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ORIGINAL RESEARCH

Effectiveness of acceptance and commitment therapy (ACT) on sleep disorder and quality of life in mothers of children with learning disabilities (LD)

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Abstract

Objective: The impact of learning disabilities, struggles with life changes, and difficulties in communicating one's needs has been documented in a wide range of health and social care evidence. Therefore, this study aimed to determine the effectiveness of Acceptance and Commitment Therapy (ACT) on sleep disorder and quality of life in mothers of children with learning disabilities.
Materials and Methods: The research approach is a quasi-experimental one, specifically a pre-test-post-test design with a control group. The research population consisted of all mothers with at least one child with learning disabilities who sought services at the Learning Disability Centers at District 2 of Tehran in the year 2023. A purposive sampling approach was employed, selecting 30 participants based on the inclusion and exclusion criteria for the study. These participants were then randomly divided into two groups: an experimental group and a control group. To gather data, the following instruments were used: Individual Clinical Characteristics Form, Pittsburgh Sleep Quality Index (PSQI). Multivariate Analysis of Covariance (MANCOVA) was used to analyze quantitative data using the SPSS statistical software, version 26.
Results: The findings of the study revealed that after controlling for the effect of the pre-test scores, the difference in the pre-test-post-test scores between the two groups for the variables of sleep quality and quality of life was statistically significant. Additionally, the mean scores of the Acceptance and Commitment Therapy (ACT) group on the sleep quality and quality of life variables were also significantly higher than those of the control group ($p < 0.05$).
Conclusion: Based on the research findings, it can be concluded that Acceptance and Commitment Therapy (ACT) is effective in improving sleep disorder and quality of life in mothers of children with learning disabilities.

Keywords: Acceptance and commitment therapy (ACT), Sleep disorder, Quality of life, Children, Learning disabilities

Introduction

In comparison to the educational, neurological, and cognitive aspects of Specific Learning Disabilities (SpLD), family issues have received less attention in the literature (1). Findings indicate that parents of children with SpLD experience greater stress and a lower quality of life compared to parents of typically developing (TD) children (2). For instance, mothers of children with SpLD have reported experiencing poorer mental health and social relationships (3). Moderate levels of anxiety have been shown to emerge in mothers by the time of SpLD diagnosis, particularly associated with their child's underachievement, behavior, and future life prospects (5). Additionally, parental quality of life in relation to social relationships impacts various dimensions of children's HRQOL, namely (1) family, (2) friends, and (3) daily school functioning (6).

Individuals with learning disabilities are of a diverse group of people. The label of learning disability, also known as a cognitive or developmental disability, defines a cognitive disorder that exists from childhood and affects a person's intellectual, adaptive, and social functioning (7). The term learning disabilities is a preferred term chosen by many contemporary experienced professionals (8).

Throughout their lives, individuals with learning disabilities may find it more challenging to understand, learn, develop new skills, and communicate their needs (9). The global prevalence of learning disabilities has been estimated at up to 1.55% of the population (10). In the UK, approximately 2.3% of the population (1.5 million people) have a diagnosed learning disability (11).

The impact of learning disabilities struggles with life changes, and difficulties in communicating one's needs is well-documented in a wide range of healthcare and social care settings. Individuals with learning disabilities generally have poorer physical health than the general population (references 12, 13). They are more likely to experience premature death and die from common diseases compared to the non-disabled population (Klaver et al., 2017). They also have smaller social networks, suffer from more severe loneliness, and have fewer close friendships (14). People with learning disabilities are more likely to experience social determinants of poor health, such as "poor housing, family violence, lower income, and social isolation" (15), which negatively impacts their quality of life.

In addition, there is a higher prevalence of mental health disorders among adults and children with learning disabilities (16-18). For instance, in the UK, the prevalence of mental health problems for this population is estimated to be significantly higher than that of the general population (30-50%) (19). Moreover, there is a higher prevalence of challenging behaviors in this population, especially for those with more severe learning disabilities (20). Challenging behavior is typically understood as ‘attempts [by the individual with a learning disability] to communicate unmet needs’ (21), which can include psychological distress and physical pain.

However, there have been reports of negative impacts on mothers' lives from taking on the caregiving responsibilities for children with DD. Mothers of adolescents with DD have been reported to experience higher levels of caregiver stress than mothers of adolescents with TD (22), experience higher levels of depression and somatization than mothers of TD children (23), and have an increased burden of managing their children's healthcare needs (24). Additionally, mothers of children with DD reported more marital problems and family dysfunction than mothers of TD children (25). And older mothers with adolescents with DD were more likely to experience stress than mothers of similar age with TD children (22).

The findings presented allow us to gain a glimpse into how mothers are affected by the need to address changes in their matured children. Considering the significant time mothers dedicate to caring for their adolescent children with chronic illnesses and during their midlife, the health and quality of life of these mothers must be considered, as the well-being of caregivers directly impacts the quality of life of the children they care for. However, limited detailed information exists regarding the impact of children with unpleasant disorders on mothers, and many aspects of the burden faced by caregivers in adapting to the physical, sexual, emotional, and behavioral changes in their children remain largely unknown.

Acceptance and Commitment Therapy (ACT) focuses on creating a ‘meaningful life’ by promoting meaning. It aims to achieve this through engagement in activities aligned with clients' core values (26-29). This approach

allows for the simultaneous experience of feelings of grief and loss, which are natural and expected when facing life-limiting prognoses (30). ACT is an evidence-based intervention that improves mood and quality of life (26-29,31). Based on the aforementioned studies, the researcher seeks to investigate the impact of Acceptance and Commitment Therapy (ACT) on sleep disorders and quality of life in mothers of children with learning disabilities.

Methodology

The research approach is a quasi-experimental one, specifically a pre-test-post-test design with a control group.

The research population consisted of all mothers with at least one child with a learning disability who sought services at the Learning Disability Centers at District 2 of Tehran in the year 2023. A purposive sampling approach was employed, selecting 30 participants based on the inclusion and exclusion criteria for the study. These participants were then randomly divided into two groups.

The initial step involves visiting learning disability centers. Through student records, researchers will identify girls and boys from elementary school who have been diagnosed with a specific learning disability (the type of disability is not considered). This identification will be based on the students having normal intellectual functioning (defined by Wechsler Intelligence Scale scores at least 1.5 standard deviations below the mean). The mothers of these students will then be contacted and invited to participate in the research study.

The criteria for entering the study are twofold: mothers must have a child with a specific learning disability (diagnosed by a learning disability center), and they themselves cannot have any specific psychological or psychiatric disorders (as determined through interviews with staff). Criteria for leaving the study involve missing more than 3 consecutive sessions and a lack of willingness to continue participation in the research process.

A researcher-designed questionnaire containing information about the mother's and child's names and ages was presented to the participants. After reviewing the participants' responses to the questionnaire, those who did not meet the study's inclusion criteria were excluded. Subsequently, based on the study's inclusion criteria, 30 mothers with at least one child with a learning disability were purposefully selected and randomly divided into two groups. The Sleep Disorders and Quality of Life questionnaires were presented to the participants as a pretest. The Acceptance and Commitment Therapy (ACT) protocol was implemented for 8 weeks with the experimental group participants. Finally, a post-test was administered to the participants.

Pittsburgh Sleep Quality Index (PSQI)

It is one of the most widely used and well-validated tools for assessing sleep quality. It was developed in 1989 by Dr. Buysse and colleagues at the Pittsburgh Psychiatric Institute. The PSQI measures an individual's perception of their sleep quality over the past four weeks. However, the questionnaire effectively assesses 19 distinct aspects of sleep quality due to the inclusion of 10 sub-questions within question 5. These sub-questions, along with the 9 main questions, are scored on a 4-point Likert scale ranging from 0 to 3.

Dr. Buysse and colleagues (1989) reported an internal consistency reliability of 0.83 for the PSQI using Cronbach's alpha. The Iranian version of the PSQI demonstrated validity of 0.86 and reliability of 0.89 (Shahrifar, 2009 as cited by Heydari, Ehteshamzadeh & Marashi 2010). Also, in another study, the reliability of the PSQI was assessed using Cronbach's alpha (0.46) and split-half reliability (0.52) (Heydari, Ehteshamzadeh & Marashi, 2010). The scale's validity was calculated as 0.80, and its retest reliability was reported to range from 0.93 to 0.68 (Agargun, Kara, & Unal, 1996). The validity and reliability of the PSQI have also been confirmed in Iran; the Cronbach's alpha coefficient for the PSQI has been reported to range from 0.78 to 0.82 (Gharaei et al., 2009). Additionally, a Cronbach's alpha coefficient of 0.72 was obtained in the study by Sadri Damirchi, & Cheraghyan (2017).

World Health Organization Quality of Life Questionnaire (WHOQOL-BREF)

Recognizing the need for a standardized and comprehensive measure of quality of life (QoL) for research and clinical applications, the World Health Organization (WHO) assembled a team of experts to develop a questionnaire. The

culmination of their efforts was the 100-item WHO Quality of Life (WHOQOL) questionnaire. Several years later, a shorter version of the questionnaire was created for ease of use, known as the WHO Quality of Life - Brief Form (WHOQOL-BREF). The World Health Organization Quality of Life Questionnaire- Brief Form (WHOQOL-BREF) is a 26-item questionnaire designed to evaluate an individual's overall and general quality of life. Developed in 1996 by a group of WHO experts, the WHOQOL-BREF is an abridged version of the 100-item WHOQOL-100 assessment. It comprises three subscales and a total score, encompassing the following domains: Physical Health, Psychological Health, Social Relationships, Environment and an Overall Quality of Life Score. For each subscale, a raw score is initially calculated. These raw scores are then converted to standardized scores ranging from 0 to 100 using a specific formula. A higher score indicates a better quality of life in that particular domain.

The WHOQOL-BREF has been translated into 19 different languages and is utilized in various countries to assess individuals' quality of life. The World Health Organization's (WHO) research group considers this measure to be intercultural, enabling its application across diverse cultures (World Health Organization, 1996).

In Iran, Naseri and colleagues (2005) translated the WHOQOL-BREF into Persian and assessed its validity II and reliability III. The Cronbach's alpha coefficient 4 of 0.83 indicated good internal consistency of the Persian version. Factor analysis of 5×26 items of the Persian WHOQOL-BREF revealed the presence of four subscales: Physical Health, Psychological Health, Social Relationships, and Environment, which corresponded to the subscales of the original measure. This finding supported the structural validity of the Persian version.

To assess the validity and reliability of the Persian WHOQOL-BREF, a study was conducted involving 1167 residents of Tehran, Iran. Participants were divided into two groups: those with chronic illnesses and those without. Test-retest reliability coefficients were calculated for each subscale to assess the stability of the measure over time. The coefficients were as follows: Physical Health: 0.77, Psychological Health: 0.77, Social Relationships: 0.75, Environment: 0.84. Internal consistency, which measures the extent to which the items within each subscale are related to each other, was assessed using Cronbach's alpha. The alpha coefficients for each subscale are presented in the table below (Jat et al., 2006).

Acceptance and Commitment Therapy (ACT) Protocol

The experimental group will receive Acceptance and Commitment Therapy (ACT) based on the insomnia treatment protocol developed by Fletcher and described by El-Rafeihy-Freire (32). The therapy will consist of 8 weekly 90-minute sessions. Participants will attend the sessions and complete the assigned exercises.

First: Explaining the goals of the training, Introduction to members, Evaluation and Creative disappointment, Introduction to therapy, Commitment to the therapy process, Building the therapeutic alliance, Recalling sleep difficulties through imager, Motivation and acceptance, Sleep Diary Review, Sleep calendar, Metaphors: Mud in a glass [represents the heaviness and stuckness of sleep problems]: Two mountains [symbolizes the uphill struggle of overcoming sleep difficulties]: A man in a meditation hole [emphasizes the potential for using meditation as a tool to escape the negative cycle of sleep issues]: Mindfulness. Homework: Sleep diary, Interpretation of bills, Evaluation and interpretation of participants' distractions during home meditation and share them with the group.

Second: Creative appointment, Imagery-Based meditation on sleep difficulties, Sleep diary review (Sleep calendar), Continued creative disappointment, Metaphor: Tug-of-war with the monster [to describe the struggle with sleep difficulties], Homework: Sleep diary, Mindfulness through focusing on breath and counting, Documenting the participant’s experience of releasing the rope.

Third & Fourth: Accepting problems and ineffective strategies, Meditation, Journaling [Regularly reflect on experiences, observations, and learnings from mindfulness exercises], Reviewing mindfulness assignments, Sleep dairy, Metaphors: Polygraph or lie detector, Falling in love with chocolate cake [Symbolize the joy and satisfaction derived from mindfulness practices], Passengers on a bus [Illustrate the concept of observing thoughts

and emotions without judgment, allowing them to pass through like passengers on a bus], Pain vs. suffering (strategies proposed by participants): Willingness and acceptance, Two scales, Homework: Sleep diary, Meditation exercises.

Fifth & Sixth: Exploring the self as a concept & letting go, Sleep diary review and meditations (memories and its events), What do the numbers represent? Metaphors: Chess game [Represents the strategic approach to addressing sleep problems and making informed decisions], Lion taming [Symbolizes the process of controlling intrusive thoughts and emotions that disrupt sleep], Meditation in session, Labeling thoughts, leaves on a river [Illustrate the impermanence of thoughts and emotions, allowing them to flow through like leaves on a river]. Homework: Sleep diary, Meditation and sessions review, and 5-minute check-in.

Seventh & Eighth: Sleep diary review and Meditations, Introduction to values, focusing on committed actions, Metaphors: Wanderer by the door [Represent the notion of being present in the moment and making conscious choices aligned with personal values], Crossing the swamp [Symbolize the process of overcoming obstacles and challenges through mindful action and adherence to personal values], Meditation with a focus on values and committed actions. Homework: Practice meditations from previous sessions (Session 7): Values Assessment Completion for Session 8.

Statistical Methods

Descriptive and inferential statistical methods were employed to examine and analyze the raw data. Descriptive statistics were used to determine central tendency (mean) and dispersion (standard deviation) indices. The Shapiro-Wilk test was used to assess the assumptions for entry into inferential analysis, such as the normal distribution of data between groups, while Levene's test was used to examine the homogeneity of variances between groups. To determine the effectiveness of the exercise within groups and between-group comparisons, one-way analysis of variance (ANOVA) was conducted at the $P < 0.05$ significance level. All computations were performed using the SPSS software version 25.

Table 1. Results of Multivariate Analysis of Covariance
(MANCOVA) for the Experimental and Control Groups

Results

The sample population of this study consisted of 30 women who referred to counseling and nutrition clinics. The age of the individuals in the experimental and control groups was within the range of 29-43 years, with an age range of 18-140 years. The results showed that there was no significant difference in age between the two groups. There was no
significant difference in the education of the subjects between the two groups ($\chi 2= 0.891$).

The results of the independent t-test also showed that there was no significant difference in age between the experimental and control groups ($p = 0.215$).

The Shapiro-Wilk test results for none of the study variables were significant ($p < 0.05$), so it can be concluded that all study variables have a normal distribution. The Levene's test results also show that the variances of the variables are equal between the two groups and do not differ significantly from each other ($p > 0.05$). This means that the variances of the two groups are equal; also, the assumption of homogeneity of regression holds for both groups in the attention deficit and hyperactivity variable ($p>0.05$).

The results of the Box's M test showed that the variances and covariances are homogeneous in the two groups ($F= 1.38$, $p=0.246$). Therefore, Multivariate Analysis of Covariance (MANCOVA) can be used to compare the two groups.

Table 3. Adjusted Post-Test Means for Sleep Quality and Quality of Life

Dependent Variable	Group	Adjusted Means	Standard Error
Sleep Quality	Acceptance & Commitment Therapy	70.74	0.74
	Control	68.06	0.74
Quality of Life	Acceptance & Commitment Therapy	75.71	0.79
	Control	75.71	0.79

Table 1. Results of Multivariate Analysis of Covariance (MANCOVA) for the Experimental and Control Groups							
Effect	Source of Variation	Value	F	Degrees of Freedom (Hypothesis)	Degrees of Freedom (Error)	P	Eta Squared Value
Group	Pillai's Trace	0.45	10.19	2	25	<0.001	0.45
	Lambda Wilks	0.55	10.19	2	25	<0.001	0.45
	Halting Effect	0.81	10.19	2	25	<0.001	0.45
	Largest Eigenvalue	0.81	10.19	2	25	<0.001	0.45

The results of the Box's M test showed that the variances and covariances are homogeneous in the two groups (F= 1.38, p=0.246). Therefore, Multivariate Analysis of Covariance (MANCOVA) can be used to compare the two groups.

The results presented in Table 1 indicate that after controlling for the effect of the pre-test, the difference in pre-test-post-test scores between the Acceptance and Commitment Therapy (ACT) and control groups is significant for at least one of the sleep quality and quality of life variables ($p<0.05$). Therefore, it can be concluded that at least one of the third and fourth sub-hypotheses of the present study is supported. To further examine the results, a one-way ANCOVA test was conducted using MANCOVA, which is presented in Table 2.

Table 2. Univariate Analysis of Covariance (ANCOVA) within the Context of Multivariate Analysis of Covariance (MANCOVA) for Sleep Quality and Quality of Life

Variable	Source of Variation	SS	df	MS	F	P	Eta Squared Value
Sleep Quality	Group	50.12	1	50.12	6.32	0.018	**0.19**
	Error	206.32	26	206.32	7.94	---	---
	Total	144772	30	---	---	---	---
Quality of Life	Group	174.8	1	174.8	19.26	<0.001	**0.43**
	Error	236.01	26	9.08	---	---	---
	Total	161200	30	---	---	---	---

Findings from Tables 2 and 3 indicate that after controlling for the effect of the pre-test scores, the difference in pre-test to post-test scores between the two groups for the sleep quality and quality of life variables is significant. Additionally, the mean scores of the Acceptance and Commitment Therapy (ACT) group on the sleep quality and quality of life variables are significantly higher than those of the control group ($P<0.05$). Therefore, it can be concluded that ACT is effective in improving sleep disorders and quality of life in mothers with children with learning disabilities. Consequently, the research hypotheses are supported.

Discussion

The purpose of this study was to determine the effectiveness of Acceptance and Commitment Therapy (ACT) for sleep disorders and quality of life in mothers with children with learning disabilities. The results showed that ACT is effective in improving sleep disorders and quality of life in mothers with children with learning disabilities. The findings of this study are consistent with the results of previous studies on sleep disorders by Motaqi et al. (33), Akbarian et al. (34), Najafi Khorramabadi et al. (35), Ravan et al. (36), Wang et al. (37), and on quality of life by Sarizadeh et al. (38), Narimani et al. (35), Jamshidi et al. (39), Asmaeli et al. (40), Nikrah et al. (41), and Constantino et al. (42).

In interpreting the research findings on Acceptance and Commitment Therapy (ACT) and sleep disorders, it can be stated that ACT, a third-wave cognitive behavioral therapy (CBT) based on functional contextualism and relational frame theory, promotes well-being and reduces symptoms by helping individuals modify the processing of internal experiences and encouraging them to utilize a set of psychological flexibility skills when faced with unwanted thoughts, emotions, and experiences (43, 44). In other words, ACT focuses on increasing psychological flexibility, which in turn reduces psychological, physiological, or mental symptoms (45). Several studies have examined whether insomnia and OCD improve with increased psychological flexibility (43,46,47). Specifically, ACT, particularly mindfulness practice in ACT, enhances psychological flexibility by impacting inflammatory, immune, and biological aging markers to improve sleep quality (48).

Acceptance and Commitment Therapy (ACT) is effective in improving sleep quality (SQ) (49,50). Several studies have shown that ACT can effectively increase sleep quality, reduce sleep-related stress and cognitive activity, increase sleep duration, and change dysfunctional sleep-related beliefs and attitudes (51). In addition, ACT has been shown to be effective in addressing insomnia caused by mental and physical arousal (52, 53).

In interpreting the research findings on Acceptance and Commitment Therapy (ACT) and quality of life, it can be stated that ACT promotes quality of life by increasing psychological flexibility as the ability to fully

engage with the present moment as a mindful and committed individual to achieving valued goals (54). One of the ways ACT promotes quality of life is by engaging in meaningful activities (55,56).

Mindfulness practice, as a core ACT technique, may be another potential mechanism by which the intervention reduces the intensity of symptom perception and promotes appropriate contact with the present moment (54).

One limitation of the study is the small sample size, which weakens the statistical power to detect effects. In this regard, it is recommended that a similar study be conducted in larger populations.

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Conflict of Interest

Author declares no conflict of interest.

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