



Effectiveness of Acceptance and Commitment Based Intervention on Stress, Future Anxiety and Quality of Life among Mothers of Children with Cerebral Palsy

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ABSTRACT

Cerebral palsy is the most prevalent motor disability in children. The term "cerebral palsy" represents a group of conditions brought on by faulty brain development or brain injury that happen shortly after birth or early in life. The study aimed to evaluate the effectiveness of acceptance and commitment-based interventions on stress, future anxiety, and quality of life among mothers of children with cerebral palsy.

Setting: The study was conducted in the outpatient clinic (Nero-psychiatric clinic) at EL Mogamma EL Teby AL Shamal, Shebin El-Kom City. **Subjects:** A purposive sample of 150 mother's children with cerebral palsy from the previously mentioned setting was included in the study. **Instruments:** Four tools were used; a semi-structured interviewing questionnaire, a stress level scale, a future anxiety scale, and a quality of life scale. After acceptance and commitment-based intervention and follow-up, the total score of stress and future anxiety levels in the study group are significantly lower than in the control group. Furthermore, the total score of quality of life levels significantly increased in the study group than in the control group after acceptance and commitment-based intervention and on follow up.

Conclusion: Acceptance and commitment therapy was an effective intervention in reducing stress levels and future anxiety and improving the quality of life among mothers of children with cerebral palsy.

Recommendation: As the primary source of information for mothers when giving the child necessary treatment, nurses in the outpatient clinic, physiotherapy clinic, and pediatrics department should be trained well and supplied with information and training on the cerebral palsy program. Also, an in-service training program for nurses on the value of acceptance and commitment therapy and how to use it to reduce future anxiety, and stress and improve quality of life.

Keywords: Acceptance and commitment intervention, stress level, future anxiety and quality of life.

Introduction:

The term "cerebral palsy" (CP) refers to a diverse collection of lifelong movement and posture abnormalities that are caused by immobility-limiting non-progressive defects in the developing fetus or infant brain. The primary symptom of CP is dyskinesia, which is frequently accompanied by sensory, cognitive, communication, perceptual, behavioural and epilepsy-related issues, as well as secondary musculoskeletal issues. One of the most prevalent causes of disability in children is known as cerebral palsy (CP), which places a heavy financial burden on children and their families for medical care, education, and rehabilitation (**Akçay et al., 2021**).

A child with CP may experience challenges such as spastic paralysis, cognitive impairment, chronic pain, speech and vision impairment, as well as gastrointestinal and eating disorders. They also experience difficulties with mobility, dressing, feeding, and other aspects of self-care. These restrictions may lead to a demand for long-term care that is significantly greater than what normal children would typically require. The challenges that parents of children with CP confront lead to increased levels of stress, which have a negative impact on their physical health and social well-being. Most children now reside at home under the care of their families rather than being placed in institutions due to changes in healthcare systems and societal views (**Lima et al., 2021**).

The caregivers are first confronted with a stressful scenario when the diagnosis of cerebral palsy is confirmed, followed by coping with caregiving obligations, treatment costs, and disassembling their social lives. The treatment of cerebral palsy is based on a multidisciplinary team approach in which parents, particularly mothers, play a critical role. In most circumstances, providing such care is likely to be harmful to the parents' (mother's) physical and psychological well-being, as well as to the family's income, family functioning, and sibling adjustment (**Sonune, Gaur & Shenoy, 2021**). Mothers are primarily responsible for the care of children with CP, which is difficult, especially in the long run, due to the children's cognitive difficulties. These circumstances may have a negative impact on the physical and mental health of the parents of permanently impaired children. Notably, the caregiver is frequently the mother of the child. A caregiver's quality of life (QoL) in terms of health, psychological well-being, social networks, and support when a large amount of time is dedicated to the care of a child with a chronic condition can be badly impacted. (**Jahan et al., 2019**).

The confirmation of the cerebral palsy diagnosis first presents a challenging situation for the caregivers, who then have to deal with caregiving responsibilities, treatment costs, and the breakdown of the social life. A multidisciplinary team approach is used to treat cerebral palsy, and parents—particularly mothers—play a crucial role in this process. In most cases, giving such care is likely to be detrimental to the parents' (mother's)

physical and mental health, as well as to the family's finances, functioning as a unit, and the adjustment of the siblings (**Sonune, Gaur & Shenoy, 2021**). Children with CP are primarily cared for by their mothers, which can be challenging over time owing to the children's cognitive challenges. These circumstances could be harmful to parents' physical and emotional health (**Jahan et al., 2019**).

Mothers with children with CP deal with physical, emotional, social, and financial issues on a daily basis. In addition, mothers of CP patients reported two to five times greater maternal psychological stress and anxiety than mothers of healthy children. Mothers of children with CP who are under a lot of stress may have physical weakness, sadness, neuralgia, anxiety, seizures, and sympathetic stress reactions (**Ahmadi Kahjoogh et al., 2021**).

Acceptance and commitment therapy (ACT) is primarily aimed at fighting distorted thinking, but also at changing relationships with stressful personal experiences. Rather than changing the content of one's thoughts and feelings, ACT examines whether one's thoughts and feelings are in line with one's worthy life and devotion. Rather than running away from ideas and emotions when they don't align with their chosen life path, they see them as background noise. Live a life of gratitude and engage in committed behavior. ACT fosters the willingness to give space to challenging emotions. Therefore, the primary goal of ACT is not to eliminate psychotic symptoms, but to

provide patients with the skills they need to live active and meaningful lives in the face of difficult and unpleasant psychological experiences (**Geda et al., 2021**).

The nurse should play an important role in teaching parents, particularly mothers, how to care for their children with cerebral palsy. They should offer emotional support to them and must teach them about all of the CP child's unique needs, as well as proper handling, homecare, and training in manual skills and daily living tasks that follow a long developmental path and are tailored to the child's functional level (**Hashem & Abd El Aziz, 2018**).

Significance of the study

Cerebral palsy (CP) is the most common movement disorder in children, with a global prevalence ranging from 1.5 to more than 4 per 1,000 live births or children in defined age groups (**Robertson et al., 2017**). However, CP appears to be more common in lower-middle-income countries than in high-income countries (**Kakooza-Mwesige et al., 2017**). Cerebral palsy (CP) is the leading cause of lifelong movement disorders in childhood, with a prevalence of approximately 2.1 per 1,000 live births in developed countries. The Centers for Disease Control and Prevention stated that 1 of her children in 321 was classified as having CP, and it is more common in boys than girls (**CDC, 2018**).

Population-based studies worldwide report estimates of the prevalence of cerebral palsy

ranging from 1.5 to 4 or more per 1,000 live births across defined age ranges. However, a recent clinical review found that the incidence of cerebral palsy is 2–3 per 1,000 live births, with common risk factors such as prematurity, low gestational age, multiple pregnancies, and maternal genitourinary infections (**Patel et al., 2020**).

The prevalence of cerebral palsy is approximately 1.5-3 per 1,000 live births in both developed and developing countries. A study in Al Quseir city, Red Sea Governorate, found a prevalence of 3.06 per 1,000 live births (**Khalil et al., 2018**).

The theoretical framework

As an evidence-based intervention, acceptance and attachment therapy are 'third wave' cognitive-behavioral therapy (**Hayes & Hofmann, 2017**). Psychological flexibility is defined as being in touch with the present moment as a conscious being, completely and without undue protection, while adhering to a particular behavior or change in behavior consistent with your personally chosen values (**Hayes et al., 2012**). In other words, while seeking meaningful behavioral change, psychological flexibility means being aware of and staying present with internal experiences (i.e., thoughts, feelings, sensations and memories) and the circumstances in which they occur. Psychological flexibility allows individuals to recognize and adapt to different contextual demands, to use their repertoire of behaviors to serve their social and personal functioning, to maintain balance between key areas of life, and to

develop themselves. able to recognize and embrace internal experiences while transforming. Behavior consistent with stated values (**Kashdan & Rottenberg, 2010**).

Methodology

Aim of the Research

The research intends to evaluate the effectiveness of acceptance and commitment- focused interventions on stress, future anxiety, and quality of life among cerebral palsy children's mothers.

Research Hypotheses

- Mothers of children with cerebral palsy who will receive the acceptance and commitment-based interventions (study group) will have lower stress and future anxiety on post-test compared to those who receive only routine care (control group).
- Mothers of children with cerebral palsy who will receive the acceptance and commitment-based interventions (study group) will have better quality of life on post-test compared to pretest than those who receive only routine care (control group).

2. Subjects and Method

Research Design

Using a quasi-experimental research approach with two groups (The study's goal was accomplished

using one study group, one control group, and follow-up).

2.2. Setting

The study was carried out in the neuropsychiatric outpatient clinic at Shebin El-Kom City's EL Mogamma EL Teby AL Shamal. It follows Menoufia governorate's Shebin El-Kom district's health insurance organization.

Subjects:

150 mothers of cerebral palsy-affected children were chosen as a purposeful sample from the previously mentioned setting. Two equal groups were created (75 for each group). The study group enrolled in the intervention based on acceptance and commitment-based interventions and the control group, which received only ordinary care from the institution. This sample size follows the following inclusion and exclusion criteria:

A-Inclusion criteria

- Mothers of children with cerebral palsy.
- Mothers who are aged between 18 and 60.
- Mothers who agree to participate in the research
- Can be accessible by telephone or by email.
- Mothers who provide the majority of the daily care to their cerebral palsy affected children.

B-Exclusion criteria

- Mothers with significant current or prior mental health issues.
- Mothers who were currently participating in another intervention study.

Data Collection Instruments

The researcher used four tools to accomplish the goal of the current study based on the review of the relevant literature.

Tool (1): Semi-structured interviewing questionnaire: including

The researcher created this questionnaire with the help of supervisors and relevant literature.

It consists of two parts:

Part one: The child's socio-demographic characteristics, such as age, gender, type of cerebral palsy, and affected side/s of the body

Part two: the mothers' socio-demographic characteristics such as age, education, and marital status.

Tool (2): Stress Level Scale: developed by **Amin (2015)** to assess stress levels among mothers of children with intellectual disability. This scale consists of 60 statements. It is divided into four dimensions: organic symptoms, which are represented in statements (1–27); cognitive and psychological problems of the child, which are represented in statements (28–38); family and social accompaniments, which are represented in

statements (39–50); and inability to bear the burdens of a disabled child, which is represented in statements (51–60). These statements are scored on a 3-point likert scale ranging from rare to always (rare = 1, sometimes = 2, and always = 3). According to these answers, scoring ranges from 60 to 180 and means the highest score on the scale is a high stress level, while indicating a low score for a low stress level.

Tool (3): Future Anxiety Scale: developed by **Shouer, (2005)** to assess the view of person toward the future. It consists of 28 statements. It is divided into five dimensions, anxiety about future life problems, which is represented in statements (17-20-21-22-24), anxiety of death, which is represented in statements (10-18-19-25-26), anxious thinking about the future, which is represented in statements (3-6-11-13-14-23-28), a negative and pessimistic view of the future, which is represented in statements (4-7-8-9-12-16), fear and anxiety about failure in the future, which is represented in statements (1-2-5-15-27). It consists of 28 statements. Some of these statements are phrased positively, such as statements 12 to 28, and other expressions are phrased as negative statements, such as statements 1 to 10. These statements are scored on a 5-point scale, on which are scored 1 point for "never", 2 points for "rarely", 3 points for "sometimes", and 4 points for "usually" and 5 points for "always". According to these answers, scoring ranges from 28 to 140 and means the highest grade on the scale is high future anxiety, while indicating a low score for low future anxiety.

Tool 4: Quality of Life Scale: developed by **Hamiza (2019)** to assess the quality of life for families of children with special needs. The scale consists of 44 statements. It is divided into five subscales: skills for solving family problems (represented by statements 1–9); skills for solving stress quality of life (represented by statements 10–18); skills of familial role (represented by statements 19–27); skills of familial function (represented by statements 28–35); and skills of behavioural control (represented by statements 36–44). These statements are scored on a 3-point likert scale from rare to always (rare = 1, sometimes = 2, and always = 3) and the following item 1-8-10-18-20-22-24-27-29-34-37 items are scored inversely. According to these answers, scoring ranges from 44 to 132, which means the highest score on the scale, is a high quality of life while the lowest score indicates a low quality of life.

Administrative approval:

The researcher obtains the permission of the ethics committee from Menoufia University's nursing faculty to secure permission to carry out the research, then delivers a formal letter and a copy of the research instrument ordered by the Dean of Faculty of Nursing, Menoufia University, to the directors of the EL Mogamma EL Teby AL Shamal, Shebin El-Kom district, Menoufia governorate, Egypt. An agreement letter was obtained and, before starting the data collection.

Ethical consideration:

-The patient provided informed consent to take part in the study.

-Reassure the mothers that their information will be kept private and confidential and will only be used for the purposes of the study.

-Stressing the flexibility to leave the study at any time.

-There was no discomfort or injury to the research volunteers due to the nature of the experiment.

- The subjects' privacy was assured.

The tools' validity:

A panel of five professionals with expertise in the domains of psychiatric nursing, mental medicine, family and community health nursing evaluated all instruments for their face and content validity to ensure their relevance and completeness.

Reliability of tools

Reliability was applied by the researcher to test the internal consistency of all the tools by the administration of the same tools to the same subjects under similar conditions on one or more occasions. Answers from repeated testing were compared (Test-re-test reliability). The tools revealed reliability at 0.87 for the tool (1), 0.94 for the tool (2) and 0.93 for the tool (3).

A pilot study:

To test the feasibility, clarity, and applicability of the tools, pilot research including 10% of the total

sample of 150 mothers was done, and any necessary adjustments were made. Data obtained from the pilot study was excluded in the current study.

Actual research:

The actual research was split into three phases: -

Assessment phase

This phase's goals included establishing a connection with the mothers and explaining the study's rationale and planned course of action.

- After looking through all of the inpatients' records to find mothers of children who satisfied the inclusion criteria, the researcher conducted the interview in the ward.

- Using the three study tools as a guide, the researcher performed baseline interviews with each patient (pre-test). Each mother interview took between 40 and 60 minutes, depending on the mother's knowledge and speaking ability.

Implementation phase

-This phase aims to give the mothers under study theoretical information about Acceptance and Commitment-Based Intervention, such as its definition and advantages, in order to get the patients' best cooperation and involvement before implementing Acceptance and Commitment-Based Intervention.

-Subgroups of the mothers under investigation were created. Each subgroup included six to eight mothers and met for seven sessions. One month of two sessions each week. Each session lasted between 45 and 60 minutes.

- Acceptance and Commitment-Based Intervention was used from the beginning of December 2021 until the end of August 2022.

- The study's conference room served as the location for the meetings.

- For greater mother engagement, individual mothers' differences, degrees of knowledge, willingness, and responsiveness were taken into account during the sessions.

- The sessions were initiated by the researcher, who also provided the mothers with the reading material and offered encouragement. In addition, he served as the facilitator, trainer, and teacher for the group

- Within the first five minutes of each session, the researcher introduced the topic and the scheduled activities. The remaining 40 minutes were utilized to complete the session's task, and the final 10 minutes were used to get feedback, thank the mothers, and remind them when the next session was scheduled.

- The research included group discussions, pictures, headphones, a laptop, flip charts, a sound system, and musical CDs.

- The intervention is broken up into sessions, each of which has a specific goal and a general objective. Various instructional techniques, such as brainstorming, lectures, discussions, and giving examples, were used to achieve this. The information indicates that images, video, and role-playing were used as media. Following a summary of each session, comments were offered, any remaining questions were answered, and a homework assignment for the subsequent session was provided.

The components of ACT intervention will include six sessions.

First session: (Increase mother's awareness about cerebral palsy)

This session aimed to gain awareness of mothers about the objectives and content of acceptance and commitment intervention sessions and to correct their misconceptions about the way of dealing with their children who have cerebral palsy. It was observed that most mothers deal roughly with their children. The researchers tried to establish a therapeutic relationship with the mothers. This session discussed cerebral palsy and covered its definition, probable symptoms, triggers, and etiology. It also covered its treatment, which focused on physiotherapy approaches, and gave mothers advice on how to deal with their children effectively. Also, the researcher discussed and demonstrated relaxation techniques (deep breathing exercises, imagination), which were then introduced in audio format, requiring the

participants to learn and practice deep breathing exercises and imagination for one week. The audio recording plays for approximately 25 minutes as these relaxation techniques help them to be relaxed and reduce their stress.

Second session: (Improve mother's understanding of ACT intervention)

The researchers tried to build an accepting atmosphere. The objective of this session is to help mothers learn about the ACT intervention, discover and assess inefficient strategies used by mothers to reduce anxiety and pain related to disease in their children in different situations and evaluate their effects on them and finally turn attention to more useful strategies.

Third session: - (Relationship between thoughts and stress)

The researcher made an effort to assist mothers in finding mental space. This session's goals are to assist mothers in separating themselves from their ideas, making it easier for mothers to avoid becoming trapped by them, and assisting mothers in replacing their bad thoughts with constructive ones.

Fourth session: - (Problem solving skills)

The researcher used analogies, feedback, and relaxation techniques in an effort to assist mothers in accepting difficult and painful personal situations without arguing with them.

Fifth session: - (Feeling box)

The researcher helps mothers express their feelings regarding their children's cerebral palsy, such as fear, anger, and sadness, to accept painful personal events without conflict by using analogies, feedback, and relaxation techniques.

Sixth session: Here and Now

The researcher made an effort to support mothers in focusing on the present moment with acceptance, attention, and openness. The goals are to make it easier for mothers to observe themselves and stay in the present while avoiding getting trapped in the past or the future.

Seventh session: (Commit actions)

Commit actions in line with the value. The goals are to assist moms in discovering their inner values and acting on them, despite the difficulties they are currently facing with their children who have cerebral palsy.

Evaluation phase:

The evaluation phase was done using the same tools (Semi-structured interviewing questionnaire, Stress level Scale, Future Anxiety Scale, Quality of Life Scale) for the study group.

2.8. Statistical Analysis

Data entry and analyses were carried out using the MS Excel and the STATA/SE version 11.2 for Windows (STATA Corporation, College Station, Texas). The mean, Standard Deviation (SD),

frequency, and percentage were used to describe collected data as appropriate. The distribution of quantitative data was examined using the skewness and kurtosis normality test. Comparisons between the study groups were carried out using univariate tests; the independent t-test, the Mann Whitney test, the Chi-square test, and the Fisher exact test, as appropriate. The Spearman correlation coefficient (ρ) was used to examine the correlation between stress level, future anxiety, and QOL scores recorded pre intervention, post intervention, and follow up, as well as with maternal age and child age. Statistical significance was considered at $P < 0.05$

Results:

Table 1 shows the demographic characteristics and clinical data among the study ($n = 75$) and the control ($n = 75$) groups. Both groups were comparable except for the child age that was significantly higher in the study group compared to controls (mean \pm SD; 5.71 ± 2.30 vs. 5.08 ± 2.88 , $P = 0.02$).

Table 2 represents stress levels recorded pre intervention, post intervention, and follow up in both studied groups. There are no significant differences in all subscale of stress levels between the study and control groups pre intervention, then the total score of stress levels is significantly lower in the study group than control group in post intervention and on follow up as the total score reduced from 133.47 ± 19.13 to 116.44 ± 16.83 and becomes 109.13 ± 17.27 ($P < 0.05$).

Table 3 shows future anxiety levels pre intervention, post intervention, and follow up in both studied groups. There are no significant differences in all subscale of future anxiety levels between the study and control groups pre intervention, then the total score of future anxiety levels is significantly lower in the study group than control group in post intervention and on follow up as the total score reduced from 96.17 ± 6.96 to 82.87 ± 8.89 and becomes 76.25 ± 10.74 ($P < 0.05$).

Table 4 represents the QOL levels pre intervention, post intervention, and follow up in both studied groups. There are no significant differences in all subscale of the QOL levels between the study and control groups pre intervention, then the total score of QOL levels is significantly increased in the study group than control group in post intervention and on follow up as the total score reduced from 85.89 ± 9.14 to 95.39 ± 8.77 and becomes 100.57 ± 8.30 ($P < 0.05$).

Figures 1-3 clarifies the changes in the total means of stress levels, future anxiety, and QOL recorded pre intervention, post intervention, and follow up. A progressive decline in represents the total means of stress level and future anxiety was noticed over time in the study group. The total mean score of QOL is increase over time among the study group, while a decline is noticed among control group.

Table 5 illustrates that, there are significant moderate negative correlations ($\rho = -0.41$ to -0.68 ; $P < 0.001$) between the total score of QOL post intervention and the total score of stress level pre intervention, post intervention, and follow up for

both the study and control groups. Similarly, Table 6 shows that, the total score of future anxiety levels were negatively correlated with the total score of QOL ($\rho=-0.52$ to -0.91 ; $P<0.001$).

Table 7 clarifies the relationships between pre interventions the total scores of stresses, future anxiety, and QOL and demographic characteristics and clinical data in the study and control groups. For the study group, significant variations in stress and future anxiety levels are recorded by the marital status of mothers, their educational levels, GMFCS, and affected side/s ($P<0.01$), while QOL is significantly associated with GMFCS and affected side/s ($P<0.001$). Also, there are significant positive correlation between stress and future anxiety scores and maternal age ($P<0.001$) and significant negative correlation between QOL and child age ($P<0.01$). For the control group, there are significant differences in stress levels, future anxiety, and QOL by GMFCS ($P<0.001$) and affected side/s ($P<0.05$). Pre intervention stress levels were positively correlated with maternal age and child age ($P<0.001$).

Table (1): Distribution of demographic characters of the studied subjects(study and control).

Demographic characters		Study group (N=75)		Control group (N=75)		Test of sig.	P value
		No.	%	No.	%		
Age of mothers (years)	Mean \pm SD	34.4 \pm 4.65		32.76 \pm 5.88		t-test	0.06
	Range	24-45		23-43		0.1.89	
Marital status	Married	69	92.0	72	96.0	FET	0.49
	Divorced	5	6.67	3	4.0		
	Widow	1	1.33	0	0.0		
Educational level of mothers	Basic education	10	13.33	15	20.0	χ^2 =2.19	0.33
	Secondary education	40	53.33	42	56.0		
	University education	25	33.33	18	24.0		
Child age (years)	Mean \pm SD	5.71 \pm 2.30		5.08 \pm 2.88		Z=2.31	0.02
	Range	0.42-14		0.25-14			
Sex	Boys	45	60.0	39	52.0	χ^2 =0.97	0.32
	girls	30	40.0	36	48.0		
GMFCS	Level I	15	20.0	12	16.0	χ^2 =1.87	0.76
	Level II	12	16.0	15	20.0		
	Level III	11	14.67	9	12.0		
	Level Iv	13	17.33	18	24.0		
	Level V	24	32.0	21	28.0		
Types of CP	Spastic	56	74.67	54	72.0	FET	0.26
	Dyskinetic	10	13.33	6	8.0		
	Mixed spastic and dyskinetic	5	6.67	12	8.5		
	Unknown	4	5.33	3	3.5		
Affected side/s of the body	Unilateral	15	20.0	15	20.0	FET	0.65
	Bilateral	57	76.0	54	72.0		
	Not reported	3	4.0	6	8.0		

t-test: the Student's t-test; χ^2 : the Chi-square test; z: Mann Whitney test; FET: the Fisher Exact test

P: Probability (statistically significant at P<0.05)

Table (2): Distribution of means and standard deviation of stress level subscales in the studied subjects (study and control) pre post and follow up intervention

Stress level	Pre intervention		Mann Whitney Test sig. P1 value	Post intervention		Mann Whitney Test P2 value	Follow up		Mann Whitney Test P 3value
	Study group (N=75)	Control group (N=75)		Study group (N=75)	Control group (N=75)		Study group (N=75)	Control group (N=75)	
	Mean±SD	Mean±SD		Mean±SD	Mean±SD		Mean±SD	Mean±SD	
organic symptoms	55.75±9.22	54.21±9.46	Z=0.18 P=0.85	48.8±8.61	55.63±9.60	Z=4.00 P=0.0001	46.11±8.6 0	56.49±9.7 0	Z=5.95 P<0.001
Cognitive and psychological problems of the child	24.4±4.96	24.24±3.97	Z=1.43 P=0.15	21.24±4.88	25.17±4.42	Z=5.14 P<0.001	19.33±5.3 6	25.67±4.6 1	Z=6.49 P<0.001
Family and social accompaniments	30.39±3.71	30.37±2.08	Z=1.56 P=0.12	27.47±3.01	31.2±2.01	Z=8.03 P<0.001	25.87±3.0 3	31.69±2.3 4	Z=9.62 P<0.001
Inability to bear the burdens of a disabled child	22.11±3.33	22.37±2.82	Z=0.03 P=0.97	18.93±2.85	23.52±3.35	Z=7.35 P<0.001	17.83±3.0 1	23.73±3.3 9	Z=8.23 P<0.001
Total stress	133.47±19. 13	130.37±14. 73	Z=1.74 P=0.08	116.44±16.8 3	135.52±15.8 6	Z=6.24 P<0.001	109.13±17 .27	137.59±16 .36	Z=8.05 P<0.001

Z: Mann Whitney test; P: Probability (statistically significant at P<0.05)

Table (3): Distribution of means and standard deviation of Future anxiety subscales in the studied subjects (study and control) pre, post and follow up intervention

Future anxiety	Pre intervention		t-test Test sig. P1 value	Post intervention		t-test Test P2 value	Follow up		t-test Test P3 value
	Study group (N=75)	Control group (N=75)		Study group (N=75)	Control group (N=75)		Study group (N=75)	Control group (N=75)	
	Mean ±SD	Mean ±SD		Mean ±SD	Mean ±SD		Mean ±SD	Mean ±SD	
Anxiety and fear of life problems and the future	16.77±1.61	16.72±2.37	Z=0.15 P=0.88	14.65±1.56	17.39±2.59	Z=6.20 P<0.001	13.24±2.14	17.57±2.61	Z=8.23 P<0.001
death anxiety	16.61±1.48	16.12±2.42	Z=1.49 P=0.14	13.45±1.79	16.69±2.70	Z=6.96 P<0.001	11.85±2.32	16.87±2.79	Z=8.69 P<0.001
anxious thinking about the future	24.72±1.81	24.64±2.73	Z=0.18 P=0.85	21.36±2.47	25.36±2.92	Z=7.34 P<0.001	19.84±2.74	26.93±2.91	Z=9.28 P<0.001
Negative and pessimistic view of the future	22.45±2.34	22.36±3.87	Z=0.92 P=0.36	20.23±2.88	22.8±4.13	Z=3.96 P=0.0001	19.2±3.20	23.49±4.13	Z=5.90 P<0.001
Fear and anxiety about failure in the future	15.61±1.43	15.76±2.42	Z=0.19 P=0.85	13.17±1.65	16.05±2.70	Z=6.18 P<0.001	12.12±1.89	16.99±2.79	Z=9.14 P<0.001
Total future anxiety	96.17±6.96	95.6±12.56	Z=0.10 P=0.92	82.87±8.89	98.29±13.76	Z=6.40 P<0.001	76.25±10.74	100.95±13.97	Z=8.67 P<0.001

Z: Mann Whitney test; P: Probability (statistically significant at P<0.05)

Table (4): Distribution of means and standard deviation of Quality of Life subscale in the studied subjects (study and control) pre post and follow up intervention

QOL	Pre intervention		t-test Test sig. P1 value	Post intervention		t-test Test P2 value	Follow up		t-test Test P3 value
	Study group (N=75)	Control group (N=75)		Study group (N=75)	Control group (N=75)		Study group (N=75)	Control group (N=75)	
	Mean ±SD	Mean ±SD		Mean ±SD	Mean ±SD		Mean ±SD	Mean ±SD	
skills of solving family problems	15.71±1.4	15.49±2.7	Z=0.7 6 P=0.44	17.55±1.5	15.08±2.52	Z=6.34 P<0.00 1	18.41±1.65	14.15±2.69	Z=8.72 P<0.00 1
skills of solving stress quality of life	17.83±2.6	17.08±3.2	Z=1.8 4 P=0.06	19.51±2.5	16.41±3.46	Z=5.58 P<0.00 1	20.49±2.49	15.68±3.36	Z=7.62 P<0.00 1
skills of familial role	17.92±2.4	17.36±2.9	Z=1.2 3 P=0.22	19.8±2.20	16.61±3.22	Z=5.94 P<0.00 1	20.97±1.96	16.03±3.36	Z=8.26 P<0.00 1
skills of familial function	17.64±2.2	16.92±3.1	Z=1.5 2 P=0.13	19.35±1.8	16.15±3.36	Z=5.51 P<0.00 1	20.25±1.76	15.52±3.52	Z=7.52 P<0.00 1
skills of behaviora l control	16.8±3.3	16.44±3.3	Z=0.0 1 P=0.99	19.19±2.8	15.61±3.49	Z=6.67 P<0.00 1	20.44±2.56	14.79±3.62	Z=8.40 P<0.00 1
Total QOL	85.89±9.1	83.29±12.	Z=1.6 1 P=0.11	95.39±8.7	79.87±13.4	Z=7.06 P<0.00 1	100.57±8.3	76.16±13.9	Z=8.50 P<0.00 1

Z: Mann Whitney test; P: Probability (statistically significant at P<0.05)

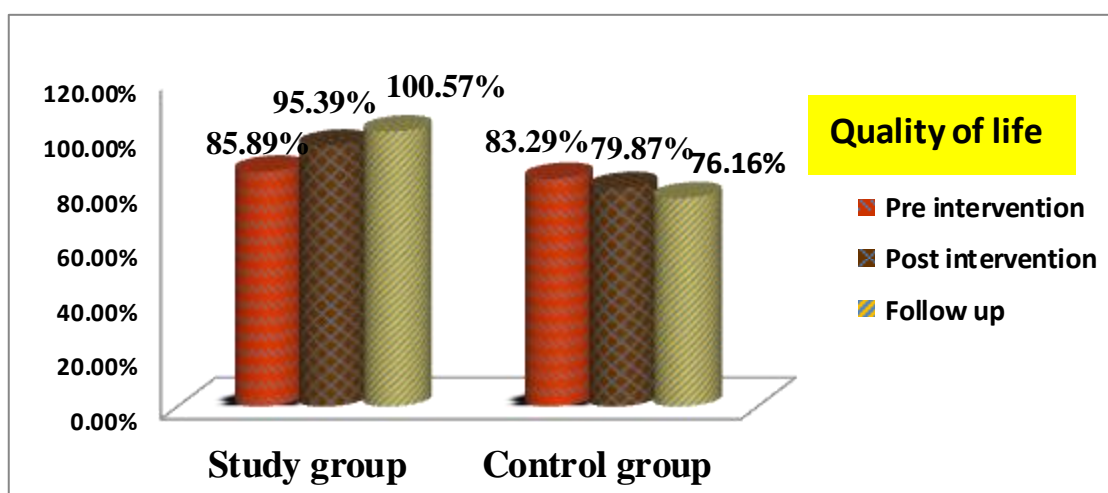
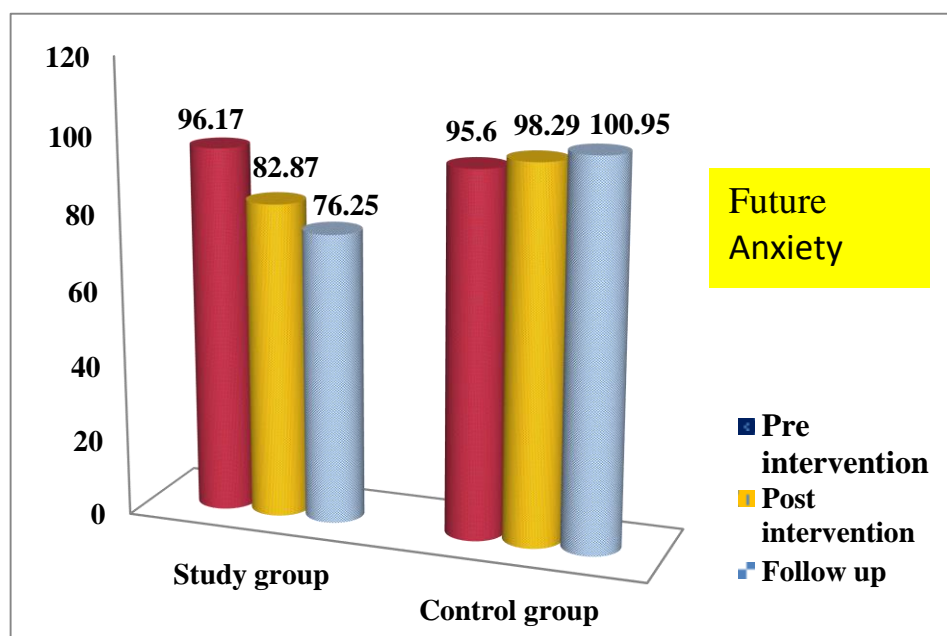
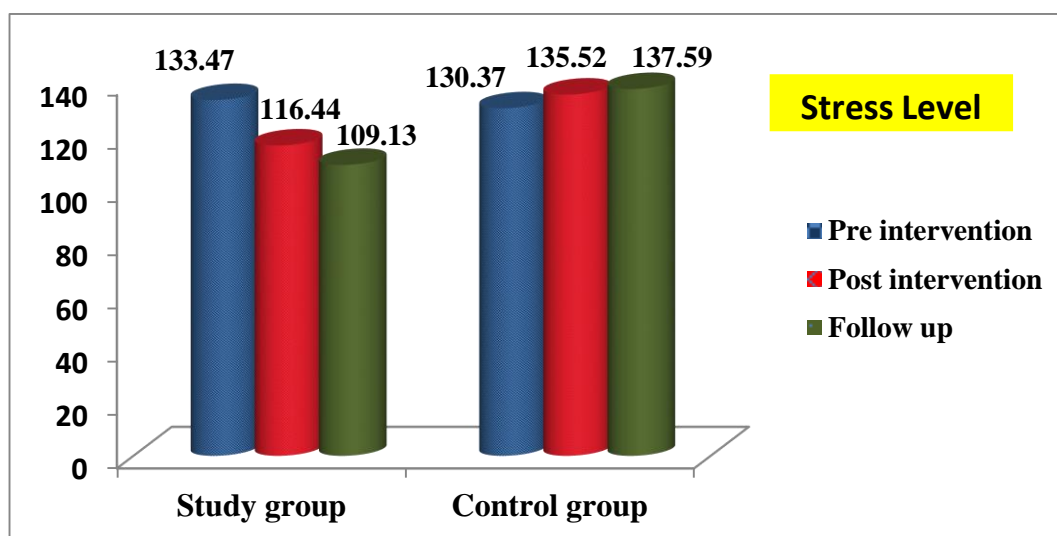


Figure (1-3): Distribution of total means score of stress level, future anxiety and quality of life pre, post and follow up intervention.

Table (5): Correlation between QOL post intervention and stress level pre, post and follow up intervention in the studied subjects (study and control).

Stress level	Total QOL			
	Study group (N=75)		Control group (N=75)	
	Rho	P value	Rho	P value
Pre intervention	-0.41	0.0003	-0.57	<0.001
Post intervention	-0.59	<0.001	-0.63	<0.001
Follow up	-0.68	<0.001	-0.63	<0.001

****High significant *significant**

rho correlation coefficient

Table (6): Correlation between QOL post intervention and future anxiety pre, post and follow up intervention in the studied subjects (study and control)

Future anxiety levels	Total QOL			
	Study group (N=75)		Control group (N=75)	
	Rho	P value	Rho	P value
Pre intervention	-0.53	<0.001	-0.89	<0.001
Post intervention	-0.52	<0.001	-0.91	<0.001
Follow up	-0.62	<0.001	-0.91	<0.001

Table (7) Relationship between demographic and clinical characteristics ad pre intervention stress level, future anxiety level, and QOL among studied subjects (study ad control)

Characteristics		Study group			Control group		
		Mean \pm SD			Mean \pm SD		
		Stress level pre-intervention	Future anxiety pre-intervention	Total QOL pre-intervention	Stress level pre-intervention	Future anxiety pre-intervention	Total QOL pre-intervention
Marital status	Married	** 132.55 \pm 18.28	** 95.71 \pm 6.39	85.78 \pm 8.87	* 129.54 \pm 14.40	95.21 \pm 12.61	83.55 \pm 12.58
	Divorced	154.4 \pm 9.83	105.6 \pm 5.27	82 \pm 2.45	150.33 \pm 6.35	105 \pm 6.93	77 \pm 3.46
	Widow	92 \pm 0	81 \pm 0	113 \pm 0	-	-	-
Educational level of mothers	Basic education	*** 123.6 \pm 21.72	** 93.8 \pm 1.55	88.4 \pm 9.35	137.33 \pm 11.02	96.6 \pm 13.72	79.93 \pm 10.33
	Secondary education	142.45 \pm 14.1	98.72 \pm 7.03	83.82 \pm 6.09	128.98 \pm 15.61	95.28 \pm 11.63	83.69 \pm 13.40
	University education	123.04 \pm 18.43	93.04 \pm 6.67	88.2 \pm 12.22	127.83 \pm 14.23	95.5 \pm 14.28	85.17 \pm 11.59
GMFCS	Level I	*** 100.6 \pm 3.68	*** 87.67 \pm 4.98	*** 99.8 \pm 10.37	*** 106.25 \pm 4.90	*** 78 \pm 1.65	*** 104.08 \pm 3.03
	Level II	129.92 \pm 8.16	96.25 \pm 3.41	77.75 \pm 4.11	133.33 \pm 9.72	86.2 \pm 5.87	91 \pm 3
	Level III	134.91 \pm 6.65	92.27 \pm 3.13	81.91 \pm 2.12	128.22 \pm 6.83	89 \pm 3.12	84 \pm 5.41
	Level IV	144.23 \pm 3.70	100.61 \pm 1.71	83.69 \pm 3.09	137.67 \pm 9.78	101 \pm 4.48	78.67 \pm 4.47
	Level V	149.29 \pm 8.47	100.83 \pm 6.40	84.29 \pm 3.83	136.71 \pm 13.25	110.57 \pm 1.89	69.57 \pm 2.78
Affected side/s of the body	Unilateral	*** 100.6 \pm 3.68	*** 87.67 \pm 4.98	*** 99.8 \pm 10.37	* 126.13 \pm 14.67	* 92.2 \pm 12.83	* 87.2 \pm 12.60
	Bilateral	141.35 \pm 10.73	98.24 \pm 5.62	82.46 \pm 4.20	132.68 \pm 14.82	97.72 \pm 12.38	81.04 \pm 11.98
	Not reported	148 \pm 5.29	99.33 \pm 7.23	81.67 \pm 5.51	120.17 \pm 6.76	85 \pm 5.48	93.83 \pm 8.70

Age of mothers	Rho	*** 0.46	*** 0.42	-0.01	*** 0.41	0.07	-0.04
Age of child	Rho	0.09	0.02	** -0.32	*** 0.40	0.009	-0.03

Comparisons were carried out using the Mann Whitney test and the Kruskal Wallis test as appropriate; rho: the Spearman correlation coefficient

*: P<0.05; **: P<0.01; ***: P<0.001

Discussion:

Developmentally disabled children, such as those with cerebral palsy (CP), intellectual disability, and autism spectrum disorder (ASD), show various levels of impairment in their ability to develop new physical, cognitive, verbal, or social skills. These children bring a lot of stress, future anxiety and troubles for the entire family because they require continual attention and support from their parents, particularly mothers of children with CP who spent most of their time taking care of them. (Park, 2018).

Children with CP who are moderately to seriously handicapped depend more on their mothers to carry out their everyday tasks throughout their entire lives. (Nobakht, Rassafiani & Hosseini, 2018). To lessen or eliminate this harmful impact, mothers of children with CP need particular training, more researches into the effectiveness and applicability of mothers being trained has been thoroughly examined, and

the findings showed that it has a beneficial impact on mothers' knowledge, reduces stress, anxiety and improves quality of life (QOL) (Nobakhta et al, 2020). As such, our study investigated the impact of acceptance and commitment-based therapy on mothers of children with cerebral palsy's quality of life and stress levels.

In this study, the first hypothesize is that, mothers of cerebral palsy children who engaged in acceptance and commitment therapy are expected to have an improved quality of life, lower stress and lower future anxiety. The finding showed that there were no notable variations in stress levels between the study and control groups pre intervention while following intervention, stress levels were considerably lower in the study group than in the control group and on follow up (P<0.05). This is may be due to shortage of mothers' knowledge before received acceptance and commitment-based therapy program regarding cerebral palsy and how to deal with stress and anxiety regarding their children diagnosis, but after

they have received the program, they know how to deal with their children and how to adapt and manage their stress.

Similar results were published by **Yang, et al, (2018); Park and Chae, (2020)** they discovered that mothers of Kids with cerebral palsy have the highest levels of parental stress than parents of usually developing children. Additionally, more than sixty percent of parents of children with CP regard themselves as the children's advocates who must make sure they receive the best care possible, and as a result, they frequently experience parenting stress.

Similar results were supported by **Ruskin et al., (2021)** who studied "Mindfulness and acceptance interventions for parents of children and adolescents diagnosed with chronic medical conditions" and found that the outcome measures used to determine parental stress, anxiety, and depression showed significant variation. Additionally, the study group showed significant variation in the additional outcome metrics used to monitor the success of the intervention.

Also, **Cachia, Anderson & Moore, (2016)** who conducted a study in the USA "Mindfulness, stress and well-being in parents of children with autism spectrum disorder " reported that results from the current systematic review and those of mindfulness and acceptance interventions provided to mothers of children with mental health difficulties (including developmental disorders like autism spectrum disorder and (CP) show a number of differences and similarities. In general, these reviews find that mindfulness and acceptance interventions for mothers have positive effects,

such as increased parental psychological flexibility and general wellbeing.

Furthermore, a previous study by **Brown et al., (2015)** who studied " does stepping stones triple p plus acceptance and commitment therapy improve parent, couple, and family adjustment following pediatric acquired brain injury? " In Australia "reported that mothers who received a combination of parenting intervention and acceptance and commitment therapy experienced lower levels of stress and depressive symptoms.

The present result indicates that future anxiety levels the results of this study showed that there was statistically significant difference in the study group compared to the control group post intervention and on follow up ($P < 0.05$). This may be due to the effect of the acceptance and commitment-based therapy program that provided the mothers with knowledge regarding difficulties they might encounter throughout their lives and how to deal with these difficulties.

Similar results found by **Brown et al., (2015)** reported that mothers who received a combination of parenting intervention and acceptance and commitment therapy reported lower levels of stress and depressive symptoms, while there were no significant changes in their mothers' future anxiety, their level of parental confidence, or how challenging they found parenting tasks.

Furthermore, previous study in Ogun state "Psychosocial problems among mothers of children with cerebral palsy attending physiotherapy outpatient department of two selected tertiary health centers " by **Michael, et al., (2019)** revealed that mothers of cerebral palsy

children were more anxious because about sixty percent of them had been concerned about their children's future. Their greatest concern was for the future of the disabled child. They worried about the difficulties they might encounter throughout their lives, worried that the child might not be able to fulfil the roles that typically belong to children who appear to be healthy, and they feared that the child might be dependent their entire lives, which might prevent them from receiving an education like a typical child. Even though one of the mothers claims that the child's developmental milestones have increased, she notes that these milestones may occur later than expected. Mothers of children with CP have always had mixed feelings about what the future holds for them.

The current study's findings revealed that at the post-intervention and follow-up phases, there were notable differences in the two groups' QOL scores for the study and control groups. ($P < 0.05$). This could be related to knowledge, received during acceptance and commitment-based therapy program regarding cerebral palsy and how to improve their QOL. This result was in the same line with prior research, as shown by **Alakh & Pradeep, (2021)** in India who studied "Is parental training effective in improving the quality of life of person with intellectual disability: and discovered that the parent education program improved the quality of life for those with intellectual disability. and discovered that there was a significant change in post-test results between the experimental and control groups on health and wellness dimension of QOL following the parent training program.

In a related study, parenting intervention combined with acceptance and commitment therapy was found to significantly improve quality of life, according to **Newland (2015)** who conducted a study in USA "Family well-being, parenting, and child well-being: Pathways to health adjustment". Additional research by **Rathee et al. (2019)** who studied "relationship between intellectual functioning, family burden and quality of life of parents with intellectual disability at Muzafferpur, Bihar. Indian" supported findings for parents' quality of life. This consistency might be due to that delivering ACT therapies to parents and children may be a successful strategy for improving both participants' quality of life.

Additionally, the findings of this study show changes in the average stress levels, future anxiety, and QOL scores recorded prior to, during, and after the intervention. A progressive decline in means of stress level and future anxiety was noticed over time in the study group while the mean scores of QOL was increased over time among the study group, while a decline was noticed among controls. This outcome is consistent with research by **Hadji constantinou et al., (2016)** who studied "Do web-based interventions improve well-being in type 2 diabetes? "And reported that, on the post-tests, the intervention group's knowledge, physical health, and overall QOL mean scores were all considerably higher than those of the control group with comparable pretest results. Based on web-based training, this demonstrated the effectiveness of intervention for mother of children with cerebral palsy on these mothers' quality of life.

In contrast with this result a study conducted by **Nobakhta et al., (2020)** who studied “A web-based daily care training to improve the quality of life of mothers of children with cerebral palsy” and noted that the mean post-test scores for depression, anxiety, and stress did not significantly change between the intervention group and the control group. In our study when covariance analysis was used to control for pretest scores. This may be due to work load and strain of mothers, as they did not have sufficient time for A web-based daily care training and less concentration, in addition to the more effectiveness of face-to-face intervention programs compared to online programs.

Also, the results of this study represent significant variations in stress and future anxiety levels were recorded by the marital status of mothers, their educational levels, GMFCS, and affected side/s ($P < 0.01$). This may be due to those married mothers have sufficient physical and psychological support from their husbands and family, in addition to educated mothers read and have more knowledge regarding how to support their children and how to deal with future anxiety and improve QOL.

This finding conflicts with research by **Nobakhta et al., (2020)** who studied “A web-based daily care training to improve the quality of life of mothers of children with cerebral palsy” and discovered no statistically significant variations between the intervention and control groups in the parents' ages or educational levels. Additionally, there was no obvious variation between the two groups in the GMFCS level, sex, or age of the

children in their care. ($P > 0.05$). This may be due to work load and burden of highly educated mothers, as they did not have sufficient time for A web-based daily care training and less concentration of on-line training, in addition to the more effectiveness of face-to-face intervention programs compared to online programs.

Also, the findings of this study show a significant positive relation between maternal age and stress and future anxiety scores. ($P < 0.001$) This may be due to that the more mature mothers can acquire more knowledge and have more experience in dealing and adapting with their handicaps. In contrast research conducted by **Michael et al., (2019)** that study " Psychosocial problems among mothers of children with cerebral palsy attending physiotherapy outpatient department of two selected tertiary health centers in Ogun state" reported finding no connection between the burden of care and sociodemographic information like the age of the caregivers.

Conclusion:

Mothers of children with cerebral palsy found acceptance and commitment therapy to be a successful intervention in reducing stress levels, reducing anxiety about the future, and enhancing quality of life.

Recommendation:

Nurses in the outpatient clinic, physiotherapy clinic, and pediatrics department should be trained well and supplied with information and training cerebral palsy program as they are the main source of the mothers' information during providing the

child by needed care. Mass media should emphasize the physical, psychological, social and financial needs and stressors of families of cerebral palsy children. An in-service training program for nurses on the value of acceptance and commitment therapy and how to use it to reduce future anxiety, stress and improve quality of life.

Practical implications

The acceptance and commitment intervention appears to be helpful in assisting mothers of children with cerebral palsy in reducing stress level and future anxiety and improving their quality of life, according to the findings of this study, As the technique's foundation is straightforward, understandable, and allows for its use in a variety of outpatient clinic settings.

Conflict of Interest:

No conflict of interest needs to be disclosed.

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