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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 are substantially get benefit from cochlear implantation that plays an important role in development of listening skills, communication abilities, social skills and participation and help children to progress in their life as an ability to carry out successful livelihood. Objective was to evaluate effect of empowerment program on parents' self competence regarding care of their children with cochlear implantation. Methods: A quasi-experimental design was used. This study was conducted at Phoniatric Unit of Ear, Nose and Throat department in Bahteem Specialized Hospital. A purposive sample of (75) parents accompanying their children with cochlear implantation. Four tools were used; A structured interviewing questionnaire sheet, Child medical data sheet, Parents' reported practices checklist and Parenting Sense of Competency Scale. Results: there were highly statistical significance 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 were no statistical significance 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: There was an improvement in parents' knowledge, reported practice and reflected a

highly self competence post empowerment program implementation regarding care of their children with cochlear implantation. Recommendations: Provide continuous educational program for parents involved in care of their children with cochlear implantation.

***Keywords*---**Empowerment Program, Parents' Self Competence, Children, Cochlear Implantation.

Introduction

Hearing loss has become the fourth leading cause of disability. Children who are born deaf or those who become deaf before the age of three years old cannot learn the verbal language and interact with the audio world. This lack of language acquisition in the early years of life has an impact on the child's ability to communicate and express emotions (Amraei, 2017).

Cochlear implantation is a surgically implanted electronic device that designed to enhance hearing abilities. It consists of a receiver/stimulator that is surgically implanted under the skin, behind the ear with a magnet and an electrode array. It is implanted into the cochlea and provides direct electrical stimulation to the nerve fibers. The external parts include a microphone, a speech processor, and a transmitting coil that are placed behind the ear (Nikkho, et al., 2018).

Using cochlear implantation in children with high hearing loss can improve the hearing ability and improve their quality of life (Saki, et al., 2017). The choclear device provides a sense of sound to children with severe to profound sensor neural hearing loss. It plays an important role in development of listening skills, communication abilities, social skills and participation and help children to progress in their life as an ability to carry out successful livelihood (Watkin, et al., 2020).

Choclear implantation surgery can be a frightening experience for the child and his parents because it can be viewed as a threat to the entire family; this is often caused by apprehension about the unknown and potential changes in the child's lifestyle. Given that this preoperative anxiety and anesthesia involves not only the child, but also his parents. Children always rely on their parents for support during illness, and they can also receive anxiety and tension from their parents; therefore, we must pay attention to families as well as pediatric patients (Mohanna & Samani, 2018).

Cochlear implantation surgery has a significant effects on the functioning of the parents and involving them in many tasks, responsibilities, and concerns related to their child care needs, educational support, follow up, medical services, tolerating cost in terms of services, ambiguous future, excessive absence from work, financial, physical, and emotional problems (Hockenberry et al., 2019).

Parents of children who have had choclear implantation surgery typically have low self-competence, which is defined as a person's belief and judgment of his or her own ability to perform a specific task. Self-competence is a cognitive structure that is useful for controlling and organizing one's own behaviors. Parental self-

competence refers to the parents' assessment of their ability to fulfill parental responsibilities. (Zarshenas, et al., 2017).

Increasing parental knowledge can increase their self-effiacy and competence. Nurses, as an important members of the health team, should be able to understand the emotional and psychological responses of the parents as well as create a good educational environment and convey necessary interest and support related to choclear 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 technique for continuous providing of knowledge and skills to parents for better managing family life as a consequence, improve their lives and quality of life of their children (El Nagar et al., 2020). Health education is a fundamental and effective health promotion technique that uses a variety of methods to increase awareness, attitudes, and preferences, as well as encourage families especially who having children with chronic conditions to adopt healthy behaviors and lifestyles (Eidivandi et al., 2020).

Significance of the Study

Worldwide, approximately 1-3 out of 1000 babies are born with a hearing loss. The World Health Organization (WHO) currently estimates that at least 34 million children under the age of 15 have disabling hearing loss (Katrin, et al., 2019). In Egypt, the prevalence of hearing impairment was 16.0% 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%. The commonest cause was Otitis media with effusion 30.8%. Hearing loss reaching 15 children out of every 1000 newborns, compared to global rates of no more than 3 per 1000 births (Morgan, 2021).

Cochlear implant is done for about 80,000 children annually worldwide and it is increasingly available for deeply deaf children and gradually growing in Arabic countries but there are only a few studies about supporting children and parents. Parents must continue to seek support and information about this issue and its potential outcomes in order to make informed decisions (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 through:

1. Assessing parents' knowledge and reported practice regarding operation of cochlear implantation.
2. Designing and implementing empowerment program based on parents' actual needs assessment about cochlear implantation.
3. Evaluating the effect of implemented empowerment program on parents' knowledge, reported practice and self competence regarding care of children with cochlear implantation.

Research Hypothesis

1. The level of parents' knowledge, reported practice and self-competence will be improved after implementing empowerment program
2. There will be a significant relationship between the parents' self-competence level with their personal characteristics.
3. There will be significant positive correlation between total parents' knowledge, total reported practices and their self competence level regarding care of their children with cochlear implantation pre, post and after three months of empowerment program implementation.

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 a surgically implanted electronic device that provides a sense of sound to children with severe to profound sensor neural hearing loss

Methods

Research Design
The current study was carried out using a quasi-experimental design

Research Setting
This study was conducted Phoniatric Unit of Ear, Nose and Throat department in Bahteem Specialized Hospital at second floor. It consists of (4) rooms each room contains one audiometer and four computers, each one contains database about children according to developing of cases & follow up

Subjects
A purposive sample of 75 parents accompanying their children with cochlear implantation who attended the previously mentioned settings through two shifts (morning and, afternoon shifts) for a period of six months and 3 months for follow up. They were taken according to the following

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 operation

Tools of Data Collection

The following three tools were used to collect data rlevant to the current study.
Tool (I): A structured interviewing questionnaire sheet: It was designed by the researchers in the light of related studies and researches ***Saki et al., (2016)& Rajan et al., (2018).*** It was prepared in simple Arabic language. Each parent was interviewed exclusively for filling the knowledge questionnaire sheet. It composed of two parts which are:
Part I: Characteristics of studied parents such as age, level of education, occupation, residence, consanguinity relation between parents and attendance of training courses regarding cochlear implantation.
Part II: Parents' knowledge regarding hearing loss: It encompassed (11) multiple-choice questions included; composition of ear (1 question), definition of hearing loss (1 question), risk factors and causes of hearing loss (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 included; 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), health promotion life style after cochlear implantation (5 questions).

Scoring system for mothers' knowledge:

Following completion of the interviewing questionnaire, the scoring system for mothers' knowledge was evaluated, as the parents' knowledge was checked with a model key answer. As a result, correct answers received (1), while incorrect or unknown answers received (2). (0). The overall score ranged from 0 to 27 (27 questions). Parents' total knowledge was classified as satisfactory or unsatisfactory, with a score of 60% considered satisfactory and a score of 60% considered unsatisfactory.

Tool (II): Child medical data sheet:
It was developed by the researchers and consisted of two parts as the follow:
Part 1:
- Personal characteristics of the studied children, it included age, gender, child rank, age of child when start deafness evaluation and family history of hearing disorders
Part 2:
-Medical history of children with cochlear implantation, it included medical diagnosis, complications that occurred as a result of cochlear implantation.
Tool (III): Parents' reported practices checklist: It was adapted from *Johnstone et al., (2018)& Park et al., (2022)* to assess parents' reported practice towards care of their children after 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 total 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:

- Less than 85% was considered incompetent practice level
- Equal to or more than 85% was considered competent practice level

Tool (IV): Parenting Sense of Competence Scale (PSOC): It was adopted from *Gibaud-Wallston & Wandersman, (1978).* PSOC scale was used in the current study to assess parents' self competence in caring for their children with cochlear implantation and consisted of (17) items, with two subscales (self-efficacy subscale and satisfaction subscale). Concerning **self-efficacy subscale**, it composed of (8) items (1, 6, 7, 10, 11, 13, 15, and 17), each item is rated on a 6-point Likert scale ranged from (1) for strongly disagree, and (6) for strongly agree. According to **satisfaction subscale** it was reverse coded, it included (9) items (2, 3, 4, 5, 8, 9, 12, 14, and 16). Reverse coded indicates that a high score on the parent item is not indicative
of having a sense of self competence; the item expressed negatively, Also, each item is rated on a 6-point Likert scale ranged from (1) for strongly agree, and (6) for strongly disagree.

Scoring System:
The score for each item can be recorded in the right-hand side of the PSOC scale once completed. Regarding scoring of self-efficacy subscale, these 8 items, 1, 6, 7, 10, 11, 13, 15,
and 17 only write the number the participant indicated as their choice where, strongly disagree (1), somewhat disagree (2), disagree (3), agree (4), somewhat agree (5), and strongly
agree (6). Total scoring for self-efficacy subscale was (8- 48). Reverse coding for satisfaction subscale (the remaining 9 items 2, 3, 4, 5, 8, 9, 12, 14, and 16), replace the following numbers and record in right hand side for totaling: strongly disagree (6), somewhat disagree (5), disagree (4), agree (3), somewhat agree (2), and strongly agree (1). Total scoring for these 9 reverse items (9-54).
The overall items of parents' competence level were ranged from (1-102). The parents' competency level was categorized as the following:
- Low competence level (< 60%) was ranged from (17- 61) items.
- Moderate competence level (60<75%) was ranged from (62 - 76) items.
- High competence level (≥75 %) was ranged from (77-102) items.

Preparatory Phase
To cover the various aspects of the study and develop relevant tools for data collection and content design, the researchers reviewed local and international related literature. This period lasted from early August 2021 to the end of September 2021.
Validity and Reliability

The tools' validity was evaluated by a panel of three pediatric nursing experts, faculty of nursing, Benha University to test the tools simplicity, clarity, comprehensiveness, and relevance. Modifications were made in accordance with experts' judgment. judgment. The Cronbach's alpha test was used to assess the reliability of all items of the tool. The knowledge score was 0.89, the practice score was 0.87, and the Parenting Sense of Competency Scale was 0.82. (PSOC). This phase lasted one month, from October 2021 to October 2022.

Ethical Considerations

According to the Faculty of Nursing Ethical Research Committee, the researchers obtained permission from the hospital directors by submitting an official letter. All participants were assured that their participation in the study was voluntary; parents were informed about the aim, benefits and nature of the study and each parent had the right to withdraw from the study at any time without explanation, after that oral consent was obtained from them. The confidentiality and anonymity of each subject were ensured by coding all data and all information obtained was safeguarded.

Pilot Study

Over a one-month period (November 2021), a pilot study was conducted on 10% of the total sample size (8 parents) and their children (8 children) to test the clarity of the data collection tools, feasibility, objectivity, and time required for each data collection tool. No changes were made based on the findings of the pilot study. As a result, the pilot study subjects were included in the overall study sample.

Field Work

The actual fieldwork took place between the beginning of November 2021 and the end of April 2022. The researchers were available three days per week (Sunday, Monday, and Thursday) in the morning shift to collect the data by using the previously mentioned data collection tools.

Assessment Phase

This phase was done prior conducting the empowerment program to have baseline of data and to assess parents' learning needs. Prior to data collection, the researchers interviewed each mother, introduced themselves to each participant in the study, explained the aim of the study, duration, and activities, and obtained oral consent to participate in the study. Then, the structured interviewing questionnaire sheet filled individually for each parent (Tool I). Following that, the researchers completed the children's medical data sheet, which took about 10-15 minutes (Tool II). For nurses, the average time required to complete each interview ranged between 20 and 35 minutes. The average time needed for the completion of the reported practice sheet was between 20-30 minutes (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 phase included analysis of the assessment phase (pre-test) findings and identification of the actual needs of the studied parents. Accordingly, the empowerment program was designed by the researchers using simple Arabic language and pictures in order to facilitate parents' understanding.

The general objective of the empowerment program was to update studied parents' knowledge and improving their practice of caring for their children after cochlear implantation.

Specific objectives:
At the end of empowerment program implementation each parent should be able to:
- Identify the ear composition.
- Define hearing loss.
- Enumerate risk factors and causes of hearing loss.
- Mention signs of hearing loss in infants and children.
- Recognize diagnostic tests for hearing loss.
- Discuss management of hearing loss.
- Explain prevention of hearing loss.
- Define cochlear implantation.
- Illustrate 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 life style 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 was completed in five sessions (3 sessions for theory and 2 sessions for practice). Parent were divided into 8 groups of approximately 9-10 parents in each. During session parent and their children sits together with the researchers in circle, every parent had an opportunity to ask questions and share information.

The duration of each theoretical and practical session 45-60 minutes for three days/week. At the beginning of each session, the researchers started by a summary of the previous session and objectives of the new one, taking into consideration using Arabic language to suit the parents' educational level.
The empowerment program implementation helps in explaining complex information, developing ability for critical thinking, fostering decision-making and action, enhancing self-esteem and self-confidence for parent. Also, provides them with the information they need in an interactive format. Small group discussions,

brain storming, and role modeling were among the teaching methods used. (After telling parents what to do, it's very important to show them exactly how to do it). Videos and a recorded Power Point presentation were used as teaching aids, and each parent was supplemented with a copy of an Arabic booklet. Also, researchers develop a group of WhatsApp and parents were added for motivation, communication, interaction, support and follow up, all through the study period.
Furthermore, flashcards were used as a teaching tool by the researchers. The flashcards used to help parents improve their memory through practiced information retrieval. Flashcards used are two-sided, with the title on one side and information about the title on the other, and they contain names, vocabulary, concepts, and procedures. Furthermore, flashcards encourage parental interaction, good and effective communication, creativity, and active recall.

Contents of each session:

The first theoretical session focused on:
- General and specific objectives.
- Introduction about hearing loss in children.
- Risk factors and causes of hearing loss.
- Signs of hearing loss in infants and children.
- Diagnostic tests for hearing loss
- Management and prevention of hearing loss.

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 life style 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:
After implementation of the empowerment program; the parents' knowledge,

reported practice and self competence level were evaluated immediately, the post tests were administered by using same pretest tools. Additionally, this helped to evaluate the effect of empowerment program on parents' self competence regarding care of their children with cochlear implantation.

Statistical Analysis

The collected data were coded and transformed into specially designed form to be suitable for computer entry process. The SPSS computer program Version 21 was used to enter and analyze data. The mean and standard deviation were used to present quantitative data and there were qualitative data presented. Number and percentage as frequency distribution tables A comparison of qualitative variables using the parametric Chi-square test. Pearson correlation coefficient was used to calculate variable correlation. At p-value 0.001, a highly statistically significant difference was considered. At p-value 0.05, a statistically significant difference was considered, and at p-value > 0.05, no statistically significant difference was considered.

Results

Table 1: reveals the parents' characteristics; it was found that, the mean age of the studied parents was 31.47±4.13 years and the majority (89.3%) of them were mothers. In relation to parents' educational level more than half (56.0%) of them had intermediate education. Additionally, it was noticed that, slightly less than two thirds (65.3%) of parents not occupied and less than three quarters (72.0%) of them from rural area. Moreover, less than two thirds (62.7%) of the studied parent had no consanguinity relation and they had all (100%) never attended any previous cochlear implantation training courses.

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

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

Table 4: describes distribution of total level of parents' knowledge regarding hearing loss and cochlear implantation pre, post and after 3 months of empowerment program implementation. It was found that, most (82.7%) of the studied parents had unsatisfactory knowledge pre-empowerment program implementation. While, (85.3% & 78.7%) of them had satisfactory total level of knowledge post- program and after three months of empowerment program implementation respectively.

Table 5: reveals parents' reported practice regarding care of their children after cochlear implantation pre, post and after 3 months of empowerment program implementation. It was observed that, there is highly statistical significance improvement of parents' reported practice post empowerment program implementation ($p < 0.001$). Meanwhile, there is no statistical significance between post program and after 3 months.

Figure 1: portrays total reported practice regarding care of their children after cochlear implantation pre, post and after 3 months of empowerment program implementation. It was found that, more than three quarters (78.7%) of the studied parent had incompetent reported practices pre-empowerment program. In contrast, (81.3% &72.0%) of them had competent total reported practice post- program and after 3 months of empowerment program implementation respectively.

Table 6: displays parents' total level of self competence regarding care for their children with cochlear implantation pre, post and after 3 months of empowerment program implementation (54.7%) had low self competence level pre-empowerment program. While, (72.0% & 66.7%) of them had high self competence level post-program and after 3 months of empowerment program implementation respectively.

Table 7: shows relation between parents' total self competence level scores and their personal characteristics pre, post and after 3 months of empowerment program implementation. It was found that, there were highly statistically significant relation in pre and post empowerment program implementation regarding parents' total self competence level scores and their age and educational level.

Table 8: reveals correlation between total knowledge score, total reported practice score and total parents' self competence level of the studied parent pre, post and after 3 months of empowerment program implementation. It was observed that there were highly statistical positive correlation between the studied parents' total level of knowledge, total reported practices and their total self competence level at pre, post and after 3 months of empowerment program implementation.

Table 1. Distribution of the studied parents according to their personal 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 of training courses regarding cochlear implantation		
Yes	0	0.0
No	75	100

Table 2. Percentage distribution of the studied children according to their personal characteristics (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 start 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. Percentage distribution of the studied children according to their medical history (n=75)

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. Percentage distribution of the total knowledge of studied parents' regarding hearing loss and cochlear implantation pre, post and after 3 months of empowerment program implementation (n=75)

Items	Pre empowerment program implementation (n=75)		Post empowerment program implementation (n=75)		After 3 months of empowerment program implementation (n=75)		X2(1)	P-value	X2(2)	P-value
	No	%	No	%	No	%				
Total knowledge level										
tisfactory (≥60 %)	13	17.3	64	85.3	59	78.7	29.16	P<0.001**	2.63	P>0.05
ısatisfactory (<60%)	62	82.7	11	14.7	16	21.3				

**Highly statistical significant difference at p value< 0.001 No statistical significant difference at 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. Percentage distribution of the studied parents' reported practice regarding care of their children after cochlear implantation pre, post and after 3 months of empowerment program implementation (n=75)

Practice items	Pre empowerment program implementation (n=75)		Post empowerment program implementation (n=75)		after 3 months of empowerment 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**

**Highly statistical significant difference at p value< 0.001 No statistical significant difference at p value P>0.05

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

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

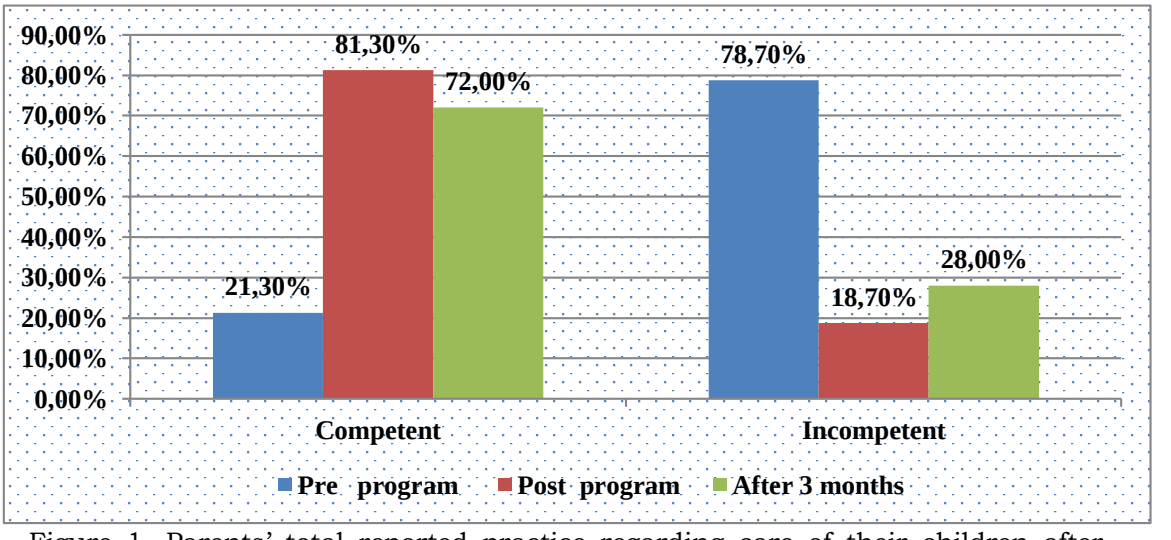

Figure 1. Parents' total reported practice regarding care of their children after cochlear implantation pre, post and after 3 months of empowerment program implementation (n=75)

Table 6. Percentage distribution of the studied parents' total level of self competence regarding care for their children with cochlear implantation pre, post and after 3 months of empowerment program implementation (n=75)

Items	Pre empowerment program implementa	Post empowerment program implement	after 3 months of empowerment program	X2(1)	P-value	X2(2)	P-value

	tion (n=75)		ation (n=75)		implementation (n=75)					
	No	%	No	%	No	%				
Total level of competence										
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	20.91	P<0.001 **	1.14	P>0.05
High self competence level	8	10.6	54	72.0	50	66.7				

**Highly statistical significant difference at p value< 0.001 No statistical significant difference at 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**	

*** Highly statistical significant at P value P>0.001 *A statistical significant at P value P<0.0*

Table 8. Correlation between total knowledge score, total reported practice score and total parents' self competence level of the studied parents pre, post and after 3 months of empowerment program implementation (n=75)

Variables	Total knowledge Pre program	Total reported practices Post program	Total parents' self competency level After 3 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 statistical significant difference (p ≤0.05) A highly statistical significant difference (p ≤0.001**) r- Pearson Correlation Coefficient*

Discussion

Hearing impairment is one of the most common disabilities and has lifelong consequences for affected children and their families. Parents of hearing impaired children usually feel depressed and unqualified to manage their children in a beneficial and efficient manner. This doubt in their own abilities is often exhibited as affliction. Nurses and specialists should preserve the level of parental involvement, quality, quantity and timing of care services that children receive is essential to their psychosocial, academic development and ultimately the quality of life they achieve (Zhang et al., 2020).

The current study was a quasi-experimental research study that aimed to evaluate the effect of empowerment program on parents' self competence regarding care of their children with cochlear implantation. Regarding the parents' characteristics; it was found that, the mean age of the studied parents was 31.47±4.13 years. In relation to parents' educational level more than half of them had intermediate education. Additionally, it was noticed that, slightly less than two thirds of parents not occupied. These findings were congruent with Hashemi et al., (2019) who carried out a study about "The effect of education on anxiety and self-effiacy in mothers of 1-3-year-old children under cochlear implant surgery: a randomized controlled clinical trial" and founded that, slightly more than three quarters (77%) of the studied mothers in the age group of 25 to >30 years, exactly half (50%) of them had diploma, most (81.4%) of the studied mothers were housewives.

Regarding children's personal characteristics; it was observed that, more than half of the studied children had age 3-≥ 5 years. As regards gender it was found that slightly less than two thirds of children were males. These findings were disagreed with Nada et al., (2021) who found in a study entitled "Assessment of quality of life in Egyptian children after cochlear implant" and revealed that, there were 40.8% of children with cochlear implant younger than five years old and 59.2% of them older than 5 years old 53.5% were males.

Additionally, the present study revealed that, more than two fifth of the studied children was the first child in order and more than two thirds of them had no family history of hearing disorders. These findings was matched with Saki et al., (2017) whose study about "Investigating the impacts of cochlear implantation on the happiness and self-esteem of mothers of children with severe hearing loss" and

reported that, more than half (52.5 %)of studied children were ordered as first child in addition, more than one third (37.5 %) of children had deafness history in the family. Concerning children medical history (Table 3), it was stated that, less than half of them diagnosed with inner ear malformation. This finding was incongruent with Vincenti et al., (2014) who carried out study entitled “Partitioned versus duplicated internal auditory canal” who found that, inner ear malformations were present in approximately 20% of children with congenital sensory neural hearing loss.

In the light of the same table, the current study illustrated also that, more than half of children who had complication after cochlear implantation complicated with facial nerve stimulation. This finding was incomparable with Sefein et al., (2022) whose study carried out in Egypt with the title" Cochlear implantation in 602 cases: Surgical complications during 7 years of experience in a specialized institute" and reported that, the most common minor complications was mild facial palsy in (1.83%) cases, potentially due to neural edema provoked by heat generation from burrefriction in narrow posterior tympanotomies while facial nerve stimulation occurred only for two males (0.39%) out of 509 child who had undergone choclear implantation.

As regards total level of parents' knowledge regarding hearing loss and cochlear implantation pre, post and after 3 months of empowerment program implementation. It was found that, most of the studied parents had unsatisfactory knowledge pre-empowerment program implementation. While, most of them had satisfactory total level of knowledge post- program and more than three quarters had satisfactory total level of knowledge after three months of empowerment program implementation. These findings were congruent with study done by Suskind et al., (2016) about" Spoken language intervention curriculum for parents of low-socioeconomic status and their deaf and hard-of-hearing children ". Their results showed a positive impact of the program on parental knowledge for majority (89%) of participants concerning children’s language development and on the quality of the parents’ linguistic exchanges with their children post training program. Furthermore, after 3 months from the end of training program, the improvements in parental information regarding quality of communication interactions with their children.

As viewed in the current study it was found that, there was highly statistical significance improvement of parents’ reported practice regarding care of their children after cochlear implantation post empowerment program implementation. These findings supported by Glanemann et al., (2013) whose study entitled "Muenster parental programme empowers parents in communicating with their infant with hearing loss" and confirmed that training program was effective as a method to increase parental total practice and communication-enhancing behaviors and to reduce communication-inhibiting behaviors in PT parents. By the end of the training, the researchers found that the trained parents were significantly more attentive and responsive to the child’s vocal signals than untrained parents. Children of parents in the trained parents demonstrated significantly more vocalizations when compared with the children in the control group.

In the same line, Nicastri et al., (2020) whose study entitled" Parent training and communication empowerment of children with cochlear implant" stated that, prior to educational program, there were no differences on CI-children of the PT group and the control group. At the end of the group sessions, CI-children whose parents attended the training showed a larger increase in word and sentence comprehension and word production, with significantly better performance of parents regarding care of their children than control group ($p < 0.001$).

The present study clarified that less than half of studied parents had low self competence level pre-empowerment program. While, about two thirds of them had high self competence level post- program and after 3 months of empowerment program implementation respectively. These findings were emphasized by Hashemi et al., (2019) who found that, there was no significant difference in the mean of self-effiacy ($p=0.41$) of the participant parents between the control and intervention groups before the study. Moreover, there was a significant increase in self efficacy when measured immediately after the intervention and two months later in the interventional group ($p<0.001$) but not in the control group.

The current study demonstrated that, there were highly statistically significant relation in pre and post empowerment program implementation regarding parents' total self-competence level scores and their age and educational level. This finding was congruent with Gou et al., (2019) whose study entitled "Coercive control during the transition to parenthood" and reported that, there was a positive association between a higher education level and higher parents self efficacy additionally, the parental demographic characteristics especially age have been suggested to have a strong impact.

According to opinion of current study researchers, higher levels of education influences parents' knowledge, beliefs, values, and goals about their children and enable parents to acquire and model social skills and problem-solving strategies parents with higher levels of education are also more likely to believe strongly in their abilities to manage stress and alleviate anxiety related to their children condition.

Finally, the current study revealed that, there were highly statistical positive correlation between the studied parents' total level of knowledge, total reported practices and their total self-competence level at pre, post and after 3 months of empowerment program implementation. These findings were matched with study done by Joulaie et al., (2019) entitled " Maternal Perception of Self-Efficacy and Involvement in Young Children with Prelingual Hearing Loss" and explained that, Parents who have high self-efficacy are more likely to put their knowledge and skills into action and have positive interactions with their children. . Parents who perceived themselves as less competent exhibited no difference and low quality of care and level of knowledge regarding choclear implantation. For the group of more confident mothers, increased knowledge resulted in more effective practices with their children. Therefore, both specific knowledge and confidence appear to be related to successful care and follow up.

The researchers of the present study viewed that, knowing the nature of the disease reduces the anxiety and abnormal behavior of parents, especially mothers and

providing the parents with education and appropriate information help them to feel having more control and power on different situations as parental education is an essential tool that reduces the fear of unknowns and can reduce anxiety and improve parental and ill children outcomes.

Conclusion

Based on the results of the present study, it can be concluded that, there were an improvement in parents' knowledge, reported practice and reflected a highly self competence post empowerment program implementation regarding care of their children with cochlear implantation.

Recommendation

In the light of the findings of the current research, the following recommendations are suggested:

1. Provide continuous educational program for parents involved in care of 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 for ensuring effective loyalty to plan of care.
3. Regular screening especially children with family history of hearing impairment for early detection as well as prevent serious consequences.
4. Consistent training of parents on the support and communication skills with their hearing-impaired children with cochlear device.

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