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Effect of Empowerment Program on Parents' Self Competence regarding Care of their Children with Cochlear Implantation

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***Abstract*---**Background: Children with severe or profound hearing loss benefit significantly from cochlear implantation, which helps to build listening skills, communication abilities, social skills, and involvement, as well as allowing children to grow in their life as a method of earning a living. Objective: This study aimed to evaluate the effect of empowerment program on parents' self competence regarding care of their children with cochlear implantation. Methods: The research was carried out at Bahteem Specialized Hospital's Phoniatric Unit of the Ear, Nose, and Throat department. A total of (75) parents accompanied their children to the cochlear implantation procedure. A structured interviewing questionnaire sheet, a child medical data sheet, a checklist of parents' reported practices, and a Parenting Sense of Competency Scale were employed. Results: there was a highly statistically significant difference in parents' knowledge, reported practice and self competence level regarding care for their children with cochlear implantation pre and post empowerment program implementation.

while, there was no statistically significant difference in parents' knowledge, reported practice and self competence level regarding care for their children with cochlear implantation between post and after 3 months of empowerment program implementation. Furthermore, parents had a high self competence post program and follow up after 3 months compared with pre program implementation. Conclusion: After the empowerment program was implemented, parents' knowledge, reported practice, and self-competence in caring for their children with cochlear implantation improved. Recommendation: Provide a continuous educational program for parents involved in their children's cochlear implantation care.

Keywords--- Empowerment Program, Self- competence of Parents, Children, Cochlear Implantation

Introduction

Hearing loss is now the fourth leading cause of disability. Children born deaf or developing deaf before the age of three cannot learn to talk or engage with their surroundings. The child's ability to communicate and express emotions suffers because of a lack of language acquisition in the early years of life (Amraei, 2017).

A surgically implanted electronic device used to improve hearing is called cochlear implantation. It consists of a receiver/stimulator that is surgically implanted behind the ear and is equipped with a magnet and an electrode array. It is implanted into the cochlea and provides direct electrical stimulation to nerve fibers. A microphone, a speech processor, and a transmitting coil are the external components behind the ear (Nikkho, et al., 2018).

In children with severe hearing loss, cochlear implantation can improve hearing ability and quality of life (Saki, et al., 2017). Children with severe-to-severe sensor neuronal hearing loss can use the cochlear gadget to hear noises. It is critical for developing children's listening skills, communication abilities, social skills, engagement, and capacity to work successfully (Watkin, et al., 2020).

Cochlear implantation surgery can be a challenging event for both the child and his parents since it is viewed as a threat to the entire family; this is typically caused by dread of the unknown and anticipated changes in the child's lifestyle. The children and his parents are affected by preoperative anxiety and anesthetic. Children always depend on their parents for support throughout the illness, and they may pick up on their parent's concerns and stress; so, we must pay attention to both families and pediatric patients (Mohanna & Samani, 2018).

Cochlear implantation surgery has a significant impact on parental functioning, involving them in many tasks, responsibilities, and concerns related to their child care needs, educational support, follow-up, medical services, tolerating service costs, indefinite future, excessive absence from work, financial, physical, and emotional problems (Hockenberry et al., 2019).

A person's self-competence is defined as their belief in and judgment of their own capacity to perform a task. Parents of children who have had cochlear implantation

surgery frequently describe a lack of self-competence in their children. Self-competence is a cognitive structure that assists individuals in governing and organizing their behavior. Parental self-competence refers to parents' assessment of their ability to carry out parenting activities (Zarshenas, et al., 2017).

Increasing parental comprehension may increase parental confidence and competence. Nurses should be able to understand the parent's emotional and psychological reactions, as well as create an excellent educational environment and convey vital interest and support related to cochlear implantation surgery and its outcomes for the parents so that the parents can better adapt to the created condition and gain a better understanding from their new role in that new position (Zare, et al., 2017).

Parental empowerment is a way of regularly educating parents on knowledge and skills to manage family life better and, as a result, enhance their lives and the quality of life of their children (El Nagar et al., 2020). Health education is a fundamental and effective health promotion technique that uses various methods to increase awareness, attitudes, and preferences and encourage families, especially children with chronic conditions, to adopt healthy behaviors and lifestyles (Eidivandi et al., 2020).

Significance of the Study

Around 1-3 out of every 1000 infants are born deaf worldwide. According to WHO, at least 34 million children under the age of 15 have substantial hearing loss (Katrin, et al., 2019).

In Egypt, the prevalence of hearing impairment was 16.0 percent of the population of Egypt. This means more than 13 million people across all age groups. The prevalence was high in children up to 4 years old, 22.4 percent. The most typical cause was Otitis media with effusion of 30.8. Hearing loss reaches 15 children out of every 1000 newborns, compared to global rates of no more than 3 per 1000 births (Morgan, 2021).

Cochlear implants are performed on approximately 80,000 children worldwide each year. It is becoming increasingly available for profoundly deaf children and is progressively expanding in Arabic nations; however, there is little research on helping children and parents. To make informed decisions, parents must continue to seek help and information about this condition and its potential implications (Molla, et al., 2019).

Aim of the Study

The current study aimed to evaluate the effect of empowerment program on parents' self competence regarding care of their children with cochlear implantation by:

1. Assessing parents' knowledge and reported practice about cochlear implantation operations.
2. Developing and implementing an empowerment program based on an assessment of parents' actual cochlear implantation needs.
3. Evaluating the impact of an empowerment program on parents' knowledge, reported practice, and self-competence in caring for children with cochlear implants.

Research Hypothesis

1. After executing the empowerment program, parents' knowledge, reported practice and self-competence would improve.
2. The level of self-competence of the parents and their personal traits will have a substantial relationship.
3. Total parental knowledge, total reported practices, and self-competence will all have significant positive correlation before, during, and three months after implementing the empowerment program in caring for their children with cochlear implantation

Operational definitions:

***Empowerment**:*

Empowerment is an intervention and educational model that helps parents and caregivers to feel the desired changes.

Cochlear implantation:

Cochlear implantation is the surgical implantation of an electronic device that allows children with severe to profound sensor neuronal hearing loss to sense sound.

Methods

Research Design

A quasi-experimental design was used in the current study.

Research Setting

This study was conducted on the second floor of Bahteem Specialized Hospital's Phoniatric Unit of the Ear, Nose, and Throat department. It consists of (4) rooms; each room contains one audiometer and four computers, and each one contains a database about children according to the development of cases & follow-up.

Subjects

Seventy-five parents accompanied their children with cochlear implants to the previously mentioned settings in two shifts (morning and afternoon shifts) for six months and three months for follow-up. They were chosen based on the criteria listed below.

Inclusion criteria for children:

- From both genders.

- Children who have already undergone cochlear implantation.

- Ages ranged from 2 – 5 years.

- Free from any other previous ear diseases.

Exclusion criteria:

- Children with mental disabilities

- Children with other ear operations

Tools of Data Collection

The three tools described below were used to collect data for the current study.

Tool I: A structured interviewing questionnaire sheet: It was created by researchers based on related studies and research Saki et al., (2016)& Rajan et al., (2018)**.** It was written in straightforward Arabic. Each parent was interviewed solely to complete the knowledge questionnaire sheet. It is split into three parts:

Part I: Age, level of education, occupation, domicile, consanguinity relationship between parents, and attendance at cochlear implantation training courses are some of the parents analyzed.

Part II: Parents' knowledge of hearing loss: It encompassed (11) multiple-choice questions, including the composition of the ear (1 question), the definition of hearing loss (1 question), Hearing loss risk factors and causes (2 questions), signs of hearing loss in infants and children(2 questions), diagnostic tests for hearing loss (1 question), management of hearing loss (2 questions), methods of prevention of hearing loss (2 questions).

Part III: Parents' knowledge regarding cochlear implantation: It encompassed (16) multiple-choice questions; including; the definition of cochlear implantation (1 question), indication and importance of cochlear implantation (2 questions), factors associated with good outcomes after cochlear implantation (1 question), conditions required for cochlear implantation (1 question), diagnostic tests required before cochlear implantation (1 question), the best time for function activation of the cochlear (1 question), How is the cochlear activated? (1 question), expected risks of cochlear implantation (1 question), cochlear implant complications (1 question), How to care for cochlear implants(1 question), and health promotion lifestyle after cochlear implantation (5 questions).

Scoring system for mothers' knowledge:

Following the completion of the interviewing questions, the scoring system for mothers' knowledge was examined, as parents' knowledge was checked using a model key response. As a result, valid responses were received (1), whereas wrong or unknown responses were received (2). (2). (0). The overall score ranged between 0 and 27. (27 questions). Parents' complete knowledge was classified as satisfactory or unsatisfactory, with a score of 60 percent and more considered satisfactory and a score of < 60 percent considered unsatisfactory.

Tool II: Child medical datasheet:

The researchers created it, which is separated into two sections:

Section 1:

- The analyzed children's characteristics were age, gender, child rank, age of kid when deafness evaluation began, and family history of hearing difficulties.

Section 2:

- Medical history of children with cochlear implantation included medical diagnosis and complications that occurred because of cochlear implantation.

Tool III: Checklist of reported parental practices: It was developed by **Johnstone**

et al., (2018) and Park et al., (2022) to assess parents' stated practice in caring for their children following cochlear implantation. It has six main items and a total of 41 steps, including; immediate post-operative care (5 steps), essential cochlear care (4 steps), child psychological rehabilitation (4 steps), communication skills training (17 steps), maintain hearing training (7 steps), follow up after cochlear implantation (4 steps). Score (1) was given to a correctly done step. Score (0) was given to incorrectly done or not done step. The incremental steps included 41 steps.

Scoring system for nurses' practice:

Total scores were ranged from (0-41). Accordingly, parents' reported practices were classified as the following:

- A practice level of less than 85 percent was considered incompetent.
- A practice level of 85 percent or higher were judged competent.

Tool IV: Parenting Sense of Competence Scale (PSOC): developed by ***Gibaud-Wallston & Wandersman, (1978).*** The PSOC scale, which comprised (17) questions, was utilized in the current study to assess parents' self-competence in caring for their children with cochlear implantation, with two subscales (self-efficacy subscale and satisfaction subscale). Concerning the self-efficacy subscale, it consists of (8) questions (1, 6, 7, 10, 11, 13, 15, and 17), with each item assessed on a 6-point Likert scale ranging from (1) to (6) for strongly disagree. It was reverse coded based on the enjoyment subscale and included (9) components (2, 3, 4, 5, 8, 9, 12, 14, and 16). When reverse coded, a high score on the parent item is not indicative.

Each item is graded on a 6-point Likert scale, with (1) indicating strong agreement and (6) indicating strong disagreement.

Scoring System:

When scale filled out, note the score for each item on the PSOC scale's right side. Concerning the self-efficacy subscale, these eight items, 1, 6, 7, 10, 11, 13, 15, and 17, simply write the number the participant chose as their choice where, strongly disagree (1), somewhat disagree (2), disagree (3), agree (4), somewhat agree (5), and strongly disagree (6). (6). (6).

The overall score for the self-efficacy subscale was (8- 48). Replace the following figures on the right-hand side for summing: strongly disagree (6), somewhat disagree (5), disagree (4), agree (3), somewhat agree (2), and strongly agree (1). (2). (1). The total score for these nine reversals is (9-54).

The overall items of parental competence ranged from (1-102). The competency level of the parents was classified as follows:

- Low competence level (< 60 percent) ranged from (17- 61) items.

- Moderate competence level (60<75 percent) ranged from (62 - 76) items.

- High competence level (≥75 percent) ranged from (77-102) items.

Preparatory Phase

To cover the many components of the study and create suitable methodologies for data collection and material generation, the researchers studied local and international related literature. This period lasted from early August 2021 through

the end of September 2021.

Validity and Reliability

A panel of three pediatric nursing specialists from Benha University's college of nursing assessed the tools' validity by testing their simplicity, clarity, comprehensiveness, and relevance. Changes were made based on the advice of a specialist. Cronbach's alpha was utilized to assess the dependability of all tool elements. The Parenting Sense of Competency Scale was 0.82, the knowledge score was 0.89, the practice score was 0.87, and the knowledge score was 0.89. (PSOC). From October 2021 to November 2021, this phase lasted one month.

Ethical Considerations

The researchers obtained permission from hospital officials by submitting an official letter, according to the Faculty of Nursing Ethical Research Committee. All participants were assured that their participation in the study was entirely voluntary; parents were educated about the purpose, benefits, and nature of the study; and each parent was given the option to withdraw from the study at any time without explanation, which was followed by oral agreement. To ensure the security and anonymity of each subject, all data were coded, and all information received was kept secure.

Pilot Study

Over one month (November 2021), a pilot research was conducted on 10% of the total sample size (8 parents) and their children (8 children) to assess the clarity of the data collection tools, feasibility, objectivity, and time required for each data collection instrument. The findings of the pilot research were not utilized to make any changes. As a result, the pilot study subjects were included in the overall study sample.

Field Work

Fieldwork was conducted between November 2021 and the end of April 2022. The researchers were accessible three days per week in the morning shift (Sunday, Monday, and Thursday) to gather data utilizing the previously specified data collection instruments.

Assessment Phase

This phase was carried out before the empowerment program to establish a baseline of data and assess parents' learning needs. Before data collection, the researchers interviewed each mother, introduced themselves to each study participant, explained the study's purpose, duration, and activities, and acquired oral consent to participate. Each parent filled out the structured interviewing inquiry sheet individually (Tool I). The researchers then completed the children's medical data sheet, which took about 10-15 minutes (Tool II). The time it took nurses to complete each interview ranged between 20 and 35 minutes on average. The stated practice sheet took between 20 and 30 minutes to complete on average (Tool III). Meanwhile, the researchers began to assess parents' sense of competency regarding caring for their children with cochlear implantation (Tool IV).

Planning Phase

This step includes analyzing the assessment phase (pre-test) data and determining

the actual needs of the parents under study. As a result, the researchers devised the empowerment program with easy Arabic language and visuals to aid parents' comprehension.

The empowerment program's overarching goal was to refresh studied parents' knowledge and improve their practice of caring for their children following cochlear implantation.

Specific objectives:

After the empowerment program, each parent should be able to:

- Identify the ear composition.
- Define hearing loss.
- Enumerate risk factors and causes of hearing loss.
- Mention newborn and child indications of hearing loss.
- Recognize diagnostic tests for hearing loss.
- Discuss hearing loss management.
- Explain how to avoid hearing loss.
- Define cochlear implantation.
- Illustrate the indication and importance of cochlear implantation.
- Understand factors associated with good outcomes after cochlear implantation.
- Mention the best time for function activation of the cochlear
- Explain the methods for cochlear activation.
- Illustrate expected risks of cochlear implantation.
- Enumerate complications of cochlear implantation.
- Discuss health promotion lifestyle after cochlear implantation.
- Apply immediate post-operative care after cochlear implantation
- Apply wound care after cochlear implantation surgery.
- Demonstrate steps of care for cochlear implants.

Implementation Phase

The implementation phase took five sessions to complete (3 sessions for theory and two sessions for practice). Parents were divided into eight groups of nine to 10 each. Parents and their children sat in a circle with the researchers during the session, and each parent had the opportunity to ask questions and discuss information.

Each theoretical and practical session lasts 45-60 minutes and is held three times a week. The researchers began each session by reviewing the previous session's aims and the goals of the next one, considering the parents' educational level and utilizing the Arabic language.

The empowerment program implementation aids in the explanation of challenging

material, the development of critical thinking skills, the promotion of decision-making and action, and the enhancement of self-esteem and self-confidence in parents. Also, it provides them with the information they need in an interactive format. The teaching methods used were small group discussions, brainstorming, and role modeling. (After telling parents what to do, it's essential to show them exactly how to do it). Videos and a recorded PowerPoint presentation were used as teaching aids, and each parent was supplemented with a copy of an Arabic booklet. Additionally, researchers created a WhatsApp group to which parents were added for incentive, communication, interaction, support, and follow-up during the study time.

Furthermore, flashcards were used as a teaching aid by the researchers. The flashcards were designed to help parents improve their memory through knowledge retrieval practice. The flashcards are two-sided, with the title on one side and title information on the other, and they include names, words, concepts, and procedures. Parental involvement, effective communication, inventiveness, and active memory are all encouraged by flashcards.

Contents of each session:

The first theoretical session focused on:

- General and specific goals
- A summary of children's hearing loss.
- Risk factors and causes of hearing loss
- Infants and children who are deaf.
- Diagnostic tests for hearing loss
- Hearing loss management and prevention

The second theoretical session focused on:

- Definition of cochlear implantation.
- Indication and importance of cochlear implantation.
- Factors associated with good outcomes after cochlear implantation.
- The best time for function activation of the cochlear.

The third theoretical session focused on:

- Methods for cochlear activation
- Expected risks of cochlear implantation
- Complications of cochlear implantation
- Health promotion lifestyle after cochlear implantation.

The fourth practical session focused on:

- Immediate post-operative care after cochlear implantation
- Wound care after cochlear implantation surgery
- Auditory skills including detection, discrimination, identification of sounds, and comprehension
- Language development, communication skills, and social skills after cochlear implantation**.**

The fifth practical session focused on:

- Steps of care for cochlear implants.

- Healthy behaviors and adaptation after cochlear implantation

Evaluation phase:

The parents' knowledge, reported practice, and degree of self-competence was immediately tested following the implementation of the empowerment program. Post-tests were administered using the same pre-test methods. This also helped to determine the influence of the empowerment program on parents' self-efficacy in caring for their cochlear implanted children.

Statistical Analysis

The acquired data were coded and translated into a specially developed format for computer entry. The SPSS computer application Version 21 was used to enter and analyze data. The mean and standard deviation were employed to convey quantitative data, and qualitative data were presented. Tables of frequency distribution for numbers and percentages to compare qualitative variables, the parametric Chi-square test is utilized. The Pearson correlation coefficient was used to calculate the variable correlation. At a p-value>0.001, a highly statistically significant difference was considered. A statistically significant difference was considered at a p-value>0.05, but at a p-value>0.05, no statistically significant difference was considered.

Results

The characteristics of the parents are shown in **Table 1**. It was observed that the mean age of the researched parents was 31.474.13 years, and the majority (89.3 percent) of them were mothers. Regarding educational attainment, more than half (56.0 percent) of parents had secondary education. Additionally, it was noticed that slightly less than two-thirds (65.3 percent) of parents are not occupied, and less than three-quarters (72.0 percent) of them are from rural areas. Moreover, less than two-thirds (62.7 percent) of the studied parent had no consanguinity relation, and they all (100 percent) never attended any previous cochlear implantation training courses.

Table 2: reveals children's personal characteristics; the average age of the children studied was 3.52±1.83. In terms of gender, it was discovered that slightly less than two-thirds of the youngsters (65.3 percent) were males. Furthermore, more than two-fifths (42.7 percent) of the children studied were the first in line, and less than half (45.3 percent) of them were between the ages of one and three when they began deafness evaluation. Also, more than two-thirds (69.3 percent) of them had no family history of hearing disorders.

Table 3: explains children's medical history in less than half (45.3 percent) of them diagnosed with inner ear malformation and more than half (54.5 percent) of children who had complications after cochlear implantation complicated with facial nerve stimulation.

Table 4: depicts the distribution of total parental knowledge on hearing loss and cochlear implantation before, after, and three months after the empowerment program was implemented. Most (82.7 percent) of the parents studied had inadequate information before program initiation. At the same time, 85.3 percent and

78.7 percent had a proper total knowledge following the workshop and three months of empowerment program implementation, respectively. Table 4 depicts the distribution of total parental knowledge on hearing loss and cochlear implantation before, after, and three months after the empowerment program was implemented. Most (82.7 percent) of the parents studied had inadequate information before program initiation. While following the workshop and three months of empowerment program implementation, 85.3 percent and 78.7 percent had a suitable total level of understanding.

Table 5: demonstrates parents' claimed habits for caring for their children after cochlear implantation before, after, and three months after implementing the empowerment program**.** It was observed that there is a statistically significant improvement in parents' reported practice post empowerment program implementation ($p < 0.001$). Meanwhile, there is no statistical significance between post-program and after three months.

Figure 1: depicts the total reported practice of parents regarding their children's care following cochlear implantation before, after, and three months after the empowerment program was implemented. Before the empowerment program, over three-quarters (78.7 percent) of the parents investigated had incompetent reported practices. In comparison, after three months of empowerment program implementation, 81.3 percent had competent total reported practice, and 72.0 percent had competent total reported practice.

Table 6: displays parents' overall level of self-competence in caring for their cochlear implanted children before, after, and three months after completing the empowerment program (54.7 percent). While 72.0 percent indicated high levels of self-confidence following the training, and 66.7 percent reported high levels of self-confidence after three months of empowerment program implementation.

Table 7: depicts the relationship between parents' overall self-competence level scores and their characteristics before, after, and three months after the empowerment program was implemented. There was a highly statistically significant association between parents' overall self-competence level ratings and their age and educational level in the before and post empowerment program implementation.

Table 8: demonstrates the relationship between the study parents' total knowledge score, total reported practice score, and total self-competence level before, after, and three months after the empowerment program was implemented. Before, following, and three months of empowerment program implementation, there was a strong statistically significant positive link between the evaluated parents' total level of knowledge, total reported practices, and total self-competence level..

Table 1. The distribution of the parents based on their characteristics (n = 75)

Parents' characteristics	No.	%
Age in years		
20:30	17	22.6
30:40	35	46.7
≥40	23	30.7
Mean ±SD	31.47±4.13	
Consanguinity		
Fathers	8	10.7
Mothers	67	89.3
Educational level		
Illiteracy	3	4.0
Read and write	5	6.7
Intermediate education	42	56.0
University education	25	33.3
Occupation		
Yes	26	34.7
No	49	65.3
Residence		
Rural	54	72.0
Urban	21	28.0
Consanguinity relation between parents		
Yes	28	37.3
No	47	62.7
Attendance at cochlear implantation training classes		
Yes	0	0.0
No	75	100

Table 2: The percentage distribution of personal traits among the children (n = 75)

Children's personal characteristics	(n = 75)	
	No	%
Age in years		
2-> 3	33	44.0
3-≥ 5	42	56.0
$\bar{x}$±SD	3.52±1.83	
Gender		
Males	49	65.3
Females	26	34.7
Ranking of the child		
First	32	42.7
Second	19	25.3
Third	15	20.0
Fourth	9	12.0
Age of child when starting deafness evaluation		
< 1 year	28	37.3
1-> 3	34	45.3
3-≥ 5	13	17.4
Family history of hearing disorders		
Yes	23	30.7
No	52	69.3

Table 3: The percentage distribution of children' medical history

Children's medical history	(n=75)	
	No	%
Medical diagnosis		
Inner ear malformation	34	45.3
Bilateral sensorineural hearing loss	20	26.7
Cochlear nerve deficiency	16	21.3
Cochlear ossification	5	6.7
Occurrence of complications after cochlear implantation		
Yes	22	29.3
No	53	70.7
If yes, the complications are (n=22)		
Infection	7	31.8
Facial nerve stimulation	12	54.5
Pedestal problems with the inner aid device	3	13.7

Table 4: The percentage distribution of studied parents' overall knowledge about hearing loss and cochlear implantation before, after, and three months after implementing the empowerment program (n = 75)

Items	Pre empowerment program implementation (n=75)		Post empowerment program implementation (n=75)		After three months of empowerment program implementation (n=75)		X2(1)	P-value	X2(2)	P-value
	No	%	No	%	No	%				
Total knowledge level										
Satisfactory (≥60 %)	13	17.3	64	85.3	59	78.7	29.16	P<0.001**	2.63	P>0.05
Unsatisfactory (<60%)	62	82.7	11	14.7	16	21.3				

**** At p value < 0.001, the difference is highly statistically significant. There is no statistically significant difference in the p-value. P > 0.05**

X2 (1) Difference between pre-test and post-test

X2 (2) Difference between post-test and follow-up test.

Table 5: The percentage distribution of parents' reported child care practices after cochlear implantation before, after, and three months after the implementation of the empowerment program (n = 75)

Practice items	Implementation of a pre-empowerment program (n = 75)				Implementation of the empowerment program (n = 75)				after three months of program implementation (n = 75)				X^2	P-value	X^2	P-value
	Competent practice		Incompetent practice		Competent practice		Incompetent practice		Competent practice		Incompetent practice					
	No	%	No	%	No	%	No	%	No	%	No	%				
Key elements of practice																
Immediately post-operative care	14	18.7	61	81.3	65	86.7	10	13.3	57	76.0	18	24.0	25.83	<0.000**	1.16	P > 0.05
Essential cochlear care	20	26.7	55	73.3	60	80.0	15	20.0	53	70.7	22	29.3	23.15	0.000**	1.05	P > 0.05
Child psychological rehabilitation	17	22.7	58	77.3	54	72.0	21	28.0	49	65.3	26	34.7	19.27	0.000**	0.93	P > 0.05
Communication skills training	13	17.3	62	82.7	57	76.0	18	24.0	51	68.0	24	32.0	19.01	0.000**	1.24	P > 0.05

Maintain hearing training	**10**	**13.3**	**65**	**86.7**	**63**	**84.0**	**12**	**16.0**	**55**	**73.3**	**20**	**26.7**	**27.62**	**0.000****	**2.09**	**P > 0.05**
Follow up after cochlear implantation	**22**	**29.3**	**53**	**70.7**	**68**	**90.7**	**7**	**9.3**	**61**	**81.3**	**14**	**18.7**	**25.09**	**0.000****	**1.98**	**P > 0.05**
Total	**16**	**21.3**	**59**	**78.7**	**61**	**81.3**	**14**	**18.7**	**54**	**72.0**	**21**	**28.0**	**23.32**	**0.000****	**1.40**	**P > 0.05**

**** At p value < 0.001, the difference is very highly statistically significant. There is no statistically significant difference in the p-value. P > 0.05**

X2(1) Difference between pre-test and post-test

X2(2) Difference between post-test and follow-up test.

Figure 1: depicts the total reported practice of parents in caring for their children following cochlear implantation before, after, and three months after the introduction of the empowerment program (n = 75)

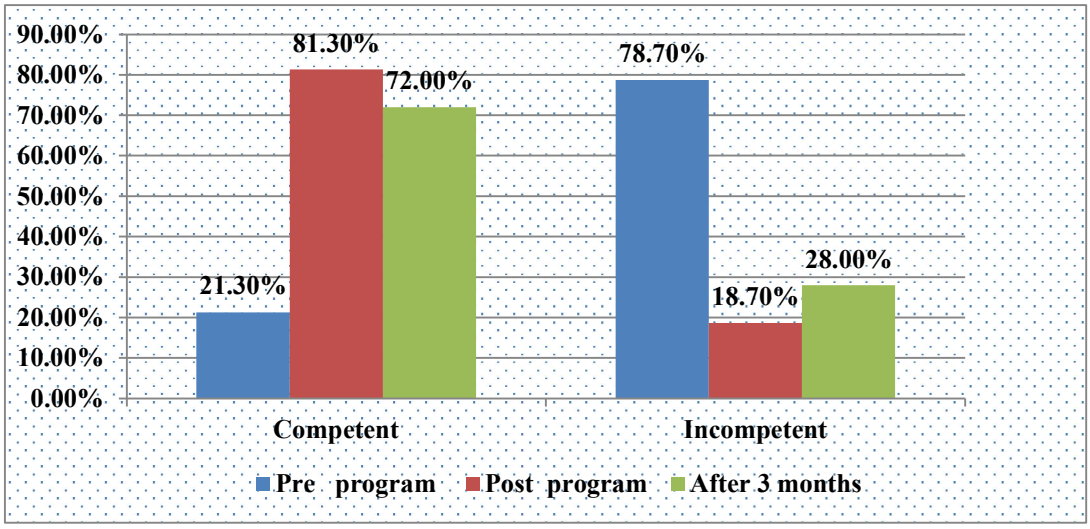

Table 6: The percentage distribution of the examined parents' total degree of self-competence in caring for their children with cochlear implants before, after, and three months after the empowerment program was implemented (n = 75)

Items	Implementation of a pre-empowerment program (n = 75)		Implementation of the empowerment program (n = 75)		after three months of program implementation (n = 75)		X2(1)	P-value	X2(2)	P-value
	No	%	No	%	No	%				
The total level of competence							20.91	P<0.001**	1.14	P>0.05
The low self-competence level	41	54.7	6	8.0	9	12.0				
Moderate self-competence level	26	34.7	15	20.0	16	21.3				
High self-competence level	8	10.6	54	72.0	50	66.7				

**** At p value < 0.001, the difference is very highly statistically significant. There is no statistically significant difference in the p-value. P > 0.05**

X2(1) Difference between pre-test and post-test

X2(2) Difference between post-test and follow-up test.

Table 7: Relation between parents' total self competence level scores and their personal characteristics pre, post and after 3 months of empowerment program implementation (n=75)

Parents' characteristics	Pre empowerment program implementation(n=75)						Post empowerment program implementation (n=75)						after 3 months of Post empowerment program implementation (n=75)					
	Low self competency level (n=41)		Moderate self competency level (n=26)		High self competency level (n=8)		Low self competency level (n=6)		Moderate self competency level (n=15)		High self competency level (n=54)		Low self competency level (n=9)		Moderate self competency level (n=16)		High self competency level (n=50)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No	%	No.	%	No.	%	No.	%
Age (in years):																		
20->30	12	29.3	4	15.4	1	12.5	2	33.3	7	46.7	8	14.8	2	22.2	5	31.3	10	20.0
30->40	23	56.1	9	34.6	3	37.5	3	50.0	5	33.3	27	50.0	5	55.6	8	50.0	22	44.0
≥40	6	14.6	13	50.0	4	50.0	1	16.7	3	20.0	19	35.2	2	22.2	3	18.7	18	36.0
Chi square / P-value	22.049		<0.001**				19.767		<0.001**				11.430		< 0.05*			
Consanguinity																		
Father	5	12.2	3	11.5	0	0.0	2	33.3	5	33.3	1	1.9	4	44.4	4	25.0	0	0.0
Mother	36	87.8	23	88.5	8	100.0	4	66.7	10	66.7	53	98.1	5	55.6	12	75.0	50	100.0
Chi square /P-value	12.796		<0.05*				25.254		<0.001**				20.004		< 0.001**			
Educational level:																		
Illiterate	3	7.3	0	0.0	0	0.0	2	33.3	1	6.7	0	0.0	2	22,2	1	6.2	0	0.0
Read and write	5	12.2	0	0.0	0	0.0	3	50.0	2	13.3	0	0.0	4	44.4	1	6.2	0	0.0
Intermediate education	31	75.6	9	34.6	2	25.0	1	16.7	10	66.7	31	57.4	3	33.4	10	62.6	29	58.0
University education	2	4.9	17	65.4	6	75.0	0	0.0	2	13.3	23	42.6	0	0.0	4	25.0	21	42.0
Chi square / P-value	23.146		<0.001**				18.127		< 0.001**				15.007		<0.05*			
Residence:																		
Urban	11	26.8	5	19.2	5	62.5	1	16.7	4	26.7	16	29.6	2	22.2	6	37.4	13	26.0
Rural	30	73.2	21	80.8	3	37.5	5	83.3	11	73.3	38	70.4	7	77.8	10	62.6	37	74.0
Chi square /P-value	8.430		<0.05*				15.720		< 0.001**				20.602		< 0.001**			

**** At p value < 0.001, the difference is very highly statistically significant. There is no statistically significant difference in the p-value. P > 0.05**

Table 8: The relationship between the parents' self-competence scores overall, reported practice scores overall, and total scores for all of the parents. Three months following the start of the empowerment program (n = 75)

Variables	Total knowledge		Total reported practices		Total parents' self-competency level	
	Pre-program		Post-program		After three months	
	r	p	r	P	r	P
Total knowledge	-	-	0.436	0.001**	0.302	0.031*
Total reported practices	0.378	0.001**	-	-	0.354	0.025*
Total parents' self-competency level	0.343	0.015*	0.651	0.001**	-	-

A statistically significant difference (p ≤ 0.05 *) A highly statistical significant difference (p ≤ 0.001 **) r- Pearson Correlation Coefficient

Discussion

One of the most prevalent disabilities, hearing loss has a long-term impact on children and families.Parents with deaf children frequently feel sad and unqualified to handle their children effectively. This lack of belief in one's abilities frequently manifests as disease. Nurses and experts should maintain the degree of parental participation, quality, quantity, and timing of care services that children get, as they are critical to their psychosocial, academic, and overall quality of life (Zhang et al., 2020).

To determine how an empowerment program affected parents' self-efficacy in caring for their children with cochlear implants, the current study conducted a quasi-experimental research study.

In terms of parent characteristics, it was discovered that the average age of the parents analyzed was 31.474.13 years. Regarding educational level, over half of the parents had an intermediate education. Furthermore, it was discovered that somewhat fewer than two-thirds of parents were unoccupied. These results were in line with Hashemi et al(2019) research, "The Effect of Education on Anxiety and Self-Efficacy in Mothers of 1-3-Year-Old Children Undergoing Cochlear Implant Surgery: A Randomized Controlled Clinical Trial," which found that the studied mothers in the age range of 25 to >30 years, just over three quarters (77%) had a diploma, exactly half (50%) had one, and the majority had an (81.4 percent)

It was found that more than half of the children tested were between the ages of three and five, which is when it came to personal characteristics. Less than two-thirds of the children were found to be males, according to their gender. These findings were challenged by Nada et al., (2021). In a study titled "Assessment of quality of life in Egyptian children after cochlear implant", they discovered that 40.8 percent of children with cochlear implants were younger than five years old and 59.2 percent were older than five years old, respectively, with 53.5 percent being males.

Furthermore, the current study found that more than two-fifths of the children evaluated were the first child in their family and more than two-thirds had no family history of hearing impairments. More than half (52.5%) of the children investigated were ordered as first children. More than one-third (37.5%) of the children had a family history of deafness, according to Saki et al (2017) study, "Investigating the impacts of cochlear implantation on the happiness and self-esteem of moms of children with severe hearing loss."

Regarding children's medical histories (Table 3), it was indicated that less than half of them had inner ear malformations. This finding contradicted the findings of Vincenti et al., (2014), who discovered that inner ear abnormalities were present in roughly 20% of individuals with congenital sensory, and neurological hearing loss in research named "Partitioned versus duplicated internal auditory canal."

The new investigation found, as shown in the same table, that difficulties with facial nerve stimulation occurred in more than half of children who had complications after cochlear implantation. This result contrasted with that of Sefein et al., (2022). They reported that the most frequent minor complications were mild facial palsy (1.83 percent) cases, possibly because of neural edema brought on by heat generation from burrefriction in narrow posterior tympanotomies while facial nerve stimulation was taking place.

Before, following, and three months after the implementation of the empowerment program in regards to the degree of comprehensive parental understanding of hearing loss and cochlear implantation. Before the empowerment program began, it was found that many of the parents examined lacked the necessary expertise. Most participants possessed adequate general knowledge after the training, but three months later, the majority still did. Suskind et al. (2016) studied a "spoken language intervention curriculum for low socioeconomic level parents and their deaf and hard of hearing children." According to the researchers' findings, most of the participants' parental awareness of their children's language development and the quality of their parents' linguistic interactions with their children after the training session benefited from the program. Improvements in parental awareness of the quality of communication interactions with their children were also observed three months following the training session.

After the empowerment program was implemented, parents reported childcare practices following cochlear implantation had a statistically significant change. Glanemann et al. (2013) found that the training program successfully increased total parental practice and communication-enhancing behaviors while reducing communication-inhibiting behaviors in PT parents in their study titled "Muenster parental program empowers parents in communicating with their infant with hearing loss." By the end of the program, trained parents had significantly higher levels of language sensitivity and awareness than untrained parents. Children whose parents received instruction displayed more vocalizations than kids in the control group.

Similarly, in their study titled "Parent training and communication empowerment of children with a cochlear implant," Nicastri et al. (2020) discovered no changes between CI-children in the PT and the control groups before the educational program. At the end of the group sessions, CI-children whose parents participated in the training exhibited significantly more gains in word and phrase knowledge and word output and significantly improved parental performance in childcare ($p < 0.001$).

According to the current study, less than half of the parents assessed had poor self-competence levels before the empowerment program. While nearly two-thirds of them demonstrated high levels of self-competence during the program and after three months of empowerment program implementation, Hashemi et al., (2019) confirmed these findings by discovering that there was no significant difference in the mean self-efficacy ($p = 0.41$) of the participating parents before the study between the control and intervention groups. Furthermore, when examined immediately after the intervention and two months later, there was a significant increase in self-efficacy in the interventional group ($p < 0.001$) but not in the control group ($p < 0.001$).

The current study showed a statistically significant relationship between parents' perceptions of overall self-competence and their age and educational level before and after introducing an empowerment program. This finding was like to Gou et al (2019) study, "Coercive control during the transition to parenting," which discovered a positive association between parental self-efficacy and education level. Furthermore, parental demographic variables, notable age, have been suggested to influence significantly.

According to current study researchers, higher levels of education influence parents' knowledge, opinions, beliefs, and goals for their children, enabling parents to acquire and model social skills and problem-solving strategies. Higher-educated parents are

also more inclined to believe in their capacity to manage stress and anxiety over their children's health.

Finally, the current study showed a highly statistically significant beneficial association between the studied parents' total level of knowledge; total reported practices, and total self-competence level before, after, and three months after the empowerment program implementation. These findings corroborated the findings of a study titled "Maternal Perception of Self-Efficacy and Involvement in Young Children with Prelingual Hearing Loss" conducted by Joulaie et al., (2019), which stated that parents with high self-efficacy are more likely to put their knowledge and skills into action and have positive interactions with their children. There was no difference in care quality or awareness of cochlear implantation among parents who felt less capable. For the more confident mothers, increased knowledge resulted in more effective practices with their children. As a result, specialized knowledge and confidence are connected with successful care and follow-up.

Parents, particularly mothers, who are educated and given the right information can feel more in control and empowered in a variety of situations, according to the researchers of the current study. Parental education is an important tool that lowers anxiety levels, lessens fear of the unknown, and improves outcomes for both parents and sick children.

Conclusion

Based on the findings of this study, it is reasonable to assume that parents' knowledge, reported practice, and personal competency increased following the implementation of an empowerment program for children with cochlear implantation.

Recommendations

The following recommendations are made in light of the current research findings:

1. Provide a continuous educational program for parents caring for their children with cochlear implantation.

2. Written instructions about cochlear implantation in the form of booklets or brochures should be provided to each child with hearing impairment and their parents to ensure effective loyalty to the care plan.

3. Regular screening, especially for children with a family history of hearing impairment, for early detection and prevention of severe consequences.

4. Ongoing training for parents on assisting and communicating with their deaf and hard of hearing children who use a cochlear device.

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