



The Impact of Emotional Expressions of Parents on their Children with Specific Learning Disorders: The Role of Parental Educational Counseling Program

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Abstract

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BACKGROUND: Children are the world's real treasures; they should be cherished, well raised, and given the chance to develop properly. Some of them in different countries worldwide are suffering from various forms of specific learning disorders (SLDs), which can be extremely frustrating the school child, especially if associated with parental high emotional expression (EE).

OBJECTIVES: The purpose of the study is to identify the relation between parents' EEs and anxiety rate in their children with SLDs and its correlation with serum cortisol level of the children. The effect of parental educational counseling program (PECP) on the anxiety rate of children and parental EE was studied.

METHODS: The study was carried out on 140 children with SLD to evaluate their anxiety rate using Taylor anxiety scale of children, and measuring serum cortisol level. Data were collected from parents by EE scale (EES). Taylor anxiety scale and EES were repeated for children and parents after conducting sessions of PECP.

RESULTS: Results of Taylor anxiety scale showed that 60% of studied children were suffering from morbid anxiety. Results of EES showed that 80% of parents were practicing high EE. Scores of children on Taylor anxiety scale demonstrated a significant drop from 33.06 ± 10.4 to 25.85 ± 10.4 after applying the intervention ($p < 0.001$). More than two-thirds of parents became practicing low EE after receiving sessions of the interventional program PECP. Scores of parents on EES showed a significant drop from 61.31 ± 16.84 to 36.51 ± 13.89 after PECP ($p < 0.001$). A statistically significant positive correlation between scores of Taylor anxiety scale and EES before PECP was found ($r = 0.533$) and after PECP ($r = 0.309$). Average level of serum cortisol of children with SLD was 8.973 ± 1.784 mcg/dl, and it was significantly higher in boys than girls ($p < 0.05$). Serum cortisol level of studied children was higher in children with morbid and severe anxiety ($p < 0.001$). Cortisol levels of children were significantly higher in those whose parents were practicing high EE. Serum cortisol level of children revealed a positive correlation with each of their scores on Taylor anxiety scale ($r = 0.771$) and scores of parents on EES ($r = 0.468$).

CONCLUSION: Results of this study proved the presence of direct relation between anxiety in school children with SLDs and high EEs of their parents. Results concluded the effectiveness of PECP in the management of children's anxiety and parental EE.

Introduction

Children are the world's real treasures; they should be cherished, well raised, and given the chance to develop properly. Some of them in different countries worldwide are suffering from various forms of specific learning disorders (SLDs), which can be extremely frustrating the school child, especially if associated with parental high emotional expression (EE); considering this, we measured the parental EE in order to improve the way of dealing with children who have SLDs and to know if the negative (high) EE of parents increase the anxiety in their children or not.

Health educational counseling intervention is an important practice to enhance parental skills and play a main role in the caregiver burden and quality of life of the school children with SLDs. For this reason, we conducted

this interventional study aiming to assess the effectiveness of the parental educational counseling program (PECP) on children with SLDs targeting their anxiety.

According to DSM-5, studies report 15–20% of school children have SLDs; 4–9% for deficits in reading (Dyslexia), 3–7% for deficiencies in mathematics (Dyscalculia) [1]. Epidemiological studies estimate SLD prevalence of 15–20% for difficulties in reading among Egyptian school children [2]. Many children with SLD struggle in school long before being diagnosed. SLDs can be extremely frustrating for the school child, affect self-esteem and motivation [3]. Considering this, we conducted this study to assess the impact of parental EE on their children's anxiety level.

Regardless of the non-academic talents of the child, the academic performance in many times is taken as gold standard for judgment. These educational

challenges combined with an unsupportive social and familial atmosphere will burden the child with SLD. High EE makes the school child with SLD anxious [4].

SLDs are neurodevelopmental disorders that share common features of persistent difficulty in learning key academic skills such as reading, writing, or mathematics [5]. DSM-5 considers SLD as a persistent difficulty in learning skills among average or above level of intellectuality. It is not due to intellectual, visual, auditory disabilities, attention deficit, other mental or neurological disorders, psychosocial adversity, or inadequate education [6].

Cortisol, called “stress hormone,” participates in response to stress situations, and enters into complex interactions with the hormonal and immune system [7]. Corticosteroid has frequently been observed to interact functionally in the pathogenesis of anxiety disorders associated with the dysfunctional hypothalamo-pituitary-adrenocortical axis system. Chronic increase in cortisol secretion leads to permanent structural changes (up to irreversible damage) to the hippocampus, increasing vulnerability to suffering from depression and anxiety disorders [8]. Regarding this, we measured serum cortisol level for children and the relation of it with their anxiety was studied.

High EEs are considered to be an adverse family environment, which includes the quality of interaction patterns and nature of family relationships among the family caregivers and patients [4]. High EE is more likely to cause a relapse than low EE. The three dimensions of high EE are hostility, emotional over-involvement (EOI), and critical comments. Low EE represents in warmth and positive remarks [9].

On the other hand; when the family is more educated and does not have to “put up” with the patient and his/her disorder, they are more likely to have low EE [10]. The prevalence of severe stress in SLD children is 16.6%, severe depression is 14.2% and severe anxiety is 23.8% [3]. According to DSM-5; criteria of generalized anxiety disorder in children are anxiety and worry associated with one or more of the following six symptoms, most of the days for 6 months (restlessness, being easily fatigued, difficulty concentrating, irritability, muscle tension, and sleep disturbance) [11], [12].

The study provides a counseling program for the family that is easy to use and implement on broad national scale at the level of learning disabilities centers and units especially after revealing significance.

Materials and Methods

Study setting

The study was conducted in learning disabilities unit (LDU) that attached to the child psychiatry outpatient clinic in educational hospital of Helwan University, which

receives 30 patients/week with equal 120 patients/month, 10% of them were referred to LDU that equal 12 learning disability case per month and 144/year.

Research design (Type of the study)

Interventional study design.

Subjects and population

Children with SLDs who attended the LDU and whose parents agreed to participate. The study was conducted upon children with SLDs, children were diagnosed by two psychiatric consultants according to SLD's specific criteria of DSM-5, and using battery for diagnostic assessing standards of developmental and academic learning disabilities (DASDA) [13]. They were in average or above average IQ (>85) using Stanford-intelligence scale [14]. Their parents or caregivers were included. The study begins after obtaining the approval of research ethical comity on the study and continued for a year.

Sample size

The sample size was 137 and increased to 140 to be compensated for non-responsive participants. Calculation of the number was according to the following equation:

$$\left\{ n = \frac{(z)^2 p (1-p)}{d^2} \right.$$

n = minimum sample size

z = level of confidence according to the standard normal distribution (for a level of confidence of 95%, z = 1.96, for a level of confidence of 99%, z = 2.575)

p = estimated prevalence of specific learning disorder 10% (0.1) according DSM5

d = tolerated margin of error (for example we want to know the real proportion within 5% [0.05])

$$\left. n = \frac{(1.96)^2 \times (0.1 \times 0.9)}{(0.05)^2} = 136.8 + 15 \right\}$$

All children were recorded in Arabic governmental national schools. Children with co-morbid disorders as attention deficit hyperactivity disease, intellectual disabilities, or nocturnal enuresis, were excluded. Those with a history of sensory impairment (visual or hearing defect), history of head injury, neurological disorder, or those who have an insufficient learning environment were also excluded.

This interventional study was carried out on 140 children with SLDs 10–14-years-old, attending the learning disability unit attached to the psychiatric

department of the educational hospital of Helwan University, Cairo, Egypt. Their levels of anxiety were assessed using the Taylor anxiety scale and serum cortisol level. Parental EEs were evaluated using the EES. The study began after obtaining written informed consent from parents.

Limitations of the study

1- Presence of another source to provoke anxiety in children as their mentors or colleagues in school. 2- Difficult handling of the children during the cortisol measurement. 3- Difficult communication with illiterate mothers made the study and filing the structured interview questionnaires more time consuming. 4- Difficulties in scheduling the sessions to suit the circumstances of all of the parents.

All children were subjected to the following:

Personal history data

To collect the socio-demographic data of children and their parents. It was attached to the informed consent.

Stanford-Binet Intelligence Scale fifth edition

This scale includes five factors of cognitive ability; fluid reasoning, knowledge, quantitative reasoning, visual-spatial processing, and working memory. Both verbal and nonverbal responses were measured. Each of five factors was often reduced to a ratio known as the IQ [14].

Battery for DASDA, (El-Zayat and El-Zayat, 2007)

It consists of: developmental learning standards (Attention, memory, auditory perception, visual perception, and motor perception), academic learning standards (Reading, writing and math), emotional difficulties, and social behavior scale [13].

Taylor manifest anxiety scale

Consists of 50 true or false items to assess anxiety level. Total score is obtained by summing answers of 50 questions about anxiety symptoms. Scores were from Zero to 16 (free), 17–20 (mild), 21–26 (moderate), 27–29 (severe) and 30–50 (morbid anxiety) [15]. The test is taken and interpreted as an explicit measure of anxiety, which was translated into Arabic by Fahmi *et al.* [16]. They also conducted the necessary studies on the test so that they were assured of its reliability. Construct validity has been studied on children in the Egyptian environment from the age of 10–15 years.

Serum cortisol level measurement

5 ml of venous blood were collected. The morning sample was used for measurement as a biological marker for stress [17]. This test was applied in laboratory department of the hospital, collected and analyzed by their staff. It was measured only before applying PECP intervention. Normal range in this age is 3–21 mcg/dl [18].

All parents will be subjected to the following:

Expressed emotional scale (EES)

It includes 48 items; divided into four subscales of questions; seven items for EOI, 13 for family warmth and positive remarks, 19 for criticism and hostility, and 9 items for negative perception. (Answers were: never happened, sometimes and always). The scores were designed to be zero for never happen, 1 for sometimes, and 2 for always. Total score of positive response in each domain reaching > 50% were considered (high) EE, and those with scores < 50% were considered (low) EE [19], [20]. The scales have been completed before and after applying PECP intervention.

Interventional method - PECP

Family counseling is very important for all children's psychological, social, educational, professional, and emotional aspects. So, the study conducted an educational counseling program for parents. Sessions of this program aimed to improve the anxiety of children with SLDs through correction of ways of parents to deal with the disorder. PECP was designed after reviewing studies about the same issue. Their results revealed effective development in psychological disorders of children with learning difficulties after conduction of parental health education [21], [22].

The program consisted of 10 sessions over a period of 10 weeks (session per week). Duration of each was 45 min–1 h. The program was delivered in Arabic language and in simple ways. It included logic, realistic simulating situations to suit the audience's educational, cultural, and socioeconomic levels.

Illustrative tools, flyers, and diagrams were added to make the program more informative for parents and more competent for the expecting results. Different strategies (like interactive lectures, videos, role play, assignments, and summarization) were used in conduction of the sessions to cover all styles of learning; visual, auditory, read and write, and even kinesthetic. Hand outs had been distributed beside usage of white board and markers to clarify some points.

Interactive lectures, slides of powerpoint material, assignments, and constructive feedbacks were used in conducting all sessions. Role playing was used in sessions of effective parenting, behavioral modification, and anger management.

The sessions and their specific objectives were as follow:

Opening session

To establish rapport with parents, obtain informed written consent, complete forms of EES questionnaire, introduce the program (definition, objectives, procedures, and system of sessions), and to create parent's motivations toward commitment and participation in the program. This was achieved by clarifying the program's advantages and benefits in helping them improve the familial atmosphere and the relation with their children who have SLD.

Learning disabilities and families

To assist parents to be aware of the concept of SLD, its types, signs, causes. It showed the proper way to deal, manage, and insight the parents about the importance of their effective role in providing a healthy environment for the child's mental health.

Continue (learning disabilities and families)

To acquire some skills of positive perception, interaction, and proper responses and construct parental cognition to promote children's self-confidence and abilities by encouraging their talents.

Signs of anxiety in children with SLD

To enlighten parents about manifestations and criteria of children's anxiety and to illustrate some important tips and studying techniques to overcome the anxiety in children.

Parental EE PEE

Concept and types of EE (High and Low) were discussed. Direct relation of parental EE towards children with levels of anxiety was explained, and how to control high EE.

Behavior, behavioral modification and positive reinforcement

To define the behavior and how to note and record. Strategies of behavioral modification were suggested. Concept of positive reinforcement and how to apply the praise were discussed.

Temporary isolation and anger management

To identify the temporary isolation as a useful way to punish, and the negative effects of physical and verbal punishment, enlighten parents

about meaning of anger and some strategies for management.

Communication skills and problem-solving

Providing awareness about effective communication and its role in achieving effective parenting. Assist the audience in acquiring skills to solve problems and to find alternatives.

Parental effectiveness (PE) ([the role model] and [acceptance and unconditional love])

Realize that they are the powerful source of learning, emotional support, an element of developing the personality of their children, and the role model to imitate. Clarify the concept of PE, acceptance, and its effect on the behavior. Stimulate parents to build strong bonds with children through unconditional love.

Closing session

For revision, summarization, feedback, assessment and complete the post-EEs questionnaires. It was in the 10th session.

Validity and reliability

Tools were tested and evaluated for their face and content validity, and reliability. Face and content validity is tested by five professors in two different specialties; mental health nursing and community health nursing department. To ascertain relevance, clarity, and completeness of the tools, professors elicited responses, which were either agree or disagree for the face validity and content reliability. The items on which 85% or more of the professors have agreed were included in the proposed tool. The required corrections and modifications were done. The reliability of the tools was assessed through measuring their internal consistency by the Cronbach Alpha Coefficient test. It was proved to be high, as in the following:-

Cronbach alpha coefficient			
Tools	Reliability	Face validity	Statistical validity
	6.34	98.2	6.24

The study was conducted after explaining the importance and objectives of the study to the participants, only those who agreed were included and those who refused were excluded and detailed consent was obtained from all parents before participation as an ethical consideration. Approval for using questionnaires was obtained from the digital library of Ain Shams University. Approval for using LDU was obtained from the head department of psychiatry in the faculty of medicine, Helwan University.

Written informed consents were obtained from parents with their agreement on participation in

the study and attending sessions of the PECP. The consent form was including brief about steps of study and its benefits with right to withdraw after telling the researcher and without affecting the health service provided to him/her.

Statistical analysis

The collected data were tabulated and analyzed using the Statistical Package for Social Science Version 25. Categorical data were expressed as number and percentage using “Chi-square,” Fisher’s exact test, or “Z” test for analyzing them. Continuous variables were presented as mean and standard deviation using “Student t” test or ANOVA for analyzing them. The accepted level of significance in this work will be 0.05, (p < 0.05 will be considered significant).

Ethical consideration

1. Informed consent were obtained from the parents before participation; it was include data about the aim of the work, study design, site, time, subject, tools, confidentiality, and possibility of withdrawal from the study at any time without any consequences.
2. The study protocol, questionnaires, educational program, and scales were approved by my supervisors in family medicine and psychiatric departments of Kasr Al Ainy.
3. Approval from the research ethics committee and institutional review board in Cairo University was obtained.

Table 1: Socio-demographic data of studied group

Socio-demographic data	No.	%	Total	%
Age Groups (Years)				
10–11	101	72.1	140	100
12–13	30	21.4		
14	9	6.4		
Gender				
Boys	82	58.6	140	100
Girls	58	41.4		
Age Distribution (Mean + SD)				
Boys	10.95 + 1.264	58.6	(10.94 + 1.210)	100
Girls	8.586 + 1.903	41.4		
Sibling Order				
Single	14	10.0	140	100
Youngest	44	31.4		
Middle	51	36.4		
Oldest	31	22.1		
Educational Level				
Grade 5	38	27.1	140	100
Grade 6	52	37.1		
Grade 7	23	16.4		
Grade 8	27	19.3		
Consanguinity				
Positive	19	13.6	140	100
Negative	121	86.4		
Marital Status				
Married	118	84.3	140	100
Separated	22	15.7		
Father Occupation				
Professional	78	55.7	140	100
Not fixed job	11	7.9		
Employee	51	36.4		
Mother Education				
Illiterate	99	70.7	140	100
Read and Write	41	29.3		
Total			140	100

Results

Socio-demographic data (Table 1) showed that more than half of patients were boys, with an average age between 10 and 11 years, the average age of the children was from 10 to 14 years; the mean age ± SD of boys were 10.95 ± 1.246 years and of girls 10.93 ± 1.168. Around 40% of them were of middle sibling order and in sixth educational level of the primary stage. Majority of attendants (90%) were mothers, all of them were housewives, and most of them were illiterate and can read and write. Regarding fathers; 60% of them were working in professional jobs (without fixed income). Majority of parents (87%) showed negative consanguinity.

Table 2: Scores of Taylor scale before and after PECP

Level of Anxiety	Score	Taylor before PECP		Taylor after PECP		p-value
		No.	%	No.	%	
Free	0–16	14	10.0	30	21.4	<0.001
Middle	17–20	7	5.0	23	16.4	
Moderate	21–26	26	18.6	28	20.0	
Sever	27–29	8	5.7	5	3.6	
Morbid	30–50	85	60.7	54	38.6	
Total		140	100.0	140	100.0	

Results of Taylor scale showed that 60% of children were suffering from morbid anxiety before PECP. After PECP, percentage of children with morbid anxiety decreased from 60% to around 40%. Percentage of children free from anxiety increased from 10% to more than 20% (Table 2). Scores of Taylor anxiety scale revealed significant drop from 33.06 ± 10.4 to 25.85 ± 10.4 (p < 0.001). Results of EES showed that 80% of parents were practicing high EE before PECP. This percentage decreased from 80% to 8.6%. Those who were practicing low EE increased from 20% to 91.4% after receiving the PECP (Table 3). More than two-thirds of parents became practicing low EE, and scores of EES revealed significant drop from 61.31 ± 16.84 to 36.51 ± 13.89 after PECP (p < 0.001).

Table 3: Scores of parental EES before and after PECP

Level of EE	EE before PECP		EE after PECP		p-value
	No	%	No	%	
Low	28	20.0	128	91.4	<0.001
High	112	80.0	12	8.6	
Total	140	100.0	140	100.0	

Mean±SD of serum cortisol level was significantly higher in boys than in girls (p < 0.05) (Table 4). Average level of serum cortisol was higher in children with morbid and severe anxiety (p < 0.001) (Table 5). Mean level of serum cortisol was higher in children whose parents have high EE (p < 0.001) (Table 6). Relation between scores of Taylor scale and EES before PECP revealed a statistically positive correlation (r = 0.533) (Figure 1). After PECP, this relation revealed a statistically positive correlation (r = 309) (Figure 2). Scores of parents on EES revealed a statistically positive correlation with

Table 4: Cortisol level of children regarding their gender distribution

Gender	Boys	Girls	t	p-value	Total
No	(82)	(58)			140
%	58.6%	41.4%	2.185	0.031	(100%)
Cortisol (mcg/dl) Mean±SD	9.25 ± 1.65	8.59 ± 1.90			8.973 ± 1.784

Table 5: Cortisol level of children according to level of anxiety

Anxiety L	Taylor scale before PECP					Total	p-value
	Free	Mild	Moderate	Severe	Morbid		
No.	(14)	(7)	(26)	(8)	(85)	140	<0.001
Serum Cortisol	5.60 ± 1.706	7.77 ± 0.048	8.16 ± 1.406	8.75 ± 0.935	9.89 ± 1.038	100%	

serum cortisol level of children ($r = 0.468$) (Figure 3). Scores of children on Taylor anxiety scale demonstrated a statistically positive correlation with serum cortisol level ($r = 0.771$) (Figure 4).

Table 6: Serum cortisol level of children according to scores of parents on EES

EE No.	Low (28)	High (112)	p-value
Cortiso Level Mean ± SD	7.182 ± 2.1384	9.421 ± 1.3657	< 0.001

Discussion

Studies that assessed needs of parents and caregivers of children with SLDs highlighted their needs to attain better knowledge about the disorder, the ways of handling cognitive and behavioral problems of SLDs, as well as psychological support needs such as stress management and EE skills [23].

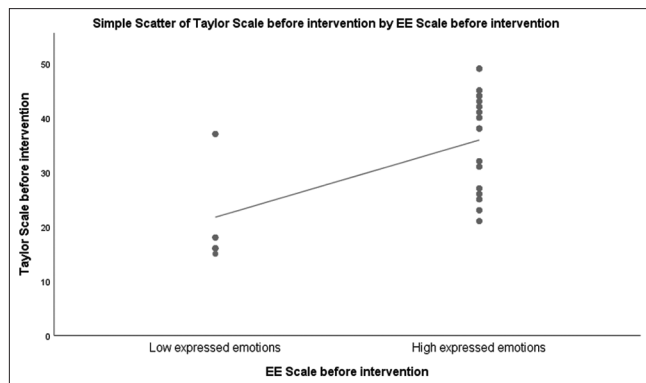


Figure 1: Relation between Taylor and EE scores before PECP

Health educational counseling intervention is an important practice to enhance parental skills and play a main role in the caregiver burden and quality of

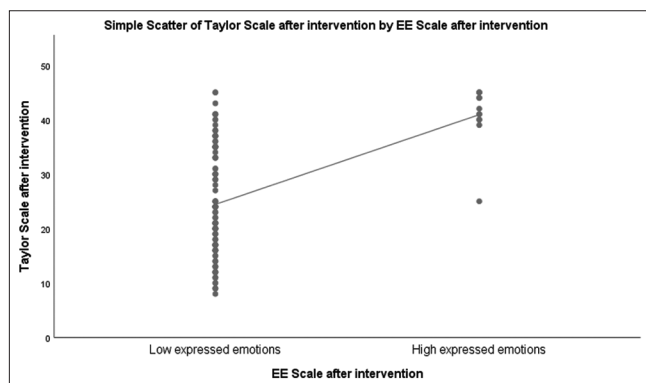


Figure 2: Relation between scores of Taylor and EE after PECP

life of the school children with SLDs [24]. Regarding this; we conducted this interventional study aiming to assess the effectiveness of the PECP on children with SLDs targeting their anxiety.

Scores of the children on anxiety scale in this study decreased significantly after conducting the intervention of PECP from 33.6 ± 10.4 to 25.8 ± 10.4 , with a mean change of scores that equal $7.207 + 6.642$. This improvement was almost similar to the study of Mawad *et al.* (2016) which was conducted in Egypt on sample of 150 cases to illustrate expressed emotions among families having disabled patients, which revealed drop in psychiatric disorders of patients from 35.8 ± 11.73 to $28.6 + 9.82$ after their caregivers attended multiple sessions of educational psychosocial intervention [20].

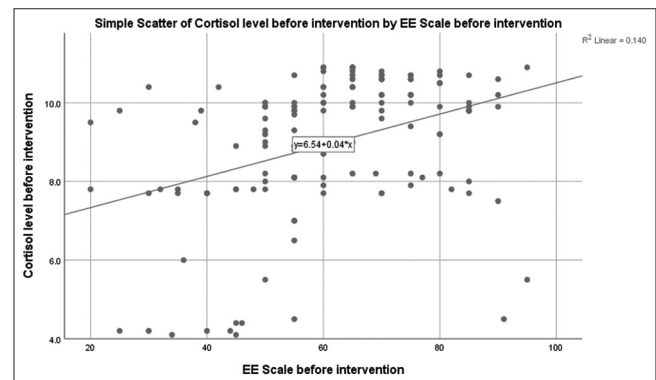


Figure 3: Relation between scores of EES before PECP and serum cortisol level of children

After receiving the PECP sessions; scores of parents on EE scale demonstrated significant drop from 61.31 ± 16.84 to 36.51 ± 13.89 , with a mean change 24.793 ± 22.657 . This improvement in parental EE differs slightly from the study performed by Mawad *et al.* (2016) that revealed less improvement, in which parental EE decreased only from 38.22 ± 15.48 to 34.80 ± 14.96 , and this reflects the need of parents and caregivers in our community to that kind of educational intervention.

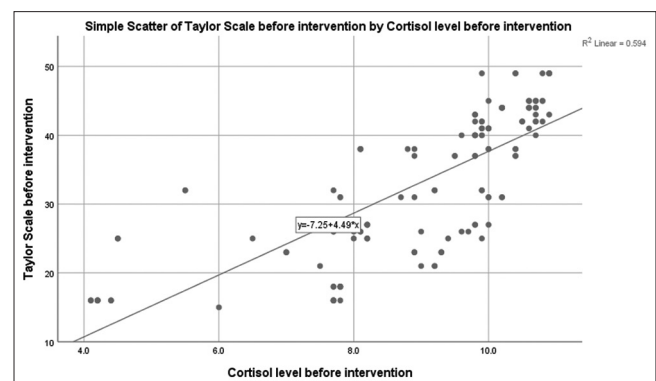


Figure 4: Relation between scores of Taylor scale before PECP and serum cortisol level

Percentage of parents who were practicing high (negative) EE decreased significantly from eighty percent to eight percent, and percentage of parents who were practicing low (positive) EE increased significantly from twenty to ninety percent after receiving the sessions. EE of more than two-thirds of parents in our study improved after applying the intervention; their scores demonstrate significant drop from 67.19 ± 12.63 to 32.86 ± 9.33 , and this supports the effectiveness of our interventional educational counseling program of parents in improving their EEs.

This improvement is in accordance with an interventional study performed by Anuja *et al.* (2016) on 82 participants of children and adolescents with SLDs. The study assessed the level of stress, depression, and anxiety among them using depression, anxiety, and stress scales. It also determined the awareness about SLDs among their parents after receiving remedial training sessions about learning disabilities. Fortunately, it revealed that more than two-thirds of parents became better in practicing positive EEs after receiving the intervention [3].

Anxiety in 41% of our children improved after applying the intervention; their scores demonstrated, significant drop on anxiety scale from 31.25 ± 8.22 to 19.26 ± 4.89 . This provides evidence to support the effectiveness of PECP in the management of anxiety associated with SLDs. On the other hand, familial conflicts concerning other things than learning disorders may be the reason for the unimprovement of some cases as existence of struggles between parents and members of family which can worsen the anxiety and stress.

Percentage of children who were suffering from morbid anxiety decreased significantly from 60 to 40%, percentage of the children free from anxiety increased significantly from ten to more than 20% after applying the intervention. This significant improvement did not occur in the study performed by Medina-Pradas *et al.* (2011); which was conducted on 170 SLD patients and their caregivers in which the study group attended 24 multi-professional psychosocial intervention sessions. That study was carried out in Barcelona, Spain, to evaluate the PEE which was measured by Brief Dyadic Scale of expressed emotions and Camberwell Family Interview. Parental EE s were classified in form of perceived warmth, criticism, hostility, and EOI. Anxiety of patients was classified into mild, moderate, severe, and morbid anxiety. It demonstrated that patients with morbid anxiety, decreased only from 70% to 65% after the intervention, and patients free from anxiety were still as they were without change [25].

Existence of a statistically significant positive correlation between scores of scales of our study (Taylor anxiety scale and EES) before applying the PECP intervention ($r = 0.533$), proved the presence of direct effect of parental EE on anxiety of the children with SLDs. Furthermore, the positive correlation between

scores of Taylor scale and EES after applying the PECP intervention ($r = 0.309$) gives the same conclusion. It also demonstrates the important role of health education and counseling about learning disorders in the improvement of learning difficulty problems.

The improvement of parental EEs in our study following the sessions of PECP in spite of the low socioeconomic condition and high illiteracy level of our sample; suggest that the tools and the methods used in the interventional program, especially face-to-face interactive lectures, with an additional video tool, assignments, feedbacks, and role plays were very appropriate for the educational level of the studied sample.

Conduction of the sessions in a group education helped the participants to share their experiences and problems that occurred between family members, which might be similar to each other. That allowed exchanging experiences between parents and made them more competent to cope better with their life struggles, to acquire skills of problem solving, enhances ways of thinking, and let most of them feel less guilty about the disorder of their children and low levels of care provided before applying the sessions.

Giving exchanged constructive feedbacks between researcher and audience; facilitated early detection and management of domestic violence and hostility. In addition, it helped the parents in acquiring the skills about how to deal with learning difficulties and clarifying the concept of SLDs through provided information in our sessions.

Role playing, giving feedback, discussing the assignments, and summarizations were effective activities used in our program. One of the mothers told me at the closing session that she was hitting her daughter during studying and doing homework before our sessions, but now she promotes self confidence of her child, through encouraging other talents and activities, and through applying our strategies of studying and effective parenting.

The study was conducted on 140 children with SLDs, from 10 to 14-years-old; more than half of them were boys with an average age from 10 to 11 years, most of them were in the middle sibling order and in the sixth educational level of primary stage.

These data are slightly different from the study of Abdelnaby, (2017) that was conducted in Cairo, on one hundred children with SLDs in primary stage of education. It was conducted in department of mental hygiene and psychological counseling of Faculty of Education in Ain Shams University; with equal gender number, ages from 8 to 10-years-old, most of them were the oldest order between siblings and in the fourth grade level of basic education [22].

Regarding the educational grades, number of children in 6th, 5th grades is larger than those in 8th, 7th grades, this reflects the early appearance of learning

disorders which affects their scholar performance directly and passing to the next grades according to American Psychiatric Association (2013) [26].

Socio-demographic data of this study, showed that more than half (~60%) of the children were boys, which may refer to higher care of parents towards boys' education more than girls as a reflection of gender discrimination in our country. The prevalence of SLD in males more than females in the current study is in accordance to the U.S. Department of Education and National Center for Education Statistics, (2019) [27].

Socio-demographic characteristics of this study sample correlate with those found in other studies in this field in Egypt, which in fact, may allow us to suppose that our results may be applicable to the parents in learning disability units. Percentage of mothers in caregivers were 90%, this reflects nature of Egyptian culture in which females are responsible for providing full-time care to family members who are suffering from physical, psychiatric illness, or even mental disorders, this was almost similar to the mother's percentage in the study of Hamed, (2017) which was around 92%. High percentage of mothers refers to nature of Egyptian culture in which females are responsible for providing full-time care to family members who are suffering from disabilities [21].

The average age of the children was from 10 to 14-years-old; the mean age \pm SD of boys were 10.95 ± 1.246 years and of girls 10.93 ± 1.168 . All of mothers in this study were housewives and two-thirds of them were illiterate. Regarding fathers; most of them were working in professional jobs (without fixed income), majority of parents were non consanguineously married.

These socio-demographic characteristics were almost similar to a study performed by Chandramuki *et al.* (2012) which was carried on 150 children with SLDs in India. Their ages were close to our age group from 10 to 15 years. The study was conducted in the child out-patient department at the national institute of mental health and neurosciences to explore the parental attitudes towards children with SLD. Attitude of parents was assessed using the parental attitude scale, the mean age and SD of boys were 12.4 ± 2.21 years and of girls were 11.4 ± 3.31 years. All parents were non consanguineously married, most of mothers were housewives and illiterate, and regarding fathers; more than half of them were working in professional jobs [28].

The average age of boys and girls in the current study was too close; this may be due to narrow range of age of selected sample. Regarding sibling order, most of our children with SLDs were in middle and youngest sibling order. It was noticed that the numbers of families with single child were the least in our sample; this may refer to the better parenting of single child than multiple.

In the current study, most of the fathers were working in professional occupations and non-fixed jobs (without fixed income) which reflect high prevalence of

SLDs among families with low socioeconomic status. This is in accordance to the U.S. Department of Education and National Center for Education Statistics, (2019) [27].

Corticosteroids have been observed to interact in the pathogenesis of anxiety disorders associated with the dysfunctional hypothalamo-pituitary-adrenocortical axis, especially on the level of the amygdala and hippocampus [17]. Cortisol hormone is considered as a stress hormone, anxiety marker, and an indicator for exposure to stressors. It participates in the response to stress situations. It has a role in the complex interactions between response of the hormonal and immune systems [7]. For this reason, we measured serum cortisol level for our children with SLDs in the current study.

The average level of cortisol was significantly higher in boys than in girls; the mean \pm SD of boys was 9.246 ± 1.653 mcg/dl and of girls was 8.586 ± 1.903 mcg/dl. Fear of parents from escaping of their sons out of the educational process may be the cause of extra pressure on males more than females.

According to LaGow *et al.* (2007) the normal range of cortisol level in children at the morning is 3–21 mcg/dl. Serum cortisol values in the current study were within normal range. However, samples were taken after beginning of behavioral therapy [18]. The average value of serum cortisol level of our children with SLDs was 8.973 ± 1.7847 mcg/dl. In another study performed in the USA by Rashkova *et al.* (2010) [7], to assess the anxiety of children by measuring the salivary cortisol level, the average was 0.107 ± 0.551 mcg/dl. The normal range of salivary cortisol level is $0.28 + 0.03$ mcg/dl [29].

The way of taking our samples may explain this difference, the serum way is stressing the children more than the salivary one, because it is more invasive and painful. Also may be explained by conduction of our study in a different place with higher limitations and other environmental obstacles, all of these can add extra burden on the children.

Averages of serum cortisol in the current were significantly higher in children with morbid and severe anxiety 9.89 ± 1.038 , 8.75 ± 0.935 . In a study performed by Sajaniemi *et al.* (2011) which was carried out on serum cortisol level in 200 learning disabled children to assess the anxiety disorder in them, it was found that the average cortisol level in that study is higher in children with morbid and severe anxiety too, but with different ranges 8.70 ± 8.48 and 6.98 ± 1.35 [30].

These differences may be explained by the presence of different factors which affect children with SLDs other than EE of caregivers; like bullying attitude of their colleagues, EEs of teachers, or may be due to other recent stressing factors that put extra pressure on the children and not included in our exclusion criteria, like new source of separation anxiety.

Cortisol levels of children with SLDs in our study; were significantly higher in those whose parents were with high (negative) EE. It revealed positive relation with PEE before applying the PECP intervention ($r = 0.468$). Cortisol levels of children were significantly higher among children with high anxiety scores and revealed positive relation with scores of Taylor anxiety scale before PECP intervention ($r = 0.771$).

This relation was showed in the study performed by Spratt *et al.* (2012) which was conducted on 100 SLD patients and their caregivers who attended 12 psychosocial interventional sessions, to assess the relation between the anxiety disorder of patients and the familial EE. This study revealed positive correlation between cortisol level of patients with their scores of anxiety ($r = 0.531$), and between the cortisol level with scores of familial EE before conducting the intervention ($r = 0.811$) [31].

Serum cortisol level is higher in boys than in girls, this may reflect an extra pressure on male children than females. Average serum cortisol in the current study was significantly higher in children with morbid and severe anxiety 9.89 ± 1.038 , 8.75 ± 0.935 . In a study performed by Sajaniemi *et al.* 2011 on 200 learning disabled children, it was found that the average cortisol level in that study was higher in children with morbid and severe anxiety too [30].

This study may not be the best trial ever because of a few number of recent researches applied on SLDs. But we did everything possible according to our resources. So conduction of more studies and researches on that critical topic is recommended for importance.

Conclusion

The study concluded that there is a positive relation between parental EE and anxiety of school children with SLD. It proved the presence of a direct effect of high EE of parents on their children.

A significant positive correlation was found between EES and Taylor before PECP. A significant positive correlation was proved between EES and Taylor after PECP. There is a statistically significant positive correlation between cortisol level and EES before applying the PECP intervention.

Considering this, we recommend that more research on learning disabilities should be performed in the future, we recommended the need to improve programs and provide places to encourage hobbies of children in all schools aiming to build up the self confidence of them. The need to develop education of special needs in our country was recommended too.

On the other hand; the study confirmed that health education and counseling of parents have

important role in the management of anxiety disorder in their children with SLDs. It concluded the effectiveness of PECP in the management of children's anxiety and enhancement of parental EE.

Results of children on Taylor anxiety scale and their parents on EES improves after applying sessions of PECP. A statistically significant difference was found between scores of EES, Taylor scale before and after applying the PECP intervention.

Importance of education and counseling in the improvement of parental EE and reduction of children's anxiety was demonstrated in the study. Increase public health awareness in schools about the concept of SLD and how to deal with it are important to avoid bullying, violent practices. So, improvement of awareness of the Egyptian parents that make them interacting with disability of their children in low EE and good manner was recommended through applying the PECP in all LDUs on broad national scale.

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