

Efficacy of Attribution Retraining on Mental Health of Epileptic Children

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Background: Epilepsy affects children's quality of life and leads to social and mental problems. Promoting the mental health of children, especially epileptic ones, and preventing problems affecting them constitute major concerns for every country. Mental health promotion requires intervention programs.

Objectives: We sought to assess the efficacy of attribution retraining on the mental health of epileptic children.

Patients and Methods: The present study is a semi-experimental investigation with a pretest and posttest design and includes a control group. Thirty children, comprising 17 boys and 13 girls, were selected randomly from the Iranian epilepsy association in Tehran and assigned to experimental and control groups. They answered to the general health questionnaire (Goldberg and Hiller, 1979). The experimental group participated in 11 training sessions (twice a week; 45 minutes for each session) and received attribution retraining. The data were analyzed using the multiple analysis of covariance.

Results: The findings showed that the experimental group, in comparison with the control group, experienced a reduction in physical symptoms, anxiety and insomnia, social dysfunction, and depression and an increase in mental health significantly ($P < 0.01$) after the training sessions. There were no significant differences, however, between the two groups at 6 weeks' follow-up.

Conclusions: Attribution retraining improved mental health in the epileptic children in our study. It, therefore, seems to be an appropriate intervention for promoting the mental health of children.

Keywords: Epilepsy; Mental Health; Attribution Retraining

1. Background

Epilepsy is caused by abnormal electrical discharges in a group of neurons in the brain and triggers repeated seizures (1). It is the second most important factor after stroke to cause the diseases of the central nervous system. Almost 75% of seizures begin before the age of 20 years (2). There are about 1.5 to 14 persons in every 1,000 individuals who are prone to epilepsy (3). Epileptic patients, by comparison with normal individuals, experience more to health problems, low quality of life, emotional problems, physical or mental difficulties (4, 5), depression, anxiety (6-9), problems relating to emotional and physical health (8-14). According to The World Health Organization, mental health is a state of well-being and recovery in which an individual can accomplish his potential, cope with stress, act in a fruitful manner, and play an effective role in the community (15).

In addition to psychological problems, epileptic individuals have negative self-perception and tend to attri-

bute their failures to their insufficiencies; the failures which usually are the consequences of a neurological disease. They spread their inefficient feelings to their other experiences and, as a result, rather than address the problem appropriately, experience isolation and helplessness. According to the revised helplessness theory (16), individuals attribute their helplessness to the situations which are categorized in 3 dimensions: internal-external, general-specific, and stable-unstable (17). Seligman stated that not only lack of control in terms of learned helplessness influences human health and well-being, but also it is important that how a person explains and attributes the lack of control (18). There are 2 main attributional styles: pessimistic and optimistic. In the optimistic attributional style, negative or unpleasant events are attributed to external, unstable, and specific factors, while in the pessimistic attributional style, internal, unstable, and general factors are considered as the causal factors (19). Cognitive and me-

ta-cognitive methods have been used to modify the attributional style (20). Amongst those methods, attribution retraining is one of the most efficient methods in that it aims at enabling individuals to reconstruct their causal explanations of failures (21). Different studies have suggested that the attributional style influences the physical and psychological consequences of negative life events (22). Studies have shown that attribution retraining reduces physical problems (23-25), depression (24), and anxiety (24) and increases performance (26, 27). As one of the main concerns in every country is to guarantee the mental health of children, especially epileptic ones, the application of such programs as attribution retraining could play an effective role in the prevention of problems relating to physical and psychological problems.

2. Objectives

This study was conducted to assess the efficacy of attribution retraining on promoting mental health and its components (physical symptoms, social dysfunction, anxiety and insomnia, and depression) in epileptic children.

3. Patients and Methods

The present study is a semi-experimental investigation with a pretest and posttest design and includes a control group.

3.1. Subjects

From 175 epileptic children who were registered at the Iranian epilepsy association (IEA) in Tehran in 2014, 24 children were excluded from the study due to physical and motor disabilities, sensory difficulties (blindness and deafness), behavior disorders (conduct disorder, disruptive behavior disorder, and oppositional conduct disorder), and participation in a similar program at the same time. From the remaining 151 children, 30 children (17 boys and 13 girls; mean \pm standard deviation = 15.87 ± 1.41 , respectively) were selected randomly by lottery and according to our sample size formula ($\alpha = 0.05$, expected power = 0.80, standard deviation = 15, and mean deviation = 11) and inclusion criteria. The IEA is a charity, and our subjects were registered there and received free medical and psychological services. Data were extracted from the IEA's computerized files. Subjects were included according to their age (14 - 18 years old) and controlled epilepsy (having received medication for the preceding 6 months and without seizure). They were assigned to an experimental group and a control group. All the subjects completed the general health questionnaire (GHQ; Goldberg and Hiller, 1979) before and after the training sessions.

3.2. General Health Questionnaire

This is a screening, self-reporting questionnaire which was constructed by Goldberg and Hiller (1979) and has been used in clinical settings with the aim of differentiating people with mental disorders (28). The questionnaire has 4 subscales of physical symptoms, anxiety and insomnia, social dysfunction, and depression. Each subscale has 7 items, and the sum of the scores of the 4 subscales yields an index for general mental health. Taghavi reported its reliability through test-retest, two-split, and Cronbach's alpha of 0.70, 0.93, and 0.90, respectively. Each item is scored from 0 to 4 points. Receiving 6 points in each subscale and 22 points and higher for the total scale is an indicator for psychopathology (29).

3.3. Procedure

The study was formally approved by the ethics committee of university of social welfare and rehabilitation sciences in Iran. Written informed consent was obtained from the children's parents. Thereafter, 30 epileptic children were selected randomly from those at the IEA in Tehran, 2013. Subjects were selected according to our sample size formula and inclusion and exclusion criteria and were assigned to experimental and control groups in equal numbers. The experimental group participated in 11 training sessions (twice a week; 45 minutes per session) and received an attribution retraining program in addition to a routine program, whereas the control group received only the routine program (i.e., communication training, anger management, and life skills training) presented in the IEA. After the eleventh session and subsequently 6 weeks later, the general health questionnaire was completed by all the subjects. The data were analyzed via the analysis of covariance (ANCOVA) using statistical package for the social sciences (SPSS), version 16.

The attribution retraining program was set based on the Bandura theory about self-efficacy, the Seligman learned helplessness model, and the Wiener attribution model. This package was set by Golparvar (30) for students with dyscalculia for the first time in Iran. The reliability and validity of the package were reported to be 0.92 and 0.86, correspondingly. The contents of each sessions were as follows (Table 1):

The flow chart of the study is as follows:

- 1) Literature review (2 months)
- 2) Investigating the population and sample selection (1 month)
- 3) Administrating the intervention and data collection (3 months)
- 4) Entering the data into SPSS and data analysis (1 month)
- 5) Writing and editing the project and providing the paper (4 months)

4. Results

The descriptive indices of the experimental and control groups according to their sex and age are depicted in Table 2.

The results of the χ^2 test showed no significant difference between the experimental and control groups according to gender and age.

The mean \pm standard deviation of mental health and its components for the experimental and control groups in the pretest and posttest separately is presented in Table 3.

As is shown in Table 3, there was a difference between the mean scores of the experimental and control groups in terms of mental health and its components. The ANCOVA was employed to determine the significance of the difference. It was required to test the assumption of the ANCOVA to determine the effectiveness of attribution retraining on mental health in the epileptic children. Accordingly, the normality of the variables and the sameness of variances were tested. The Kolmogorov-Smirnov test (Table 4) demonstrated that all the variables were normal, and the Leven

test was not significant ($P > 0.01$) (Table 5).

Also, the diagram of regression square linear was shown to be 0.106, denoting a linear relation between the pretest and posttest of mental health in the 2 groups. Consequently, it was possible to use the ANCOVA since all its assumptions were tested. The ANCOVA was utilized to compare mental health between the experimental and control groups in posttest (Table 6).

As is shown in Table 6, mental health and its components (physical symptoms, anxiety and insomnia, social dysfunction, and depression) were different between the experimental and control groups significantly ($P < 0.01$). According to the eta quotient, it can be concluded that 43%, 62%, 55%, 78%, and 65% of the variances of physical symptoms, anxiety and insomnia, social dysfunction, depression, and mental health were explained by attending the attribution retraining sessions. Also, there were no significant differences between the scores of mental health and its components in the posttest and follow-up.

Table 1. Contents of the Attribution Retraining Sessions

| Session | Purpose |
|---------|---|
| 1 | Welcoming the children, introducing them to one another, and determining the responsibilities of the members and the leader |
| 2 | Drawing the children's attention to their own reactions toward unpleasant events |
| 3 | Explaining how to analyze events by presenting simple examples |
| 4 | Modifying the attributional style of the children |
| 5 | Evaluating the accuracy of beliefs |
| 6 | Identifying the style of self-blame |
| 7 | Determining the role of each person in every event |
| 8 | Training how to cope with tragic attitudes |
| 9 | Explaining the relation between adversity, beliefs and interpretations, consequences, disputes, energy levels, and feelings |
| 10 | Training how to avoid considering events as catastrophic |
| 11 | Playing mental games about the issues in the previous sessions |

Table 2. The distribution of gender and age of participants in experimental and control group separately

| Group | Experimental Group | Control Group |
|---------------------|--------------------------------------|--------------------------------------|
| Gender | | |
| Female | 7 (46.66) | 6 (40.00) |
| Male | 8 (53.33) | 9 (60.00) |
| Coefficients | $\chi^2 = 2.53$, df = 1, Sig = 0.23 | $\chi^2 = 2.53$, df = 1, Sig = 0.23 |
| Age, y | | |
| | Experimental Group | Control Group |
| 14 - 15 | 3 (20.00) | 2 (13.4) |
| 15 - 16 | 4 (26.7) | 5 (33.34) |
| 16 - 17 | 6 (40.00) | 3 (20.00) |
| 17 - 18 | 2 (13.4) | 5 (33.34) |
| Coefficients | $\chi^2 = 1.77$, df = 3, Sig = 0.37 | $\chi^2 = 1.77$, df = 3, Sig = 0.37 |

Table 3. Mean (M) and Standard Deviation (SD) of Mental Health and Its Components for Both Groups

| Variable | Experimental Group | | Control Group | |
|----------------------|--------------------|--------------|---------------|--------------|
| | Pretest | Posttest | Pretest | Posttest |
| Physical symptoms | 9.33 ± 2.79 | 4.73 ± 2.12 | 8.53 ± 2.32 | 7.60 ± 3.06 |
| Anxiety and insomnia | 9.67 ± 3.44 | 2.93 ± 2.52 | 8.66 ± 3.41 | 8.00 ± 2.53 |
| Social dysfunction | 15.13 ± 3.50 | 9.07 ± 2.37 | 6.87 ± 3.60 | 8.20 ± 3.38 |
| Depression | 7.73 ± 2.66 | 1.73 ± 1.94 | 7.87 ± 2.92 | 8.00 ± 3.46 |
| Mental health | 35.87 ± 4.48 | 24.47 ± 4.21 | 31.93 ± 5.62 | 31.80 ± 6.88 |

Table 4. Results of the Kolmogorov-Smirnov Test for Testing the Normality of All the Variables

| Variable | Experimental Group | | Control Group | |
|----------------------|--------------------|---------|--------------------|---------|
| | Kolmogorov-Smirnov | P Value | Kolmogorov-Smirnov | P Value |
| Physical symptoms | 0.97 | 0.30 | 0.48 | 0.97 |
| Anxiety and insomnia | 1.12 | 0.16 | 0.72 | 0.68 |
| Social dysfunction | 0.72 | 0.68 | 0.55 | 0.92 |
| Depression | 0.72 | 0.67 | 0.57 | 0.90 |
| Mental health | 0.65 | 0.78 | 0.60 | 0.86 |

Table 5. Results of the Levin Test for Variance Homogeneity Between the Two Groups ^a

| Variable | F | P Value |
|----------------------|------|---------|
| Physical symptoms | 0.18 | 0.67 |
| Anxiety and insomnia | 0.33 | 0.57 |
| Social dysfunction | 1.72 | 0.20 |
| Depression | 0.12 | 0.73 |
| Total mental | 0.05 | 0.94 |

^a Abbreviation: F, F statistics which is calculated according to the ratio of two variances.

Table 6. Results of the Multiple Analysis of Covariance to Compare Mental Health Between the Control and Experimental Groups

| Source of Change | Dependent Variable | Sum of Squares | F | P Value | Eta Square |
|------------------|----------------------|----------------|-------|---------|------------|
| Pretest | | | | | |
| | Physical symptoms | 28.43 | 4.62 | 0.04 | 0.15 |
| | Anxiety and insomnia | 45.04 | 9.08 | 0.01 | 0.25 |
| | Social dysfunction | 3.13 | 0.36 | 0.55 | 0.01 |
| | Depression | 0.46 | 0.06 | 0.81 | 0.002 |
| | Mental health | 430.79 | 24.26 | 0.01 | 0.47 |
| Group | | | | | |
| | Physical symptoms | 79.35 | 18.74 | 0.01 | 0.43 |
| | Anxiety and insomnia | 166.38 | 39.24 | 0.01 | 0.62 |
| | Social dysfunction | 244.91 | 29.11 | 0.01 | 0.55 |
| | Depression | 376.87 | 84.64 | 0.01 | 0.78 |
| | Mental health | 653.86 | 43.80 | 0.01 | 0.65 |
| Follow-up | | | | | |
| | Physical symptoms | 9.33 | 3.14 | 0.29 | 0.13 |
| | Anxiety and insomnia | 12.32 | 7.43 | 0.41 | 0.16 |
| | Social dysfunction | 8.91 | 7.21 | 0.34 | 0.15 |
| | Depression | 11.6 | 4.51 | 0.77 | 0.18 |
| | Mental health | 15.68 | 9.81 | 0.12 | 0.14 |

5. Discussion

The major finding of the present study was that physical symptoms in the epileptic children decreased significantly after participating in the attribution retraining sessions. This finding was concordant with the results of some previous studies (31, 32). Epileptic children experience psychological problems due to negative self-perception. They tend to attribute their failures (which are partly because of having a neurological disease) to their incompetence, and then spread their feelings of inadequacy and helplessness to their other experiences. Consequently, they miss the opportunities to perform effectively and finally yield to loneliness and helplessness rather than seek to address the problem appropriately. In the present study, it seems that modification from the pessimistic attributional style to the optimistic attributional style, which occurred in the intervention sessions, caused the epileptic children to attribute unpleasant events to unstable, specific, and external factors. As a result, they experienced fewer physical symptoms than before (19).

Another finding in the current study suggested that the attribution retraining program reduced anxiety and insomnia in the epileptic children, which chimes in with the results of a study by Larisch et al. (24), who concluded that attribution retraining led to a reduction in anxiety and insomnia in individuals with health problems. Epilepsy can affect adaptive skills and coping with problems pertaining to a chronic disease through creating inefficient underlying beliefs. As these beliefs are different from those of normal individuals and are reinforced by negative experiences allied to epilepsy, they will generate high levels of chronic anxiety (33, 34). Attribution retraining programs may result in more social relations, better mood, and modification of children's attitude toward themselves and their abilities. Amongst our study population, the attributional style of the epileptic children may have been altered from external, general, and stable dimensions to external, specific, and unstable ones (35) and, thus, brought about an amelioration in their anxiety.

Other findings showed that attribution retraining decreased social dysfunction in the children with epilepsy. This finding is in line with the results of some previous studies (26, 27, 31, 35). Negative attitudes toward epilepsy can cause social maladjustment; these children, therefore, experience problems in interpersonal relations because of the nature of their illness. Since correcting the communication style (often aggressive or passive) was the purpose of the program in the current study, the subjects may have been motivated to improve their social functioning (36).

Individuals harboring negative expectations and beliefs toward themselves and their current position are liable to interpret events pessimistically, have low performance, predict the future negatively, and attribute their performance to negative causes. All these negative

attributions can undermine individuals' motivation and performance. Furthermore, low expectations of success lessen individuals' motivation for participating in social activities (37). In the present study, it seems that the attribution retraining program enhanced social performance in the children through modifying their pessimistic attributional style to the optimistic attributional style.

Our results also revealed that attribution retraining reduced depression in the epileptic children. Layden (37), Larisch (24) and Yahyaee (31) stated that epileptic children are repeatedly exposed to seizures (as an unpredictable and uncontrollable event), so they gradually experience helplessness and passivity. They often fear being invaded by social environment and are nervous of other people's misinterpretation of them, which precludes them from having positive experiences. In sum, isolation and passivity can affect individuals' self-perception and lead to feeling of inadequacy, helplessness, and depression. Considering that attribution retraining is a method for modifying individuals' perception about the causes of success and failure, it will correct their interpretation of good and bad events. An appropriate training method should address the concept of attributional style, causes of events in different situations, effects of attributions on prospective expectations, and disruptive effects of unstable and internal attributions vis-à-vis failure. In the current study, attribution retraining may have been able to play a major role in familiarizing the epileptic children with the positive effects of attributional styles on health and in developing their skills for confronting events and, thus, reduce their depression. Therefore, this method may enable individuals to correct the negative thoughts and inefficient beliefs that underlie their depression (36).

Our findings revealed mental health improved in the epileptic children following attribution retraining. This finding is in concordance with the results of some previous studies (31, 32, 34, 36, 38, 39). Iravani and Izadi found a relationship between attributional styles and mental health in college students. The present finding can be explained in 3 ways: 1) the pessimistic attributional style renders individuals prone to helplessness, which results in cognitive deficits as well as emotional, social, and physical disabilities and ultimately health problems. 2) Pessimists are not aware of the consequences of their behaviors and fail to make the necessary effort to improve their situation, which will worsen their mental health. 3) It is plausible that the pessimistic attributional style may be due to illness and enormous mental health problems. The notion that pessimists, in comparison to optimists, are susceptible to mental health problems can be explained in 3 ways. Firstly, the pessimistic attributional style leads to helplessness, the effects of which manifest as cognitive, affective, social, and physical disorders or deficiencies and these deficiencies will ultimately cause health problems. Secondly, pessimists are oblivious to

the consequences of their behaviors and do not seek to adequately alter their behaviors; consequently, they are liable to develop health problems. And thirdly, it is widely acceptable that the pessimistic attributional style may be the outcome of disease or health problems (40).

In the current study, the results of follow-up showed no significant difference in attributional styles between the experimental and control groups. To explain this finding, one should take into account the fact that attribution retraining requires that children cooperate actively to recognize maladaptive and negative attributions and show sufficient motivation to modify these attributions; it is probable that the children in our study failed to accomplish their assignments in the time interval between the termination of the program and follow-up evaluation. Moreover, the preservation of mental health needs more time than the few intervention sessions made available to the epileptic children in the present study.

According to the Wiener theory (40), it is suitable to attribute successes to internal, stable, and general factors and failures to external, unstable, and specific causes. In the present study, maladaptive attributions in the children were modified through the attribution retraining program. Also, our findings showed that the attribution retraining program was effective in restructuring the epileptic children's causal explanation of failures. Indeed, the children succeeded in attributing their successes to internal, stable, and general factors and their failures to external, unstable, and specific factors. So, the program was able to improve mental health in the epileptic children in our study. The attribution retraining program can be employed by educators, psychologists, and counselors who provide rehabilitation services for epileptic children. It can enhance quality of life and mental health in children and prevent probable adaptive problems in adulthood.

Our study had some limitations, first and foremost amongst which was its low sample size. We reported the effectiveness of attribution retraining on mental health in epileptic children aged between 14 and 18 years who lived in Tehran. Consequently, a population-based study is required to determine the effectiveness of attribution retraining on mental health in all Iranian children with epilepsy for an appropriate interpretation of the results. In fact, there is a need to assess the status of mental health in the pediatric population via the same method.

The distribution of the intervention sessions in 11 weeks (1 session per week) may augment the positive effect of intervention on mental health at follow-up. As the sessions were held twice a week in our study, it is probable that the children were dependent on the trainer's supervision and did not feel responsible for accomplishing their tasks. According to a previous study, a 20-week program had a positive impact on mental health in the study population in the long term, even at 6 weeks' follow-up (41).

The strong point of the present study was the application of attribution retraining on epileptic children before

18 years old. It is deserving of note that the implementation of a similar intervention for rehabilitation purposes for epileptic children could confer better mental health by preventing many health problems that may interfere with epilepsy.

We recommend that future studies recruit larger sample volumes, comprising subjects of both sexes and different age brackets, so as to better evaluate the effectiveness of attribution retraining on boys and girls at different ages. Attribution retraining can be applied as an effective intervention by experts, teachers, and parents. The program can be implemented in family training classes, so that parents will be able to supervise the accomplishment of the assignments by their children.

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Authors' Contributions

Corresponding author: Tahere Najafi Fard: training attribution retraining, writing the manuscript, and examining the children. Masoume Pourmohamadreza Tajrishi: supervising the project and writing and editing the manuscript, first author. Saeid Abbasi: analyzing the data and writing the manuscript, second author. Saheb Yousefi: administrating the questionnaire, fourth author. Athar Mohammadi Malek Abadi: administrating the questionnaire, fifth author. Hosein Delavar Kasmaei: coordinating the administration of the study with the Iranian epilepsy association in Tehran, sixth author.

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