure 1 illustrates that 72.7% of hearing-impaired children had abnormal EBPs as reported by their caregivers.

Figure 2 displays that 52.7% of studied caregivers experienced moderate to severe burden.

Table 2 demonstrates that EBPs had a statistically significant negative relation with acquired hearing impairment ($t = -2.094$, $p = 0.039$) and a significant positive relation with the age at which the hearing aids were used or cochlear implanted ($F=3.635$, $p= 0.030$).

Table 3 clarifies that the caregiver burden had a statistically significant positive relation with the father's occupation ($F= 2.945$, $p= 0.036$), the first and third birth orders ($F= 2.840$, $p= 0.041$) and a statistically significant negative relation with health insurance therapeutic support ($t= -2.280$, $p= 0.025$).

In Figure 3, the scatter plot reveals a strong, positive and linear correlation between caregiver burden and total difficulties score ($r = 0.216$, $P = 0.024$), while $r^2 = 0.046$.

Table 4 represents that the caregiver burden was a statistically significant independent positive predictor of EBPs ($p= 0.024$), while the mother's education and degree of HL were statistically significant independent negative predictors of EBPs in hearing-impaired children (t=

-2.202, p= 0.030) and (t= -2.071, p= 0.046), respectively. Where the value of r^2 = 11.2%.

Table 5 discovers that the father's handicraft occupations, degree of hearing loss, and age at which HA or CI was used were statistically significant independent positive predictors of caregiver burden (p= 0.019, p= 0.009, and p= 0.031, correspondingly). Conversely, father age was a statistically significant independent negative predictor of caregiver burden (t= -2.286, p= 0.024), where r^2 = 9.2%.

Discussion

The current study presented that most hearing-impaired children fall into the school-age category (6-12 years). This may be related to many factors, including lower socioeconomic status, limited parental education, and ignorance of the early warning signs of hearing loss that often delay seeking help from audiologists and adherence to treatment regimens. Consistent with this result, **Tufail et al. (2020)** stated that many hearing-impaired children in Pakistan were of school age.

Concerning gender, this study showed that males constituted in excess of half of HI children. Similarly, a higher prevalence of hearing impairment among males has been shown in several studies conducted in Netherlands, Syria, and Nigeria, respectively **(Dirks and Szarkowski, 2022, Ghannam et al., 2024, Jibril et al., 2021).** This can be explained by X-linked genetic mutations, as males have only one X chromosome (XY), making them more susceptible to HI **(Lowery, 2024).**

According to the present study, many of the children were from rural areas, which can be attributed to socioeconomic and cultural factors, including poverty, consanguineous marriage, lower levels of education, and limited access to healthcare services in some rural areas. These factors often result in the neglect of premarital screening, thus increasing the risk of genetic conditions, such as hearing impairment. Similarly, **Mohammed et al. (2020)** found that most of the children in their study in Minia, Egypt, lived in rural areas. Conversely, a Moroccan study by **Roched et al. (2023)** detected that over half of the studied children were urban dwellers. This discrepancy may reflect the differences in culture and level of education across regions.

As regards the causes of HI, the present study found that many of them were congenital. In the same line, **Aanondsen et al. (2023)**, in their research conducted in Norway, illustrated that over two-thirds of causes were congenital. This result is further supported by **Choe et al. (2023)**, who noted in their study in Korea that hearing impairment is the most common congenital sensory deficit.

According to the severity, slightly over half of the children had severe hearing loss. Concerning the age at which assistive devices were used, more than half of children used them from three to less than six years. Additionally, three-quarters received their devices through health insurance. Likewise, **Jnaneswar et al. (2017)**, who ran their study in Odisha, India, showed that over half of the studied children had severe HL.

In contrast, **Haukedal et al. (2022)** found that more than three-quarters of the children suffered from moderate hearing loss. In addition to **Yang et al. (2022)**, they found in their study in China that many of their

examined children performed cochlear implants before the age of three years. These differences can result from variations in socioeconomic status, culture, level of awareness, and education across the studied populations.

This study showed that over three-quarters of caregivers were mothers. More than half of them finished secondary education. Slightly less than half of the fathers were workers or handicraftsmen. This can result from lower levels of education among caregivers, which can limit employment opportunities. In agreement with these findings, **Zhumabayev et al. (2022)** in Kazakhstan found that most participants were mothers. **Hamad et al. (2022)** also noted that more than half of hearing-impaired children's mothers had finished secondary education.

The current study exhibited that over two-thirds of HI children experienced abnormal emotional behavioral problems. This can be related to hearing-impaired children's incapacity to understand verbal instructions **(Buchanan, 2023)**. These findings align with those of **Hameed et al. (2023)**. As well, **Ong et al. (2023)**, in their Australian study, stated that hearing-impaired children had more emotional-behavioral problems and appeared more sensitive and hyperactive. Similarly, the results of previous studies performed in California, USA, and Beni-Suef, Egypt, by **Agung et al. (2021), Desoky et al. (2021),** respectively, found that HI children exhibited extra linguistic issues and EBPs compared to their normal peers.

In contrast, another Australian study performed by **Adily et al. (2024)** demonstrated that EBPs presented by hearing-impaired children can be classified as normal. These differences can result from cross-country variances that include different parenting styles in dealing with their children, cultural standards, and levels of support from health care systems.

Our recent study illustrated that the mean score of EBPs presented a statistically significant negative relation with acquired hearing impairment (t= 2.094, p= 0.039). This result was in harmony with **Almasian and Moghadam (2025)** in Tehran, Iran, who revealed that children with congenital hearing loss had higher average EBPs than children with acquired hearing loss. The result also found a positive relation between the total score of EBPs and the age at which the HA or CI was first used by children (p= 0.030). This result is like **Genç et al. (2023)** in their study in Turkey to assess EBPs in hearing-impaired children.

Furthermore, the mother's educational level and degree of HL were statistically significant independent negative predictors of EBPs. Accordingly, a Netherlands study by **Horoz et al. (2022)** demonstrated that lower parental education was linked to higher EBPs. Moreover, **Fahim et al. (2025),** who conducted their study in Minia, Egypt, found that lower level of HL had a statistically significant relation with conduct patterns in children at (p= 0.002). On the contrary, **Wong et al. (2017)** found that the total mean score of EBPs showed no statistically significant relation with the severity of hearing loss. This may result from variations in the level of therapeutic support from healthcare between different countries.

As regards caregiver burden, this study demonstrated that over half of hearing-impaired children's caregivers experienced moderate to severe levels of burden. The reason behind this result is that parents of hearing-impaired children often frequently deal with increased obligations, continuous demands, and a generally stressful atmosphere associated with caring for a hearing-impaired child **(Offei and Gibbah, 2024).**

Several studies conducted in different countries, such as Pakistan and Turkey, on caregiver burden of hearing-impaired children reported similar findings **(Firdous et al. 2025, Peker et al. 2020, Syed et al. 2020).**

Current results exhibited a positive statistically significant relation between caregiver burden and the father's handicraft occupation ($p < 0.036$). This can be since a handicraft occupation may be accompanied by challenges like income instability. This result is in harmony with **Güven Baysal and Çorabay (2024)**, who found that the caregiver burden score varied according to level of income ($P < 0.001$).

Moreover, this study found that the caregiver burden had a statistically significant relation with birth order, specifically among first- and third-born children ($p = 0.041$), and a negative relation with health insurance therapeutic support ($p=0.025$).In alignment with this finding, **Gross (2022)** in Hempstead, New York, found a strong, significant relation between birth order as first or third and parenting stress ($p < 0.01$). Along with **Devi et al. (2019)** in India found a statistically significant negative relation with health insurance ($p=0.045$).

Furthermore, the result of the present study determined father occupation, father age, degree of hearing loss, and the age at which the hearing aid or cochlear implant was used as predictor factors to caregiver burden. There is a statistically significant negative relation with father age ($p=0.024$) and a positive relation with degree of hearing loss ($p=0.009$) and the age at which the cochlear implant was used ($p=0.031$). This may be due to the increased awareness and experience of fathers with increased age, which could help reduce the perceived burden.

Rout and Chakraborty (2024), in their study in Odisha, India, provided similar results, showing a strong positive correlation between the severity of HI and caregiver burden. Similarly, **Rochd et al. (2023)** found that earlier ages of cochlear implant were significantly associated with well-being and happiness in parents.

In general, this study disclosed a statistically significant positive correlation between EBPs in hearing-impaired children and caregiver burden ($r = 0.216$, $p = 0.024$). The previous conclusion, supported by a study in Kuching, Sarawak, by **Chua et al. (2023),** revealed a positive association between EBPs in children and caregiver burden.

Conclusion

The study concluded that emotional-behavioral problems (EBPs) are prevalent among nearly three-quarters of hearing-impaired children, and more than half of their caregivers experienced moderate to severe levels of burden.

Recommendations

The present study recommended

- Collaboration among medical, psychological, and speech

therapist teams to provide effective intervention.

- Conducting longitudinal research to track changes in emotional-behavioral problems and care burden over time.

Authors' contributions

A.M.F.M.; gathered and interpreted data, composed the initial draft, integrated the thesis, and served as a corresponding author. H.M.T.; evaluated, revised, and offered constructive feedback on the article. A.M.E.K.; helped gather the needed data and evaluate the medical aspects of the research. D.E.E.; conducted general supervision and took part in every stage of the research. The final article was edited, approved, and involved by all authors.

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Declaration of conflicting interest

The researchers did not disclose any oppositional concerns.

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Table (1): Demographic and Clinical Characteristics of Hearing-Impaired Children and Their Caregivers (n = 110).

Characteristics	No.	%
Child' age (years)		
4-<6	23	20.9
6- 12	87	79.1
Mean± SD	**7.33± 4.16**	
Child's Gender		
Male	64	58.2
Female	46	41.8
Birth order		
First	36	32.7
Second	30	27.3
Third	30	27.3
Fourth or More	14	12.7
Causes of hearing impairment		
Congenital	87	79.1
Acquired	23	20.9
Degree of hearing loss		
Mild	3	2.7
Moderate	20	18.2
Severe	60	54.5
Profound	27	24.5
Age at initiation of hearing aid or cochlear implant use (years)		
From one < three	31	28.2
From three < six	65	59.1
Six and above	14	12.7
Type of therapeutic support		
Self-funded	27	24.5
Health insurance	83	75.5

Primary caregiver		
Mother	90	81.8
Father	16	14.5
Both	4	3.6
Mothers' age		
≤30 years	32	29.1
>30 years	78	70.9
Mean± SD	**33.91± 6.21**	
Mothers' educational level		
Illiterate	17	15.5
Primary education	11	10.0
Secondary / diploma	67	60.9
University education	15	13.6
Mothers' occupation		
Housewife	102	92.7
Working	8	7.3
Fathers' age		
≤40 years	69	62.7
>40 years	41	37.3
Mean± SD	**39.47± 7.04**	
Fathers' educational level		
Illiterate	18	16.4
Basic education	11	10.0
Secondary / diploma education	69	62.7
University education	12	10.9
Fathers' occupation		
Government employee	9	8.2
Worker	50	45.5
Handicraft	49	44.5
Other (not work or retired)	2	1.8
Residence		
Rural	94	85.5
Urban	16	14.5
Family income		
Sufficient and more	2	1.8
Sufficient	29	26.4
Insufficient	79	71.8

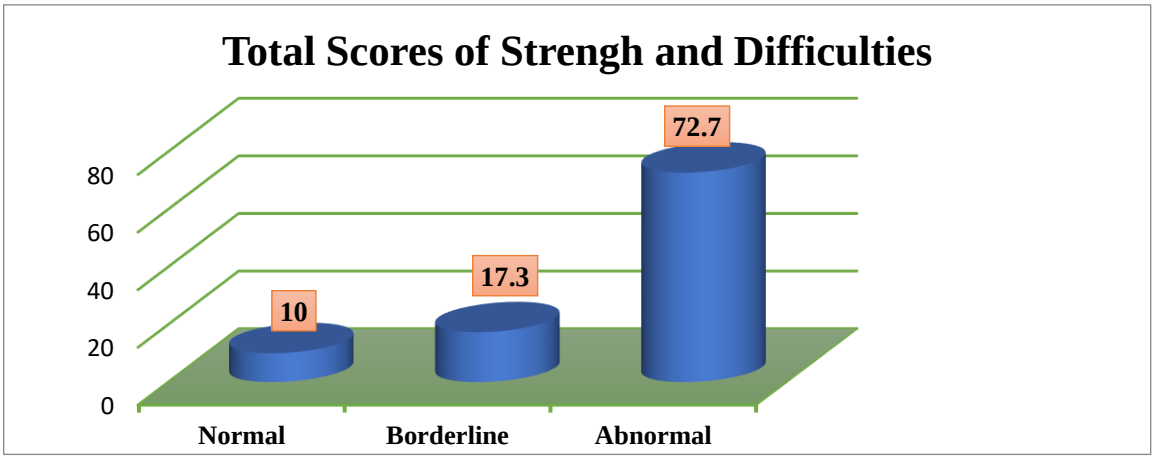

Fig. (1): Total scores of strengths and difficulties.

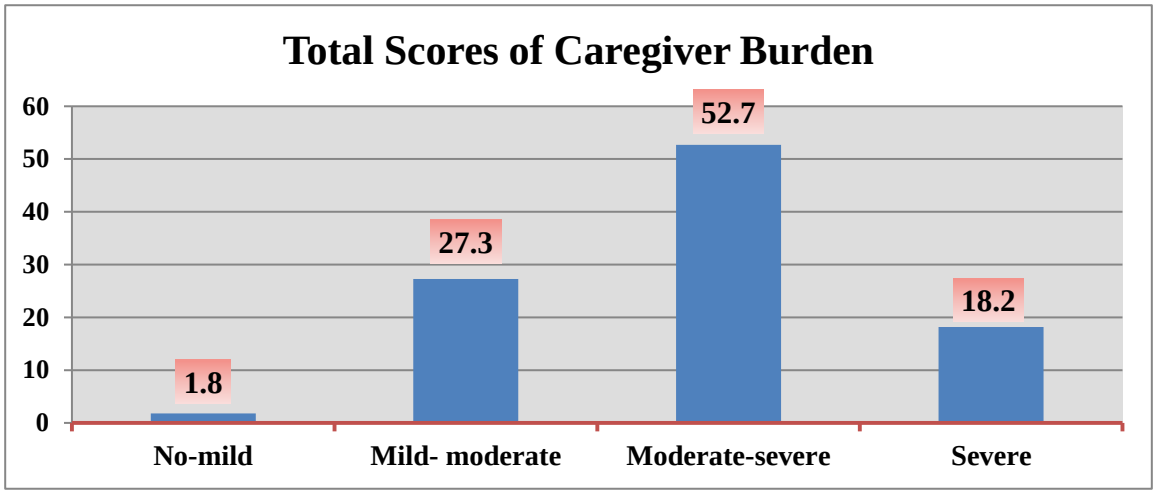

Fig. (2): Total Score of caregiver burden.

Table (2): Relation between the clinical characteristics of children and total mean scores of difficulties.

Clinical characteristics	Total Difficulties score	Test of significance and P-value
Age at diagnosis of hearing impairment (months / years)		
Less than one year	19.88±4.83	F=2.175 p=0.119
From one to three years	20.95±6.38	
From three to six years	22.96±5.68	
Causes of hearing impairment		
Congenital	23.30±4.34	t=-2.094 p=0.039*
Acquired	20.49±6.02	
Type of hearing loss		
Sensorineural	21.04±6.00	F=0.058 p=0.943
Conductive	21.83±3.48	
Mixed	20.66±2.88	

Degree of hearing loss		
Mild	23.0±4.58	F=0.684
Moderate	22.20±7.03	p=0.564
Severe	21.11±5.53	
Profound	19.96±5.62	
Type of hearing devices		
Hearing aid(s)	22.23±5.72	F=2.436
Cochlear implant(s)	19.83±5.70	p=0.092
Both	22.50±7.77	
Age at which the hearing aid / cochlear implant was used (done) (years)		
From one to less than three years	19.74±6.13	F=3.635
From three to less than six years	20.95±5.12	p=0.030*
Six years and above	24.64±7.01	
Duration between diagnosis and beginning of hearing aid/ cochlear implant		
Less than one year	22.00±5.24	t=1.038
One year and above	20.72±6.01	p=0.301
Type of therapeutic support		
Self-funded	21.03±5.84	t=-0.046
Health insurance	21.09±5.83	p=0.963

F: One-way ANOVA, t: student t-test, non-significant(p>0.05), *: statistically significant (p<0.05)

Table (3): Relation between the total mean score of caregiver burden and characteristics of the studied participants.

Characteristics of the studied participants	Total score of caregiver burden	Test of significance and P-value
Mothers' educational level		
Illiterate	46.76±15.68	F=0.586
Basic education	49.90±17.00	p=0.626
Secondary / diploma education	48.32±13.21	
University education	43.73±10.62	
Fathers' educational level		
Illiterate	44.00±11.18	F=2.367
Basic education	50.63±13.04	p=0.075
Secondary / diploma education	49.42±13.84	
University education	39.91±13.90	
Fathers' occupation		
Government employee	42.33±12.79	F=2.945
Worker	44.70±14.37	p=0.036*
Handicraft	51.75±11.37	
Others (not work or retired)	43.00±32.52	
Age (years)		
4-<6	50.43±12.50	t=1.186
6- 12	46.87±13.88	p=0.243
Gender		
Male	48.71±13.99	t=1.010
Female	46.08±13.10	p=0.315

Birth order		
The first	50.30±12.65	F=2.840
The Second	43.96±15.99	p=0.041*
The third	50.90±11.41	
The Fourth or More	41.50±12.24	
Causes of hearing impairment		
Congenital	47.59±13.91	t=-.031
Acquired	47.69±12.81	p=0.976
Mixed	35.66±19.39	
Age at which the hearing aid / cochlear implant was used (done) (years)		
From one to less than three years	44.38±13.79	F=1.766
From three to less than six years	48.15±13.08	p=0.176
Six years and above	52.28±15.03	
Type of therapeutic support		
Self-funded	42.51±12.38	t=-2.280
Health insurance	49.27±13.67	p=0.025*

F: One-way ANOVA, t: student t-test, non-significant(p>0.05), *: statistically significant (p<0.05).

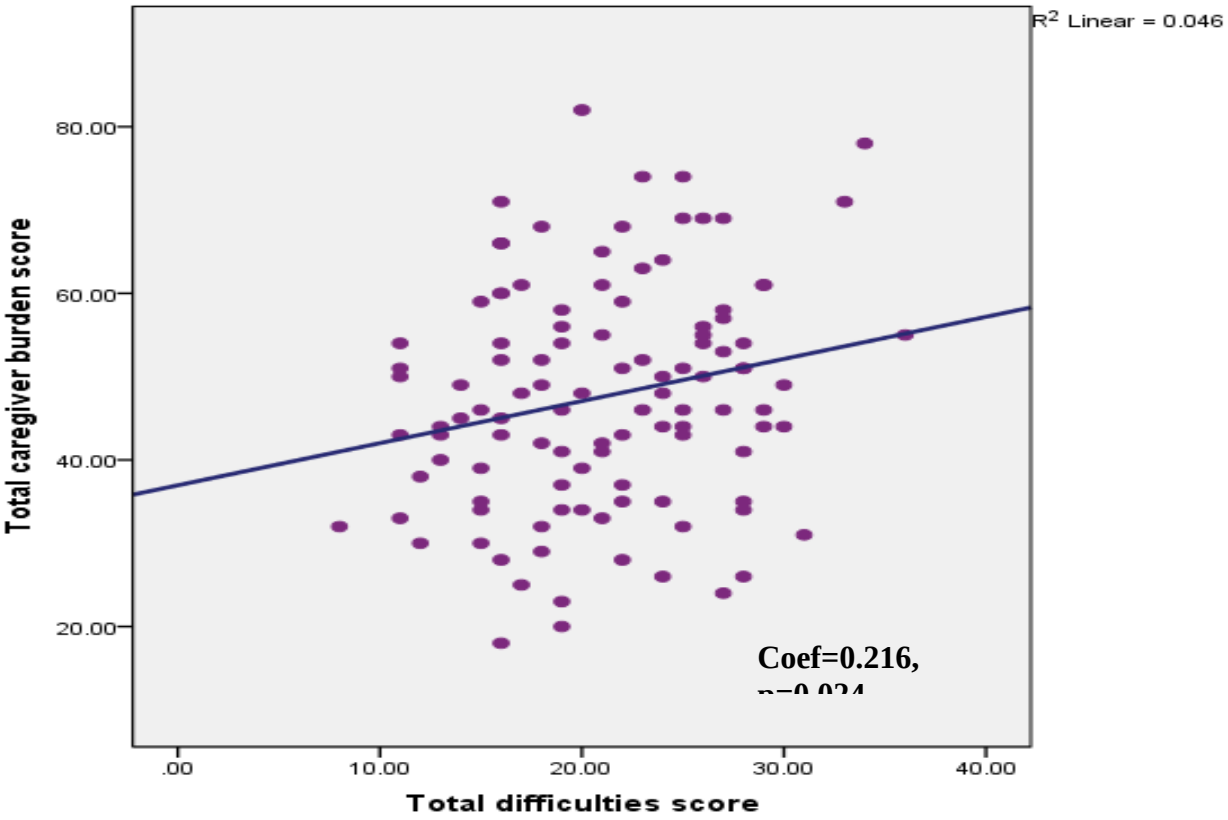

Fig. (3): Scatter dot graph showing correlation between total scores of difficulties and caregiver burden.

Table (4): Multivariate stepwise regression of factors affecting total emotional-behavioral difficulties.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
	(Constant)	20.296	2.541		7.987	.000	15.258	25.333
	caregiver burden	.090	.039	.211	2.285	0.024*	.012	.168
	Mother educational level	-.979	.445	-.203	-2.202	0.030*	-1.860	-.098
	Degree of hearing loss	-2.444	1.181	-.335	-2.071	0.046*	-4.844	-.045

: statistically significant (p<0.05).

Table (5): Factors affecting caregiver burden identified through stepwise regression.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
	(Constant)	52.881	8.694		6.083	.000	35.647	70.115
	Father occupation (handicraft)	4.497	1.882	.220	2.390	0.019*	.766	8.227
	Father age	-.407	.178	-.210	-2.286	0.024	-.759	-.054
	Degree of hearing loss	4.574	1.715	.247	2.667	0.009**	1.175	7.974
	Age of hearing aid / cochlear implant was used	4.429	2.023	.203	2.189	0.031*	.418	8.440

: statistically highly significant (p<0.01), *: statistically significant (p<0.05).

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