

Parental Stress and Mental Health in Mothers of Children with Hearing Impairment: The Effectiveness of a Behavioural Training Program

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Abstract: The aim of this study was to investigate the effectiveness of behavioral training for parents in reducing parental stress and improving mental health of mothers of children with hearing impairment. This study employed a quasi-experimental study design with pretest, posttest, and a control group. Then, 24 mothers with deaf children were randomly selected by accessible sampling and assigned into two groups, the experimental group, and the control group. Research collection data tools were mental health questionnaire and parenting stress index. Behavioral training of parents was conducted in nine 90-minute sessions in the experimental group. Finally, the two groups completed answering the questionnaires for a posttest. Data were analyzed using analysis of covariance. The analysis of the results indicated the experimental intervention has reduced parenting stress in the mothers in experimental group ($p < .05$). The analysis of the results also indicated the impact of experimental intervention on reducing maternal mental health problems ($p < .05$) of the experimental group compared with the control group. In general, the findings suggest that behavioral training of parents have reduced the psychological problems of mothers of children with hearing impairment and will prevent psychological and health problems from happening in these parents.

Keywords: Hearing impairment, behavioural parent training, mental health, parenting stress

I. Introduction

Hearing impairment is the most common sensory-neural defect in humans and nearly for every 1000 children; a child is born with severe to stable profound sensory-neural hearing impairment [1]. In addition, statistics in recent studies has changed to one in every 650 babies. Thus, hearing impairment is considered as one of the serious sensory disabilities in children and is one of the issues that the parents with children hearing impairment are faced with basic issues in the care of these children [2]. This is because in some cases, this sensory problem is associated with behavioral-emotional problems such as behavioural problems. In the diagnosis of children with special needs, first the parents' feelings of grief and loss is addressed [3], then their psychological problems and their high stress are addressed [4]. However, after a while the parents are able to reset current affairs of family and their financial programs. The families of such children need special information about their children's disability and they need to be informed about the special adaptive strategies to be applied within their families [5].

Families of deaf children, especially the parents are severely affected by hearing loss of their child and after the initial reactions to the diagnosis of deafness; they should enter the process of adaptation and compliance with the conditions because many unique challenges may arise in caring for children with hearing impairment. The challenges have many implications in terms of medical decisions, education and communication strategy for the parents and their children. In addition, the parents of these children should learn to make decisions about technological strategies, selecting appropriate intervention strategies to deal and cope with their financial problems because of having children with hearing impairment [6]

On the other hand, most parents of children with disabilities are faced with psychological problems, mental health, and emotional responses to experiences such as depression and mental confusion [7]. Researchers have argued that these psychological distresses are associated with the birth of children with disabilities because disability causes new demands on the parents, such as additional time to care for children with disabilities [8]. In addition, they have to provide the financial resources, often in the form of heavy costs of caring for these children [9]. Researches who have examined the psychological distress among parents of exceptional children have reported a high rate of health problems such as anxiety and depression, and general psychological distress in mothers of these children compared with mothers of normal children [10]; [11]; [12]. [13] have also reported on the high percentage of stress, physical and psychological health problems among mothers of children with

disability that cause the mothers to face demands and requests more than other mothers. This shows increased responsibilities in areas such as health care needs of these children and the mother's activity to organize the child's regular tasks in situations related to the school and the family. The birth of a child with hearing impairment also has many harmful effects on the parents of the child and creates many problems for them. The unique characteristics of these children with hearing impairment appear in several ways, including behavioral, emotional, and academic. Furthermore, in many cases, defects and shortcomings in these areas have tremendous impacts on quality of life, physical, and psychological health of the parents [14].

Another factor affecting the quality of life of the parents of hearing impaired children is stress. Research has shown that parents of hearing impaired children have especially high stress levels. They also have more contacts with the special requirements of deaf children compared with parents with normal hearing children [15]; [16]. Therefore, this can affect the quality of life and mental health of parents of these children. In this regard, [17] in his study found that the maintenance of children with visual impairment and children with hearing impairment can affect the mental health and the life of their parents, and cause them to suffer from stress of these children's parents. Additionally, [2] suggested in their research that the prevalence of behavioral problems in hearing impaired children is high; hence parental stress experienced by parents of these children will naturally be high. Clear evidence has been found in reports that parenting stress has adverse effects on their parenting style and parental well-being. However, the effect of the stress on parents' behavior and the quality of parent-child relationships is still questionable. One of the features of parenting stress is its stability and durability over time. However, they can change at different periods of the child development and the severity varies according to the individual characteristics of parents. Consequently, the resulting effect on parental behavior varies according these characteristics of the parents. In addition, other studies also suggest that parents of children with disabilities have many health problems, in the form of physical and psychological stress. Some of them even live in turmoil because the demand faced by the caregivers of these children affects the quality of life of the parents [18]. Similarly, other researchers have also shown that hearing impaired children affect the quality of life of their parents because they need to spend more time to meet their child care needs, especially if the rate of disability is severe. Therefore, parents need to get involved with other activities and turn to other social activities when they are facing problems [17]. Parents of deaf children experience a lot of stress dealing with the growing requirements of their own children, and therefore enjoy a lower quality of life compared with other parents [14]. Hence, one of the ways to reduce stress and improve the quality of life of parents of children with physical and mental disabilities is to let them follow training courses to handle their problems. An early form of intervention can include parenting skills, behavior and stress management techniques [19].

Meanwhile, this kind of early intervention for parents should also focus on the special needs of families with children having developmental disorders. This would minimize stress caused by the specific conditions of these children that affect their families. Early interventions in the form of parental psychological supports will help them overcome the effects of their children's disability. Furthermore, these interventions can support the parents, the child's growth, and psychological well-being in general [20]. Research findings have shown that these exceptional children have a huge impact on the family units; they force parents and others in the family to create inherent and actual changes in family structure and functions, and to redistribute responsibilities following the changes in the family responsibility structure. Such structural and functional changes in the responsibility structure can have major effects on parental stress and pathological symptoms of both the parents in a long run [21].

Training programs for parents should also focus on improving the quality of child-parent relationships, besides training them in a variety of parenting skills and skills that may influence the behavior of their child [22]. Training programs for parents can reduce parental stress and increase parental self-efficacy as well as their quality of life [19]; [23] conducted a study on parents of 263 children with genetic and biochemical abnormalities and concluded that adaptive function of the child, parental consent of social support, and health problems in children predict the parents' parenting stress. In other words, these factors explained 50% of the variance in parenting stress. These findings are consistent with previous findings in the field of children's problems impact on parenting stress. In the study, parents of children newly diagnosed with developmental disorders were asked to take a parent training program and training for behavior management intervention for twenty weeks. Parents participating in this research program improved their mental health indicators, such as insomnia, anxiety, physical problems, and malfunctions in their family system, compared with parents who benefited only from the counseling services. One of the goals of the intervention programs was to reduce stress and increase feelings of parental competence in families with children having developmental disorders. The results showed that early intervention for parents with children having developmental disorders reduced stress for parents and increase the sense of parental competence in parenting. Evidence clearly shows that parenting stress and psychological problems of parents have devastating effects on parents' parenting style and well-being. However, the effectiveness of the influence of parenting stress on parents' behavior and the quality of parent-child relationships is still questionable. One of the features of parenting stress is its stability and durability over

time. The situation can change at different periods of the child development and the effect varies according to the individual characteristics of parents, which will affect the levels of parental behaviour differently. Therefore, the major factor is to support and help these parents in preventing such situation from happening and to re-establish balance in the family. In most cases this massive responsibility depends on the parents, especially the mothers as they are the major foundation in a family. Thus, to deal with the problems of exceptional children effectively, to cope with stress and psychological problems associated with their developmental and sensory disorders, different methods of parental education and interaction need to be used. Therefore, the present study aimed to evaluate the effectiveness of behavioral training for parents in reducing parental stress and improving mental health of mothers of children with hearing impairment[23]

II. Method

This study employed a quasi-experimental research design using pretest and posttest with a control group. The statistical population of the study comprised all students with hearing impairment of elementary schools in Azna during 2012 to 2013 and their mothers. Sampling design used in this study was convenience sampling based on the accessibility of subjects. The samples were assigned to an experimental group and a control group. These two groups were homogeneous groups as both groups have the maximum similarity. After homogenization was performed with regard to the variables such as education, students, gender, severity of hearing impairment, age and education level of the mothers, their consent to participate in the study was obtained. Altogether, 30 mothers agreed to participate; they were randomly selected and assigned to the experimental group and the control group, each consisting of $n = 15$. However, some of the subjects withdrew from the study and as a result; only 24 mothers were studied and analyzed. Descriptive findings of this study showed that mean age of the children in the experimental group was 10.25 years, while for the control group; the mean age was 10.30 years. Meanwhile, the mean of age of the mothers in the experimental group was 35.60 years and the mean age in the control group was 34.54 years.

Both groups were subjected to a pretest, conducted to determine the level of parental stress and mental health of mothers. Then, the mothers in the experimental group were given training in 10 intervention sessions and after training, these variables were measured again. Contents of the program were adopted from Barkley's (1997) parents training program following the procedures outlined. The training program will be discussed next.

Table 1. Programs Content of Parents' Behavioral Training

First session: In this session the necessary information about the nature, prevalence, course, prognosis, etiology and treatment of behavioral problems in parents of deaf children were given.
Second session: In this session explained about forming the basis behaviour and behaviour management such as positive reinforcement. Reinforcement has been described separately.
Third session: In this session role and importance of parents behaviour was focused and the principles of positive behavior and ignoring inappropriate behavior were taught.
Fourth Session: In this session positive attention to the obedience of the parents' order and following the family rules was discussed.
Fifth Session: The training method of token economy was discussed.
Sixth Session: Using penalties and depriving methods were trained.
Seventh session: Management behaviour in public situations was taught.
Eighth session: Improving children's behavior in school was discussed. This session was ended by teaching recording child's positive behaviours and scoring methods at home.
Ninth session: In this session quick tour of the knowledge and deal with problems in the future were discussed.

In this study, the following tools were used:

Parenting stress index (PSI) *****

General Health Questionnaire

General Health Questionnaire is a "screening questionnaire" based on self-report which has been used in the clinical setting to trace people having a mental disorder. General Health Questionnaire can be considered as a set of questions that has been established for lowest levels of comorbid symptoms of psychiatric disorders and thus can distinguish mental patients as a general class of people who are considered healthy. The purpose of this questionnaire is not to reach a specific diagnosis of the hierarchy of mental illness. However, its main purpose is to create a distinction between illness and health. The questionnaire included 28 multiple-choice questions, with four scales, in which each scale contains seven questions. General Health Questionnaire scales include physical symptoms, anxiety and insomnia, social dysfunction and severe depression. The best method for scoring the options of the questionnaire is by using the 4-point Likert scale (with scores of 0, 1, 2, and 3). In the scoring of the questionnaire four scores are used for the subscales and one score is used for the total questionnaire. A score of 23 or higher indicates the lack of mental health and while a score of lower than 23 indicates mental health. A score above 6 in subscales shows a sign of lack of mental health. In general, there are four versions of the General Health Questionnaire, which contained samples of 12 questions, 28 questions, 30 questions, 60 questions. When analyzing the subscale item, the General Health Questionnaire requires the 28-

question sample to be used. The 28-question General Health Questionnaire on sensitivity contains 17 items, and on specificity contains 18 items; the questionnaire is considered as a good tool. The Sensitivity 28-question form is 84% and its specificity is 82%. The sensitivity and specificity of measurements are related to the ability of the questionnaire to distinguish between sick and healthy people [24]. Research by [25] and [26] have shown that the General Health Questionnaire has sufficient reliability, validity, and applicability in research associated with mental health. In this study, Cronbach's alpha coefficient for this tool achieved 0.90.

III. Results

Since the study employed a pretest and posttest research design with a control group, covariance analysis was used to analyze the statistical results. In other words, the analysis was performed to evaluate the effect of improving mental health and reducing the symptoms of parenting stress of the mothers, by using parental training. The results of the analysis are shown separately in the Table 1. Table 2 presents the statistical indicators of parenting stress and mental health scores of the two groups, the experimental group, and the control group.

Table 2. Statistical Indicators of Parenting Stress and Mental Health Subscales Of the two Groups in Pre-test and Post-test

Standard deviation	Mean	Group	Variables
4/13	44/83	Experimental	Pre test Mental health
4/23	44/41	Control	
4/14	38/33	Experimental	Post test Mental health
3/46	44/25	Control	
18/65	270/50	Experimental	Pre test Parental stress
18/67	273/58	Control	
18/52	244/50	Experimental	Post test Parental stress
17/80	278/25	Control	

As can be seen from Table 2, the pre-test scores of the two groups are identical but the posttest scores (after the implementation of the independent variable) show many differences. Since the study employed a pretest and posttest research design with the control group, the analysis of covariance was used to analyze the results statistically and to control the effect size of the pretest. This type of analysis assumed the homogeneity of the regression slopes between random variables (pretest) and dependent variables, implying that the slope of the regression line for all variables were assumed to be parallel. In this study, group interaction for the variables of parental stress pretest ($p < .05$; $F = 0.256$ and mental health of mothers ($p > .05$; $F = 0.221$) was not significant, implying that this assumption has been met. Another assumption of the test is the homogeneity of variance. Therefore, to investigate the homogeneity of variance between the two groups in the pretest and posttest, the Leuven test of homogeneity of variances was used. The calculated Leuven test was not statistically significant for all the studied variables, (posttests, parenting stress, $p < .05$; $F = 1.17$, and maternal mental health, $p < .05$; $F = 0.062$). Therefore, the assumption of homogeneity of variances was confirmed through the use of the assumptions of this test. However, we are not allowed to use the test.

Table 3. The Results of Analysis of Covariance to Compare the Post-test Scores of Stress Parenting

Etha square	Significance level	F	Mean of squares	Degree of freedom	Sum of squares	Source of changes	Scale
0/27	0/001	7/62	6258/69	1	6258/69	Pre test	Parental stress
0/26	0/001	7/37	6054/43	1	6054/43	Group	
-	-	-	820/97	21	17240/55	Error	
-	-	-	-	24	1669939	Total	

Table 3 shows that there are significant differences between the mean score of parenting stress scale [001/0 $P < or = 37/46$ (21 and 1)] after controlling for the effect of pretest. Thus, the posttest mean scores of parental stress in the experimental group were significantly lower than in the control group. In other words, the behavior parent training in parenting stress in the experimental group was significantly reduced. The effect size of 0.26 or 26% of the variation in parental stress is related to the group membership.

Table 4. Analysis of Covariance to Compare the Post-test Scores of Mental Health between the two Groups

Etha square	Significance level	F	Mean of squares	Degree of freedom	Sum of squares	Source of changes	Scale
0/0	0/96	0/002	0/032	1	0/032	Pre test	Mental health
0/31	0/001	9/82	180/76	1	180/76	Group	
-	-	-	18/39	21	386/30	Error	
-	-	-	-	24	41076	Total	

Table 4 shows that there are significant differences between the mean score of parenting stress scale [$P = 0/001$ or $= 9/82$ (21 and 1)] after controlling for the effect of the pretest. Thus, the posttest mean scores of parental stress in the experimental group were significantly lower than in the control group. In other words, the behavior parent training and the use of behavioral techniques to control children could have significantly reduced emotional and psychological distress in mothers of children with hearing loss. In addition, it has prevented mental health problems from occurring in mothers in the experimental group more than in mothers in the control group. The effect size of 0.31 or 31% of the variation in parental stress is related to the group membership.

IV. Discussion and Conclusion

The diagnosis of hearing impairment can have a huge impact on parents of hearing impaired children and on the children themselves. In other words, the diagnosis of hearing impairment will bring about a lot of fundamental changes in families with hearing impaired children. After the diagnosis, the process of accepting additional requirements and responsibilities for parents begins. In some cases, negative behaviors from the members of the family will be conjoined. Thus, family members have to cope with additional demands due to the presence of a hearing loss child in their family. Researchers have suggested that the diagnosis of hearing loss in the children can have very stressful effects on family members. Nevertheless, how to adjust to this situation depends on how these people can cope with this situation and how they can have new information about hearing impairment [27].

The results of this study suggest that training behavior management techniques have a significant impact on reduction of parenting stress in mothers of children with hearing loss. Furthermore, the training programs have been able to reduce parenting stress in mothers of children with hearing loss significantly ($p < .05$).

The findings of this study are consistent with those of the study by [28] and [29] in the field of stress management training for parents with children with developmental disorders. This is because these programs have been proven to reduce parental stress. Furthermore, in the workshop, women can communicate with other members of the workshop. This could be among other reasons that might have caused the contents of the program to increase the efficiency of how the parents felt about their child and manage to deal with their behavioral problems. Additionally, it could be because they learned to manage their experience during stressful times. Parents who gained high scores in this scale were those experiencing considerable stress.

Often, these parents have not enjoyed the support of friends, family, and social support systems. In many cases also, their relationships with their spouses are cold and dented and their efforts to fulfil the role of parents do not enjoy enough support. Therefore, the parents' deficiencies in parenting can be seen to take responsibility for them, because researches have shown that high levels of stress, increases the risk of mistreatment with children, while increasing social support stress levels also and the likelihood of mistreatment with children will be reduced. So while visiting these parents, clinicians should advise them participating in group activities and participation in social activities and in the strength of parent-child relationships work, hence it can be said that such instances of social support, is participation in support groups, such as workshops and communicate with other members of the workshop [30]. Interventions of this program has been able to play this role. On the other hand it can be said women who have participated in the workshops, due to receiving social support, have found improvements in social isolation that it has a direct impact on parental stress of these mothers.

According to various studies, that do their research best on training mothers of children with developmental disorders [31];[32] and most of the research results that show the effectiveness of cognitive behavioral training on reducing parental stress and lack of appropriate parenting feeling in the parents of children with developmental disorders [32], it can be concluded that these factors training could change the assessment of the parents about the impact of their behavior on the child's capabilities as well changing in recognition of the parents in this case, that they can follow up with a little and continuous effort, bring appropriate behavior in their children and cause perpetuation of these behaviors, have impact on the parental stress indirectly because researchers believe life is an important factor that determines how to evaluate the outcomes of these events will cause disease and psychological turmoil or not, for example, the incidence of various factors in life can be seen as challenging or seen as an event that is extremely stressful [33].

Therefore can be said that participation in this training program has made them able to influence the course of their psychological evaluation about their children's behavior and also the use of relaxation techniques has been effective on their stress reduction. Another result of this study showed that parental education and behavioral training techniques has been effective in reducing mental health problems and enhancing psychological well-being of mothers of children with hearing loss and its effectiveness is statistically significant. The results of the study is a consistent and alignment with studies [31] and [34]. Studies show that there is a close relationship between the child's disability and psychological distress of parents, especially mothers [35].

Because the diagnosis of children with special needs at first creates feeling of grief and loss [3] and high mental health problems [4] for the parents of these children. Studies imply that taking care of children with developmental problems and emotional problems and physical diseases is in relation with parents and impairment of psychological and social functions as well as the role of the parents process [36], in the meantime mothers of the children will have the greatest negative impact [12]. Terms such as care giving responsibility, and the care giving pressure represents part of the negative consequences of taking on the role of caregivers of these children [37].

Thus providing interventions for family support can be a very important factor in helping family members, especially mothers to increase their understanding of disability, providing adequate family-based services, as well as learning how to deal with stress in life and thus support the mental health of the people. Given the above points it can be argued that intervention at this regard has been able to reduce the mental health of the mothers. On the other hand, it seems that through the intervention program, these mothers have been able to learn effective problem solving and conflict resolution and how to behave when faced with adverse, as a result, it has been able to reduce parents' psychological turmoil.

On the other hand, offering this training program increase the quality of life for all family members by increasing their ability to care of these mothers and provide valuable training for them, that this issue is reflected in reducing mothers' mental health problems. In addition, studies have also shown that family support services, where parents with each other in coming to collaborate together, to help each other and to solve the problems of children with disabilities and their families, reduce from the psychological stress of the parents of these children, as well as psychological problems, that it seems that is achieved at relationship that parents have established with each other in training sessions and share and help each other in their children behavioral problems.

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