LEX LOCALIS-JOURNAL OF LOCAL SELF-GOVERNMENT
ISSN:1581-5374 E-ISSN:1855-363X
VOL. 23, NO. S2(2025)

PSYCHO-EDUCATIONAL PROGRAM FOR ENHANCING KNOWLEDGE, PRACTICE, AND ADJUSTMENT AMONG FAMILY CAREGIVERS OF CHILDREN HAVING HEARING LOSS

Rasha Mohamed khodier*[1], ZeinabAbdelhamidLoutfi[2];
Asmaa Hafez AfefeBarakat[3]; Hanaa Ezz Eldin Prince[4]

[1,2,3,4]Psychiatric and Mental Health Nursing, Faculty of Nursing, Ain Shams University, Egypt.

***Corresponding author: Rasha M. khodier;**

rasha.mohammed.abd.elfattah@nursing.asu.edu.eg.[1]

ABSTRACT

Introduction: Caring for children with hearing loss presents substantial physical, emotional, and financial challenges for family caregivers, highlighting the necessity for effective support interventions. **Methodology:** This quasi-experimental study employed a pre-post assessment design and was conducted at a specialized outpatient speech clinic affiliated with a university-based center for childhood developmental services. That made regular support for children with hearing loss and their families, making it an appropriate and accessible location to deliver the psycho-educational program and evaluate its effectiveness on family caregivers. A purposive sample of 40 family caregivers was selected based on predefined inclusion criteria during routine follow-up visits.
Results: The study found that the majority of family caregivers, mainly women who aged 25-30, with 45% working full-time and 42.5% working part-time. They reported insufficient income and had no other children with hearing impairments. The psycho-educational program significantly improved their knowledge, caring practices, and adjustment. Post-intervention findings indicated statistically significant improvements across all measured domains. Knowledge scores rose from 45.96% to 92.97% ($p<0.001$), caregiving practice scores increased from 45.96% to 92.97% ($p<0.001$), and adjustment scores improved from 56.58% to 82.58% ($p<0.001$).
Conclusions: The psych educational program improved the knowledge, caregiving habits, and adjustment of family caregivers for children with hearing loss.

Keywords: Knowledge, experience, adaption, family caregivers, and hearing loss.

INTRODUCTION

Hearing is an essential sense that helps people connect with their environment, communicate, stay secure, and enjoy more enjoyable activities like listening to music. A person's quality of life can be disrupted by hearing loss, especially if treatment is not received. Even though hearing loss is widely known, its impact and prevalence are sometimes understated**(1)**.

In Egypt, hearing loss represents a major public health concern. A national household survey conducted across six governoratesAlexandria, MarsaMatrouh, Dakahlia, Minia, Luxor, and North Sinaireported a prevalence of 16% for hearing impairment, affecting over 13 million individuals. Among children aged up to four years, the prevalence increased to 22.4% **(2)**. Similarly, a study in the Shebin El-Kom district found that 20.9% of primary school children experienced hearing loss, highlighting the urgent need for early identification and intervention**(3)**.

Nearly 700 million individuals, or nearly 10% of the world's population, will have disabling hearing loss that would necessitate rehabilitation services by 2050, according to the World Health Organization (WHO), which projects that 2.5 billion people will have some form of hearing loss. In addition, dangerous listening practices put more than 1 billion young adults at risk for irreversible, avoidable hearing loss.

There are already 34 million children and over 430 million adults with debilitating hearing loss that require rehabilitation**(4)**.

Both congenital and acquired causes can cause hearing loss. While acquired hearing loss can result from a variety of circumstances later in life, congenital hearing loss can be present at birth or develop soon after. The development of speech, language, and social skills in children can be seriously hampered by hearing loss, which frequently results in low academic achievement and delayed educational advancement. Furthermore, families may face financial, social, and psychological difficulties as a result of hearing loss, which can exacerbate societal stigma **(5)**.

Children can have minor to extensive hearing loss, with deafness being the outcome of the most severe cases. Children may have hearing loss from birth or later on as a result of trauma, illnesses, or extended exposure to loud noises. Nonetheless, a child's communication skills can be greatly improved by a number of therapies, such as cochlear implants, hearing aids, and methods like learning sign language or speech reading **(6)**.Parents' perceptions of hearing impairment might differ widely; some may know very little about it, while others actively look for information to learn more about it and its effects **(7)**.

It is crucial to give parents knowledge and non-threatening, culturally sensitive intervention alternatives because different cultures have different ideas about what is normal or abnormal. In order to assist parents feel at ease, secure, and respected in their decisions and cultural values, nurses are essential in talking with them. When deciding whether to screen their children for hearing loss, parents should follow the principle of informed choice **(8)**.Additionally, nurses play a crucial role in making sure parents comprehend the significance of early intervention and follow-up. To avoid missed appointments or canceled services, it is essential to emphasize the value of hearing screening and accessible therapies in multicultural situations in a way that is sensitive to cultural differences**(9)**.

Nurses can lower the number of children lost to follow-up by receiving training on how to use the proper testing equipment. Nurses can advise parents on the significance of follow-up and diagnostic consultations very away if a refer result is obtained **(10)**.A child's overall development, including their social, emotional, and language maturation, depends on the family's capacity to accept, accommodate, and support their hearing loss. How parents handle the difficulties brought on by their child's hearing loss is significantly influenced by elements including acceptance, self-efficacy, and social support **(11)**.

In order to effectively manage pediatric hearing loss, recent studies emphasize the value of early intervention and family participation. According to research done in 2024, prompt diagnosis and intervention, along with strong family support, can significantly enhance language outcomes and lessen the psychological toll on the family and the child**(12)**.Early intervention strategies that are family-centered are widely acknowledged as best practices, highlighting the necessity for medical professionals to involve families from the time of diagnosis**(8)**.

Furthermore, new understandings of the origins of congenital hearing loss have been made possible by developments in genetic research. Li and colleaguesstudy opened the door for individualized treatment plans by identifying particular genetic abnormalities that account for a sizable percentage of congenital hearing impairments. In young populations, these advancements have the potential to completely transform the diagnosis and treatment of hearing loss**(13)**.

Moreover, it is becoming more widely acknowledged that psychosocial assistance plays a crucial role in assisting families in adjusting to hearing loss. The usefulness of peer support groups and counseling services in lowering parental stress and improving the general well-being of families.Children with hearing loss are now receiving comprehensive treatment models that incorporate these strategies**(14)**.

Our goal is to assess the psycho-educational program that aims to improve family caregivers of children with hearing loss's knowledge, behaviors, and adjustment. After implementation, we anticipate that this program with a good impact on these elements.

MATERIALS AND METHODS

1-Study design & Study setting

This quasi-experimental study, utilizing a pre-post assessment design, was conducted at the Outpatient Speech Clinic of the Center of Special Needs Care, affiliated with the Faculty of Post-Graduate Childhood Studies at University.A purposive sample of 40 family caregivers was selected based on their inclusion criteria during follow-up visits at the clinic.

2-The characteristics of participants:

- ***Inclusion criteria:***

Caregivers were recruited during routine follow-up visits at the clinic. To be included in the study, caregivers had to live in the same household as the child with hearing loss and have no diagnosed psychiatric disorders. Children were eligible if they had been diagnosed with hearing loss within the past year, were between 2 and 6 years of age, and were free from any additional physical or mental health conditions. Both male and female children were eligible for inclusion; however, those with complete deafness were excluded from the study.

- ***Exclusion criteria:***

Caregivers who did not attend routine follow-up visits at the clinic were not considered for recruitment. Individuals who did not reside in the same household as the child with hearing loss or who had diagnosed psychiatric disorders were excluded from participation. Children were not eligible if their hearing loss had been diagnosed more than a year prior, if they were younger than 2 or older than 6 years, or if they had coexisting physical or mental health conditions. Additionally, children with complete deafness were not included in the study sample.

3-Procedure:

The researcher first translated the instruments from English to Arabic and presented the translated Arabic versions to bilingual experts for review and validation. After verifying the accuracy of the translation, the Arabic versions were re-translated back into English by other bilingual experts to ensure that the meaning and content were preserved accurately across both languages. The tools consist of four sections:

(1) The Interview Questionnaire: Demographic characteristics of family caregiver, including: age, gender, education level, working hours during child care, monthly income, and whether there is another child in the family with hearing loss. The demographic characteristics of children with hearing loss, such as age, gender, birth order, and whether the child attends a nursery.The health assessment data, including the child's diagnosis, the onset of treatment, and the type of hearing aids used.

(2) The Parent Knowledge and Awareness Questionnaire (PKAQ):was adapted from **Sevinç and Şenkal (8)** to fit the caregivers' educational levels. It contains 16 items, grouped into four subscales: general information (3 items), knowledge about hearing and hearing loss (4 items), communication skills (6 items), educational opportunities and access to services (2 items). Each item is scored as either "correct information" (1) or "no information" (0). A satisfactory level for each subscale is determined based on the percentage of correct responses, with a total score of 9.6 or more considered satisfactory.

(3) The Family Caregivers' Reported Practices Questionnaire: assesses caregivers' practices in four areas: psychological and social interaction, managing behavioral disorders, communication skills, and attention and concentration. The tool was validated for face and content reliability by a jury of psychiatric mental health nursing experts, and inter-rater reliability was tested. The scoring system includes three options for each practice: correctly done (2); sometimes done (1), and not done (0). A practice is considered correctly done if it meets 60% or more of the maximum score.

(4) The Adjustment Scale, developed by **Grant &Rivera(15)** and modified by **Ahmed et al. (1)**, includes 15 items spread across seven subscales. Caregivers are asked to score each item as "always" (3), "sometimes" (2), or "never" (1). A score of 60% or more indicates caregiver adjustment, while less than 60% suggests maladjustment. The scale measures various coping strategies, including disease information-seeking, social support, positive reinterpretation, denial, active coping, emotional discharge, and acceptance, with a total score range that classifies caregivers into three categories: maladjustment (9-17), moderate adjustment (18-26), and adjustment (27-45).

Tool Validity and Reliability:

- ***Validity*:**

The tools were evaluated for validity by five experts in Psychiatric Mental Health Nursing from the Faculty of Nursing at Ain Shams University. These experts reviewed the content of the tools for comprehensiveness, accuracy, clarity, and relevance to ensure their suitability for the study.

- ***Reliability:***

The reliability of the tools was assessed using Cronbach’s Alpha to measure internal consistency. The results demonstrated strong reliability, with Cronbach's Alpha values indicating good internal consistency for each tool: Knowledge Scale (0.78), Practice Scale (0.96), and Adjustment Scale (0.83).

Field Work: The study was carried out in several phases, each essential to the overall success of the program.

The process of data collection and implementation of the psych educational program spanned 9 months, fromJanuary 2023 till September 2023. Forty family caregivers of children diagnosed with hearing loss were selected based on the inclusion criteria established. The program was carried out in the following phases:

(A)Assessment and Planning Phase (Pre-Program):

Family caregivers who met the study criteria were selected, and initial interviews were conducted to assess their needs and to gather relevant study materials. After discussing the program’s objectives, informed consent was obtained from the participants. This phase lasted approximately two months, with data being collected twice a week according to attendance of the family caregiver who participated in the study during the shift at the Center for Special Needs Care. The goal of the planning phase was to develop a psych educational program tailored to meet the specific needs of the caregivers.

(B)Implementation Phase:

The family caregivers were divided into ten groups, with four caregivers in each group. The psych educational program was conducted in 12 sessions, designed to enhance the caregivers' knowledge, practices, and adjustment. Each session ranged from 30- 60 minutes, depending on the caregivers' attention span and comprehension.

The Training Program's Content.

The psycho-educational program consisted of 12 structured sessions delivered over nine months, combining both theoretical and practical components to enhance knowledge, practice, and adjustment among family caregivers of children with hearing loss.

- **Session (1)** introduced family caregivers to the program's content and objectives, where they completed the data collection tools through a pre-assessment questionnaire.
- **Sessions (2,3)**caregivers were educated about the meaning and causes of hearing loss, its signs, symptoms, and effects on children. These sessions also covered the components of the auditory system, types and degrees of hearing loss, and methods for diagnosis, treatment, and prevention.
- **Sessions (4,5)**focused on hearing aids and available services. Caregivers were informed about different types of hearing aids and cochlear implants, along with financial, educational, and health services accessible for children with hearing loss. They also learned how to obtain and effectively use hearing aids.
- **Sessions (6,7)**the program addressed the psychological and social needs of children with hearing loss. Caregivers learned about the psychological and social characteristics of these children and discussed their cognitive needs. They also reviewed the types, diagnosis, treatment, and prevention of hearing loss.
- **Session (8)** focused on managing behavior disorders. Caregivers identified the causes of aggressive behavior in children with hearing loss and discussed age-appropriate stimulation techniques to manage such behavior.
- **Session (9)** emphasized effective communication practices, highlighting the importance of parental involvement and demonstrating effective communication strategies with children.
- **Session (10**) aimed at enhancing focus and attention among children with hearing loss. Caregivers were taught how to improve the child's focus and attention through targeted communication strategies.
- **Session (11**) emphasized on coping strategies such as exercise, relaxation, and religiosity were introduced to help caregivers manage psychological and social challenges.
- **Session (12)** served as an evaluation session. Caregivers reviewed the program's content and objectives, and a post-test was conducted to assess the program's effectiveness.

Overall, the program aimed to empower family caregivers with the necessary knowledge and skills to improve their practice and adjustment, ultimately enhancing the well-being of children with hearing loss.

(C)Evaluation Phase:

Following the completion of the intervention, a post-test was administered to evaluate the impact of the psych educational program on the caregivers. The effectiveness of the program was assessed by comparing pre-&post-test results, measuring changes in caregivers' knowledge, practices, and adjustments in caring for their children with hearing loss. Feedback from the caregivers was collected to further understand the program's impact and to provide recommendations for future improvements.

4- Statistical analysis:

Using IBM SPSS Statistics version 20. Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to describe the demographic characteristics and baseline data of the study participants. Inferential statistics were applied to examine the effectiveness of the psych educational program. Paired sample -t-tests were utilized to compare pre- and post-intervention scores within the same group. Statistical significance Level was set at $P<0.05$. Cronbach's alpha coefficient was used to assess the internal consistency and reliability of the study tools.

SampleSize

The sample size for this study was determined based on methodological standards for single-group, pre-post intervention designs evaluating psycho-educational programs. To detect a moderate to large effect size (Cohen's d=0.7) with 90% statistical power and a 99% confidence level, a minimum of 27–31 participants was required. This calculation aligns with recommendations highlighted the necessity of sufficient sample size to ensure valid results in quasi-experimental research. Using the standard formula for paired-sample designs:

$N = (((Z\alpha/2 + Z\beta) \times \sigma) / \Delta)^2$,with $Z\alpha/2 = 2.576$, $Z\beta = 1.282$, $\sigma = 1$, and $\Delta = 0.7$, the minimum estimated sample was 30. To strengthen the study's statistical rigor and allow for potential attrition, the sample was increased to 40 participants. A purposive sampling approach was adopted based on logistical considerations and voluntary participation. Although this limits generalizability, the selected sample provided meaningful insights into the impact of the intervention on caregiver knowledge, practices, and adjustment. All participants were informed about the study's purpose, and consent was obtained with the assurance of voluntary withdrawal at any point.

Pilot Study

A pilot study was conducted on 10% of the intended sample (4 caregivers) to test the clarity, feasibility, and reliability of the data collection tools. Feedback from this pilot was used to refine the tools. These participants were excluded from the final sample.

RESULTS

Family caregivers are mostly young adults, with an average age of 27.3 years (SD±1.219). The majority (87.5%) are female, indicating a tendency of mothers taking on caring responsibilities. Most children are cared for by both parents (45%) or solely by moms (42.5%), with fathers accounting for only 10%.The mean age of family caregivers was 27.3 years. Most caregivers (37.5%) were aged between 25 to 30 years, and 32.5% were above 35 years old. The majority (87.5%) were female. Parental responsibility for childcare was distributed as follows: 45% both parents, 42.5% mothers only, and 10% fathers only. Employment status showed that 17.5% worked full-time, 42.5% part-time, 25% took leave or did not work, and 15% took unpaid leave. Sixty percent reported insufficient monthly income. Seventy percent did not have another child with hearing loss. Regarding education, 47% had secondary school education and 30% had a university education **(Table1)**.

Socioeconomic Characteristics: Education Levels: The majority of caretakers (47.5%) have a secondary education, with fewer having additional education. This distribution may have an impact on caregiver practices and health literacy.

Caregivers often work part-time (42.5%) or leave their employment to care for their children. This suggests that caregiving has a significant impact on employment. Financial hardship is a common difficulty for families managing a child with hearing loss, with 60% reporting insufficient money on a monthly basis **(Table1)**.

Children, the majority were male (72.5%) and ranged in age from 2 to 6 years, with a mean age of 3.23 ± 0.947 years. Most affected children were firstborns (40%). About 60% attended nursery school. Severity of hearing loss varied, with 37.5% classified as mild. Device use included cochlear implants (20%), hearing aids (42.5%either one or both ears), and 37.5% did not use any hearing devices. The most common intervention stage was speech preparation (32.5%), with others in diagnostic or auditory training phases. Duration since treatment initiation ranged from under 3 months to one year**(Table1)**.

Following the implementation of the psych educational program, significant improvements were recorded across all knowledge subscales. Before the intervention, the highest rate of unsatisfactory knowledge was observed in the "Hearing and Hearing Loss" subscale, with 97.5% of caregivers scoring below satisfactory levels. After the program, 100% of participants demonstrated satisfactory knowledge in all areas. These changes were statistically significant ($p < 0.001$), underscoring the program's effectiveness in enhancing caregivers' understanding of hearing loss and its appropriate management**(Table2)**.

Family caregivers demonstrated substantial improvement in their practical caregiving skills following the intervention. Before the program, a considerable proportion exhibited inadequate performance, particularly in the subscale "Dealing with Behavioral Disorders," where 40% scored below satisfactory levels. Post-intervention, all participants (100%) achieved satisfactory scores across all practice subscales. These improvements were statistically significant ($p<0.001$), indicating the effectiveness of the psych educational program in enhancing caregivers' practical competencies**(Table3)**.

Mean scores for all adjustment subscales (Disease-Seeking Information, Social Support, Positive Reinterpretation, Denial, Active Coping, Emotional Discharge, and Acceptance) and the overall total adjustment scale increased from 56.58% to 82.58% after program implementation. High T-values and low ($P<0.001$) underscore the statistical significance of these improvements, highlighting the program's effectiveness in enhancing family adjustment to caring for children having hearing loss**(Table4)**.

The psych educational program led to a significant improvement in caregivers' adjustment scores. Notable enhancements were observed across all subscales, including information-seeking, social support, coping strategies, and emotional regulation ($P<0.001$). While the "Denial" subscale remained at a moderate level, it demonstrated a statistically significant positive shift. Overall, caregivers advanced from a moderate adjustment level (56.58±11.31) to a high level (82.58±9.89), reflecting improved psychological adaptation and coping abilities following the intervention as **(Table4; Fig. 1)**.

No statistically significant correlations were found among knowledge, practice, and adjustment scores. While all three domains improved independently, their interrelations were not strong within this sample**(Table5)**.

Table (1) Baseline characteristics of the study population

Items		No.	%
Familycaregiver			
Age	> 25 years	6	15
	25≥ 30 years	15	37.5
Mean ± SD	30≥ 35years	6	15
(27.3 ± 1.219)	≤35 years	13	32.5
Sex	Male	5	12.5
	Female	35	87.5
Family caregiver responsible for child care	Father	4	10
	Mother	17	42.5
	Parent (both)	18	45
	Others	1	2.5
LevelofEducation forStudiedFamily Caregivers	Illiterate	2	5
	Primary	6	15
	Secondary	19	47.5
	University	12	30
	post graduated	1	2.5
Workingduringcare	Work full-time	7	17.5
	Work part-time	17	42.5
	Leave work or don't work for the child	10	25
	Took unpaid leave to take care of a child	6	15
Monthly income	Not enough	24	60
	Enough	16	40
Anotherchildhavinghearingloss?	No	28	70
	Yes	12	30
Children with hearing loss			
Age of the child	2 >3 years	10	25
	3>4 years	15	37.5
Mean ± SD	4>5years	11	27.5
(3.23 ± 0.947)	5>6years	4	10
Gender of child	Boys	29	72.5
	Girls	11	27.5
Childorderbetweensiblings	First	16	40
	Second	12	30
	Third	10	25
	More than third	2	5
Doesthechildgoto the nursery?	No	16	40
	Yes	24	60
Diagnosis of the child (Severity of hearing loss)	Mild	15	37.5
	Moderate	9	22.5
	Moderately severe	8	20
	Severe	8	20

Time from starting of treatment (Month)	months 3 ≤ 0 months ≥ 6 months 3 months ≥ 9 months 6 months ≥ one year 9	7 10 9 14	17.5 25 22.5 35
Child's use of hearing devices	Hearing aid in one ear Hearing aids in both ears Cochlear implants Not use any hearing aids only medication	8 9 8 15	20 22.5 20 37.5
At any stage of treating hearing loss for the child	Diagnostic stage Treatment stage Stage of using the auditory equation Stage of preparation of the speech	9 10 8 13	22.5 25 20 32.5

Data presented as numbers and percentages as appropriate; SD: Standard deviation

Table 2: Comparison of Total knowledge and total subscale among the studied family caregivers at pre and post-implementation of the program

	PRE				**POST**				**Pre and post**	
knowledge subscale	**Unsatisfactory**		**Satisfactory**		**Unsatisfactory**		**Satisfactory**		Chi.	P Value
	No	**%**	**No**	**%**	**No**	**%**	**No**	**%**		
General information	24	60.0%	16	40.0%	0	0.0%	40	100.0%	34.29	P<0.001*
Hearing and hearing loss	39	97.5%	1	2.5%	0	0.0%	40	100.0%	76.10	P<0.001*
Communication	29	72.5%	11	27.5%	0	0.0%	40	100.0%	45.49	P<0.001 *
Educational services	28	70.0%	12	30.0%	0	0.0%	40	100.0%	43.08	P<0.001*
Total knowledge scale	34	85.0%	6	15.0%	0	0.0%	40	100.0%	59.13	P<0.001*

*Data presented as numbers and percentages as appropriate; P values are determined by the Chi-square test; *P< 0.001, highly significant.*

Table 3: Comparison of Total Practice Subscale and Total Scale among studied family caregivers at pre- and post-implementation of the program

	PRE				**POST**				**Pre and post**	
Items	Satisfactory		Unsatisfactory		Satisfactory		Unsatisfactory		Chi.	P Value
	No	**%**	**No**	**%**	**No**	**%**	**No**	**%**		
Psychological & Social interaction skills	21	52.5%	19	47.5%	0	0.0%	40	100.0%	28.47	P<0.001 *
Dealing with behavioral disorder	24	60.0%	16	40.0%	2	5.0%	38	95.0%	27.58	P<0.001 *
Communication skills	29	72.5%	11	27.5%	0	0.0%	40	100.0%	45.49	P<0.001 *
Attention and concentration	27	67.5%	13	32.5%	0	0.0%	40	100.0%	40.75	P<0.001 *
Total practice scale	28	70.0%	12	30.0%	0	0.0%	40	100.0%	43.08	P<0.001 *

Data presented as numbers and percentages as appropriate ;P values are determined by the Chi-square test; P value < 0.001, highly significant.

Table 4: Comparison of Total Adjustment Subscale and Total Scale among family caregivers of children having hearing loss

Item	**Pre**		**Pos**		**Pre & Pos**	
Subscal	**(Mean ± SD**	**Adjustmen Level**	**(Mean ± SD**	**Adjustmen Level**	**T**	**P-Valu**
Disease Seeking Information	41.25 ± 27.47	No	88.75 ± 21.1	High	8.67	P<0.001 *
Social Support	58.13 ± 19.93	Moderate	82.50 ± 20.57	High	5.38	P<0.001 *
Positive Reinterpretation	60.0 ± 20.25	Moderate	85.42 ± 14.22	High	6.50	P<0.001 *
Denial	57.92 ± 17.29	Moderate	74.58 ± 17.29	Moderate	4.31	P<0.001 *
Active Coping	58.13 ± 16.40	Moderate	85.63 ± 17.80	High	7.19	P<0.001 *
Emotional Discharge	49.38 ± 19.19	No	86.25 ± 17.86	High	8.90	P<0.001 *
Acceptance	61.25 ± 17.86	Moderate	80.63 ± 16.49	High	5.04	P<0.001 *
Overall Total Adjustment	56.58 ± 11.31	Moderate	82.58 ± 9.89	High	10.95	P<0.001 *

*Data presented as numbers and percentages as appropriate ;P values are determined by the t test ; *P value < 0.001, highly significant.*

Table 5: Correlation between (Knowledge, adjustment, and practices) among studied family caregivers (N=40)

Knowledge		**Practices**		**Variables**
Pearson correlation coefficient	**P Value**	**Pearson correlation coefficient**	**P Value**	
0.19	0.24316 P>0.05 NS	0.15	0.36715 P>0.05 NS	**adjustment**
0.24	0.14027 P>0.05 NS			**practices**

*Data presented as numbers and percentages as appropriate; P values are determined by the Chi-square test (χ2) & the Student t-test; * P value > 0.05, not significant*

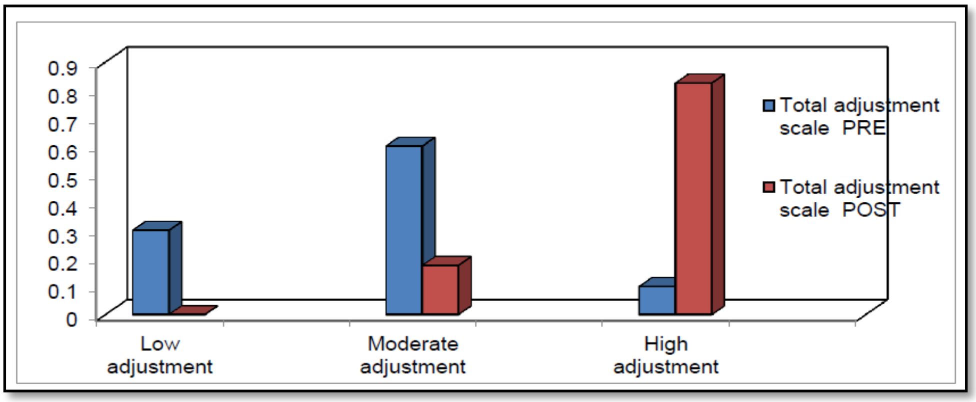

Figure 1: Adjustment level pre and post program implementation.

DISCUSSION

Hearing impairment significantly affects both the child and the mother. For children, hearing is crucial for language acquisition, speech development, and cognitive skills. Hearing loss can lead to delays in communication, learning difficulties, reduced academic achievement, and social isolation. Early interventions, as providing psychological support to mothers, can help mitigate these impacts **(2,16)**.

Our study aimed to evaluate the effects of a psycho-educational program on enhancing knowledge, practices, and adjustment among family caregivers of children with hearing loss. The demographic data of the family caregivers revealed that more than one-third (37.5%) were aged between 25 and 30 years, and another one-third (32.5%) were over 35 years, with a mean age of 27.3 ± 1.219. This distribution highlights the importance of maternal age as a factor influencing caregiving experiences. These findings are consistent with **Abd EL-Ghany et al.(9)** who explored the effects of an educational program on mothers' knowledge and practices related to caring for children post-cochlear implant.Similarly, **Zaidman-Zaitet al.(3)** who reported that caregivers' ages ranged from 25 to 35 years, with a mean age of 30.77 ± 4.99 **.**

Regarding gender, the majority (87.5%) of caregivers were female, contrasting with the findings of **Mohammed et al.(17)** who reported that 96% of their study sample were female. In terms of responsible caregivers, less than half (45%) were both parents, differing from **El Mezayenet al.(18)**who found that 45% were fathers. Concerning additional children with hearing loss, more than two-thirds (70.0%) did not have another child with hearing loss, consistent with **Abd EL-Ghany et al. (9)**and **Continisioet al. (4)**who found that less than half (49%) of mothers had no other children with hearing loss.

Regarding education, slightly less than half (47%) of the caregivers had a secondary school education, while one-third (30%) had a university education. These findings align with **Aljabri et al. (19)**who reported that more than half (55.7%) of their sample had a college education.

Characteristics and Health Assessment of Children with Hearing Loss

In our study: mean age of the children with hearing loss was 3.23 ± 0.947 years, with more than one- third (37.5%) aged 3 to 4 years, consistent **Abd EL-Ghany et al. (9)**. Regarding gender, less than three-quarters (72.5%) of the children were boys, similar to **Soleimaniet al. (20)**who found that 64.6% of children with hearing loss were boys. Concerning birth order, about two-fifths (40%) of the children were the firstborn, consistent with **Hamadet al. (5)**.Regarding nursery attendance, about three-fifths (60%) of the children attended nursery, which contrasts **Hamadet al. (5)**.who found that less than three-fifths (54%) of children did not attend nursery.

Regarding the severity of hearing loss, more than one-third (37.5%) had mild hearing loss, while less than one-quarter (20.5%) had moderate hearing loss. These findings differ from **El Mezayenet al.(18)**who observed that more than one-third (33.7%) of children had severe hearing impairment. Concerning the start of treatment, more than one-third (35%) of children began treatment between 9 months and one year, aligning with **Continisioet al. (4)**. Regarding hearing aids and treatment stages, less than half (42.5%) of the children used hearing aids, and about one-third (32.5%) were in the speech preparation stage, consistent with **Ambroseet al. (10)**.

Effectiveness of Knowledge

The psych educational program significantly enhanced caregivers' knowledge across all measured domains. Notably, understanding of "hearing and hearing loss" improved from 97.5% unsatisfactory to 100% satisfactory following the intervention. This transformation indicates the effectiveness of targeted education in building foundational knowledge. Similar outcomes were reported by **Dutt& Mittal(6)** who highlighted improvements in parental understanding and communication post-intervention. Also, emphasized that parental engagement and knowledge are critical for positive language and social development in children with hearing loss**(11)**.The structured, comprehensive nature of the intervention likely contributed to these improvements, enabling caregivers to better support their child's developmental and communicative needs while engaging more confidently with therapeutic services.

Effectiveness of Practice

Significant improvements were observed in caregiving practices, particularly in the domains of communication skills and managing attention and concentration issues. These gains reflect the program's success in equipping caregivers with practical strategies for daily interactions and behavior management. Pre-and post-intervention comparisons revealed marked improvements across all subscales, with the most notable shift occurring in the "behavioral disorders" subscalewhere satisfactory practices increased from 60% to 95%.These results support earlier studythat demonstrated that psych educational interventions enhance parental capacity to address communication and behavioral challenges**(7)**. Similarly, caregiver training in behavioral regulation correlates with better emotional and social outcomes in children with hearing loss**(21)**.The structured content, which included modules on behavioral strategies and communication enhancement, likely contributed to the observed improvements. By strengthening caregivers' confidence and competence, the intervention also reduced psychological stress and promoted more adaptive family functioning.

Effectiveness of Adjustment

Caregivers' adjustment levels showed a statistically significant increase across all subscales after the program. The most substantial change was observed in the "Disease Information Seeking" domain, where scores rose from a low to a high adjustment level. Other subscales, such as social support, adjustment, emotional regulation, and positive reinterpretation, also shifted from moderate to high levels post-intervention. The overall adjustment score increased from 56.58 ± 11.31 to 82.58 ± 9.89, indicating a transition from moderate to high adjustment. These findings underscore the intervention's role in fostering resilience, reducing stress, and promoting adaptive coping mechanisms. This improvement aligns with prior studies, such as those by **Converyet al. (22)** and **Smith et al. (23)**who demonstrated the effectiveness of psych educational support in reducing caregiver burden and enhancing psychological well-being. Although the denial subscale remained the least improved, it still exhibited a significant decline post-intervention, suggesting a shift toward more constructive coping strategies. These results are consistent with other studies that emphasized the importance of psych education in building caregiver resilience and long-term well-being**(24,25)**.

Correlation between Variables

The study found no statistically significant correlation between knowledge, practices, and adjustment among family caregivers (p> 0.05). This finding aligns with **Karkhanehet al. (26)**whoreported a negative correlation between burnout scores and attitude and practice scores post-training among mothers of children with hearing impairment.

CONCLUSION

The findings of this study indicate that family caregivers of children with hearing loss demonstrated significant improvements in their knowledge, practices, and adjustment following the implementation of the psycho-educational program.The results support the study's hypothesis that such programs can positively effectiveness on caregivers by enhancing their understanding and skills in managing hearing loss.

Recommendation

Psych educational programs should be integrated into routine care for families of children with hearing loss to enhance caregivers' knowledge and emotional well-being. These programs should be accessible and supported by follow-up sessions or support groups. Healthcare professionals, particularly nurses, should be trained to implement these interventions, and policymakers should allocate resources to support their development. Further research is needed to explore the long-term effects and replicate the study in various settings.

Sampling, single-site setting, and modest sample size, which may affect generalizability. Cultural and contextual factors unique to the setting should also be considered. Nonetheless, the findings offer valuable insight and a solid basis for future multi-site and controlled studies

The study focused only on short-term outcomes, assessing immediate pre- and post-intervention effects without long-term follow-up to evaluate the sustainability of knowledge, practice, and adjustment improvements. Participant engagement was also a challenge, as some caregivers did not attend all sessions, potentially affecting the uniformity of results. Relying on self-reported measures to assess knowledge, caregiving practices, and adjustment could introduce recall or social desirability biases.

List of Abbreviations:

WHO: World Health Organization.

PKAQ: Parent Knowledge and Awareness Questionnaire.

Disclosure statement

The authors declare that there are no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

There was no funding provided to the authors for this study.

Ethical approval

Ethical approval was obtained from the Dean, the Ethics Committee of the Faculty of Nursing at University, and the Dean of the Faculty of Postgraduate Childhood Studies at University (Ethics ID:23.09.109). Informed consent was secured from all participants, ensuring the confidentiality and anonymity of their responses. Participants were informed of their right to withdraw from the study at any time without any consequences.

Consent to participate

Written informed consent was obtained from all participants prior to their inclusion in the study. Participants were fully informed about the study's purpose, procedures, potential risks, and benefits. They were assured that their participation was voluntary and that they had the right to withdraw at any time without any consequences.

Consent for publication

All participants provided written informed consent for the publication of anonymized data collected during the study. No identifying personal information is included in the manuscript.

Acknowledgments

The authors sincerely thank every one of the study participants.

REFERENCES

1- Ahmed Ali, E., GuirguisRagheb, S., Mohamed Hamada, S., & Ibrahim, N. (2019). Family caregiver's adjustment for their children with hearing impairment. *Egyptian Journal of Health Care, 9*(2), 151–160. https://doi.org/10.21608/ejhc.2018.15516

2- Morgan, A., El-Dessouky, L., Hassan, M., &Farid, S. (2021). Prevalence and risk factors of hearing impairment among primary school children in Egypt.*Egyptian Journal of Public Health, 39*(3), 211–225.

3- Zaidman-Zait, A., Mirenda, P., &Dykeman, B. (2024). Mothers' and fathers' involvement in intervention programs for deaf and hard-of-hearing children. *Journal of Early Intervention, 46*(1), 67–82. https://doi.org/10.1177/1053815123123456

4- Continisio, G., Colbert, A., & Swanson, J. (2023). Siblings and hearing loss: Family dynamics and intervention outcomes. *Clinical Pediatrics, 62*(4), 215–223. https://doi.org/10.1177/0009922822103234.

5- Hamad, H., Ibrahim, S., &Khedher, A. (2022). Birth order and hearing loss: A study of children and family dynamics. *Journal of Pediatric Health Care, 36*(2), 89–98. https://doi.org/10.1016/j.pedhc.2021.12.003.

6- Dutt, S. N., & Mittal, A. A. (2022). Protocol for evaluation and management of hearing loss after meningitis.*Indian Journal of Otolaryngology and Head & Neck Surgery*, 1–6. https://doi.org/10.1007/s12070-022-03279-3

7- Riddhima, K., Ranjan, P. (2021). Evaluating parental practices in children with hearing impairment: A comparative study.*Indian Journal of Pediatrics, 88*(3), 275–282. https://doi.org/10.1007/s12098-020-03418-8

8- Sevinc, S., Senkal, O. A. (2021). Parent participation in early intervention/early childhood hearing impairment program.*Nigerian Journal of Clinical Practice, 24*(2), 254–261. https://doi.org/10.4103/njcp.njcp_139_20.

9- Abd EL-Ghany, M., Abd EL-Fatah, H., NabawyElaasar, M. (2023). Effect of an educational program on mothers' knowledge, practice, empowerment, and satisfaction regarding caring for children post-cochlear implant.*Journal of Pediatric Nursing, 58*, 12–24. https://doi.org/10.1016/ j.pedn.2022.12.001

10- Ambrose, S. E., Cox, L. C., Campbell, J. M. (2020). Early hearing aid use and speech development: A longitudinal study. *Hearing Research, 396*, 108101.https://doi.org/10.1016/j.heares.2020.108101

11- Meyer, C., &Hickson, L. (2020). Evidence-based practices in family-centered pediatric audiology.*Trends in Hearing, 24*, 1–12. https://doi.org/10.1177/2331216520944798.

12- American Speech-Language-Hearing Association. (2020). *Early intervention for infants and toddlers with hearing loss*.https://www.asha.org/Practice-

Portal/Professional-Issues/Early-Intervention-for-Infants-and-Toddlers-with-Hearing-Loss

13- Li, Y., Zhang, Q., Huang, R. (2024). Genetic mutations associated with congenital hearing loss: Implications for diagnosis and treatment. *Genetics in Medicine, 26*(5), 487–499. https://doi.org/10.1038/s41436-024-0135-2

14- Patel, S., Kim, S., & Johnson, D. (2024). The role of psychosocial support in managing pediatric hearing loss: A systematic review. *Journal of Pediatric Psychology, 49*(1), 77–91. https://doi.org/10.1093/jpepsy/jsaa1024

15- Grant, M., Rivera, L. (2001). *Quality of life* (2nd ed., pp. 4–10). Mosby Company.

16- Inverso, G. (2022). Advances in cochlear implants for pediatric patients.*Hearing Research Journal, 48*(3), 325–334.https://doi.org/10.1016/j.heares.2022.07.013

17- Mohammed, R., El-Gharabawy, R., Rady, M. (2024). Gender distribution among caregivers of children with hearing impairment: A cross-sectional study. *International Journal of Pediatric Otolaryngology, 153*, 109943.https://doi.org/10.1016/j.ijporl.2023.109943.

18- El Mezayen, E., Al-Mohammadi, M., Saleh, M. (2023). Caregiver roles in managing children with hearing impairment: A focus on paternal involvement. *Journal of Hearing Science, 12*(2), 89–101. https://doi.org/10.1007/s11682-023-01045-0.

19- Aljabri, M., Alabdali, N., Alotaibi, F. (2019). The relationship between education level and knowledge about hearing loss among caregivers.*Journal of Audiology and Speech Research, 14*(3), 155–162. https://doi.org/10.1007/s10143-019-01045-1.

20- Soleimani, R., Tavakoli, S., Fadaei, R. (2020). Gender distribution in children with hearing impairment: A review of clinical data. *International Journal of Pediatric Otorhinolaryngology, 136*, 110156.https://doi.org/10.1016/j.ijporl.2020.110156

21- El-Zayat, K., El-Khayat, A., &Fathy, S. (2023). Effect of empowerment programs on reducing burnout among mothers of children with hearing impairment.*International Journal of Child Health and Human Development, 16*(2), 189–202. https://doi.org/10.1007/s13139-023-01755-x.

22- Convery, E., Keidser, G., Hickson, L., Meyer, C. (2019). The relationship between hearing loss self-management and hearing aid benefit and satisfaction.*American Journal of Audiology, 28*(2), 274–284. https://doi.org/10.1044/2018_AJA-18-0130.

23- Smith, J., Taylor, R., & Williams, H. (2024). Family-centered approaches in pediatric audiology: Best practices for early intervention. *International Journal of Audiology, 63*(4), 211–224. https://doi.org/10.1080/14992027.2024.04.015.

24- Olayinka, B. T. (2023). Influence of parental involvement on academic performance of learners with hearing impairment in selected schools in Kogi State, Nigeria. *Educational Research and Reviews, 18*(1), 34–44. https://doi.org/10.5897/ERR2023.4531.

25- Martínez, A., Garcia, L., Rodríguez, P. (2024). The impact of early intervention on language development in children with hearing loss: A longitudinal study. *Journal of Pediatric Audiology, 29*(2), 115–128. https://doi.org/10.1016/j.jpa.2024.03.001.

26- Karkhaneh, M., Kharrazi, H., &Akbarian, R. (2020). Effectiveness of encouragement training in alleviating burnout among mothers of children with hearing impairment.*Journal of Behavioral Medicine, 43*(6), 892–904. https://doi.org/10.1007/s10865-020-00110-9