

Effectiveness of Acceptance and Commitment Therapy on Meta-Worry, Irritable Mood, and Emotional Experience Processing in Anxious Female Nurses

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Abstract

Background: Nursing is stressful, especially for female nurses, due to workload and emotional labor. These stressors can contribute to negative emotional states, including meta-worry, irritable mood, and difficulties processing emotions effectively.

Objectives: The purpose of the present study was to investigate the effectiveness of Acceptance and Commitment Therapy (ACT) in reducing meta-worry, irritability, and improving emotional processing in anxious female nurses.

Methods: A quasi-experimental pre-test, post-test control group design was employed. The target population comprised all female nurses at Imam Khomeini Hospital, Ahvaz, Iran, experiencing anxiety in 2023. A convenience sample of 30 nurses was randomly assigned to either the ACT intervention group (n = 15) or the control group (n = 15). The intervention group received an eight-week ACT program each lasting for 90 minutes. Anxiety-related outcomes were assessed using the Meta-worry Questionnaire, The Irritability Questionnaire, and The Emotional Processing Scale. Data were analyzed using ANCOVA with SPSS-25 software.

Results: Prior to the intervention, no statistically significant differences were identified between the control and experimental groups on measures of meta-worry, irritable mood, and emotional experience processing. Following the ACT intervention, the experimental group demonstrated significant improvements ($P < 0.001$) compared to the control group. Specifically, ACT led to a decrease in meta-worry scores and positive changes in both irritable mood and emotional experience processing among anxious female nurses.

Conclusion: The findings demonstrated that ACT positively improved meta-worry, irritable mood, and emotional experience processing among the participants. These results suggest that ACT may be a valuable intervention for reducing anxiety-related symptoms and improving emotional well-being in female nurses experiencing anxiety.

Keywords: Acceptance and Commitment Therapy, Irritable Mood, Emotional Regulation, Meta-Worry, Anxiety, Nurses

1. Background

Anxiety, a ubiquitous human experience, is characterized by a state of unpleasant apprehension about potential misfortune. It often manifests as worry, fear, or a sense of helplessness in response to perceived threats, known or unknown. These feelings can be accompanied by physical symptoms such as shortness of breath and palpitations, and can be directed at oneself or others.¹ Nurses are a professional group who routinely encounter anxiety and its consequences, both personally and in their patients.² Given their vital role in healthcare delivery, nurses' well-being directly impacts the quality of the provided patient care.³ The hospital environment and the nature of nursing work are well-recognized sources of stress for nurses.⁴ The potential for errors, feelings of inadequacy, and a perceived lack of understanding from management are among the most significant contributors to this stress. These factors can exacerbate anxiety and lead to

persistent, unwanted worries, known as meta-worry. Unlike effective coping strategies, meta-worry involves viewing worry itself as a solution, perpetuating a cycle of anxious rumination.⁵

Meta-worry, a debilitating form of anxiety, involves excessive focus and concern about the act of worrying itself. This self-referential worry pattern is fueled by negative beliefs about the uncontrollability and harmful consequences of worrying.⁶ When these negative beliefs become active, individuals engaged in meta-worry evaluate their worries negatively, leading to heightened anxiety and perceived inability to cope. As a result, meta-worry plays a significant role in predisposing nurses to developing generalized anxiety disorder.⁷ The emotional ramifications of meta-worry, including anxiety associated with anticipating catastrophic events and disrupted emotional processing, contribute to the persistence of anxious feelings and arousal. Over time, nurses' anxiety

can transform into meta-worry, which in turn perpetuates, exacerbates, and sustains worry in the individual.⁸

Nurses' work environments are frequently characterized by a multitude of physical, psychological, and social stressors. These stressors, which can be both short-term and persistent, have been linked to elevated anxiety levels among nurses, particularly those working in helping professions who may feel emotionally invested in their patients' problems.⁹ Research suggests a potential correlation between chronic stress and emotional health.¹⁰ Nurses experiencing chronic work-related stress may be more likely to report symptoms such as apathy, sleep disturbances, increased absenteeism, physical and nutritional concerns, and decreased job satisfaction.¹¹ Additionally, chronic stress may be associated with the development of psychological distress, including symptoms like irritable mood.^{12,13} The irritable mood is characterized by persistent and chronic feelings of irritation, potentially punctuated by sudden outbursts of anger.¹² This emotional state can be linked to phenomena like situational anger and even verbal or nonverbal aggression.¹³

Emotional dysregulation, or the inability to effectively manage emotions, is a significant consequence of chronic stress and elevated anxiety levels.¹⁴ Prolonged exposure to these stressors can lead to a range of psychological difficulties.¹⁵ Individuals struggling with emotional processing often resort to maladaptive coping mechanisms to regulate negative emotions. While these strategies may provide temporary relief, they ultimately exacerbate long-term arousal and cognitive burden.¹⁶ Effective emotional regulation is crucial for nurses' mental well-being, enabling them to navigate the emotionally demanding nature of their work environment. A well-developed capacity for emotional regulation empowers nurses to respond effectively to intense emotional experiences encountered on the job.¹⁷

A variety of psychotherapeutic approaches are employed to address the challenges stemming from stress and emotional dysregulation. One such approach gaining traction is Acceptance and Commitment Therapy (ACT).^{18,19} The ACT focuses on developing psychological flexibility, a core skill that allows individuals to navigate difficult thoughts and emotions without getting caught up in them.^{20,21} This flexibility is fostered through six key processes: Acceptance: Accepting unwanted thoughts and feelings as inevitable human experiences, rather than attempting to suppress or control them. Cognitive defusion: Learning to detach from unhelpful thought patterns and mental chatter by observing them objectively. Self-as-context: Strengthening one's sense of self as the observer of thoughts and feelings, rather than being defined by them. Mindful contact with the present moment: Developing present-moment awareness and focusing on sensory experiences without judgment. Values: Identifying core values that guide meaningful

living and behavior. Committed action: Taking action aligned with personal values, even in the presence of challenging emotions.^{22,23} In the context of nurses experiencing meta-worry, irritability, and difficulty processing emotions, ACT can be particularly helpful. For example, ACT can help nurses recognize the repetitive cycle of worry and learn to accept these thoughts without judgment (acceptance and cognitive defusion). Through mindfulness practices, nurses can develop present-moment awareness and focus on the task at hand, rather than dwelling on worries. ACT also emphasizes identifying personal values related to patient care and well-being, and taking action aligned with those values, even in stressful situations.

Occupying the forefront of healthcare delivery, nurses stand as the most vulnerable group among healthcare professionals. Reports consistently highlight the prevalence of emotional exhaustion and psychological distress, including anxiety, sleep disturbances, and depression, among nurses.²⁴ Existing data indicates that anxiety prevalence among nurses has fluctuated between 25% and 26% globally in recent years, with a notable surge during and following the COVID-19 pandemic.²⁵ This anxiety level is significantly higher than that observed in the general population. Similarly, research in Iran has revealed that anxiety, particularly health anxiety, is prevalent among nurses, with moderate to severe levels.²⁶

2. Objectives

Building upon the preceding background, this study examined the efficacy of ACT in alleviating meta-worry, mitigating irritability, and enhancing emotional processing among female nurses experiencing anxiety.

3. Methods

The present study employed a quasi-experimental design with a pre-test, post-test, and control group structure. The target population for this study comprised all female nurses experiencing anxiety at Imam Khomeini Hospital in Ahvaz, Iran, in 2023. A sample of 30 individuals was selected from this population using a convenient sampling method. Following informed consent, participants were randomly assigned to either the experimental group ($n = 15$) or the control group ($n = 15$). A priori power analysis was conducted using G*Power software to determine the required sample size. The analysis was based on an anticipated medium effect size (effect size = 1.12), a significance level of $\alpha = 0.05$, and a desired power of $1 - \beta = 0.90$. This analysis ensured sufficient statistical power to detect a medium-sized effect with a high degree of confidence. Participants in the study were recruited based on inclusion criteria. To be included, they had to be female nurses who were not currently receiving psychotherapy or taking psychotropic medication. Additionally, they needed

to meet the diagnostic criteria for generalized anxiety disorder. This was confirmed through assessments, along with elevated scores on both meta-worry and irritability scales. Finally, to ensure they would benefit from the intervention, participants also needed to have low scores on the emotional processing scale. Conversely, those who were excluded from the study included individuals who were already on psychotropic medication for psychological or psychiatric reasons. Incomplete questionnaires or failure to attend or lack of willingness to participate in the intervention sessions also served as grounds for exclusion. Pre-test assessments were administered to all participants in both groups. The experimental group received ACT intervention, while the control group (waitlist) served as a comparison group and did not receive the intervention. Post-test assessments were administered to all participants in both groups following the completion of the intervention.

3.1. Instruments

3.1.1. Meta-worry Questionnaire (MWQ)

The MWQ was developed by Wells (27) to assess anxiety-related thoughts. The scale consists of 21 items and three subscales: Social Anxiety (8 items), Physical Anxiety (6 items), and Meta-worry (7 items). Respondents rate their agreement with each statement on a 4-point Likert scale ranging from "strongly disagree" to "strongly agree." The MWQ has demonstrated good internal consistency reliability in various studies (28), including the present one. In this study, the Cronbach's alpha coefficient for the total scale was 0.78.

3.1.2. Irritability Questionnaire (IQ)

Developed by Craig et al. (29), the IQ is a 21-item self-report measure that assesses individual irritability levels.

It comprises three subscales: sociability, activity level, and irritability. Responses are scored on a 4-point Likert scale, ranging from 0 (not at all) to 3 (very much). Total scores range from 0 to 63. The IQ has demonstrated adequate psychometric properties, including good internal consistency (30). In the present study, the Cronbach's alpha for IQ was 0.79.

3.1.3. Emotional Processing Scale (EPS)

The EPS is a self-report measure developed by Backer et al. (31) to assess emotional processing abilities. It comprises 25 items divided into five subscales: suppression, unpleasant emotion experience, emotion control, avoidance, and signs of unprocessed emotions. Responses are recorded on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Total scores range from 25 to 125, with higher scores indicating poorer emotional processing. The psychometric properties of the EPS, including its validity and reliability, have been established by Kharamin et al. (32). In the present study, the Cronbach's alpha for the EPS was 0.86.

3.2. Intervention

3.2.1. Acceptance and Commitment Therapy (ACT)

The experimental group received an ACT intervention delivered in a group format over eight, bi-weekly sessions (total duration: 12 hours). The intervention was guided by the protocol outlined in Hayes et al. (23). A summary of the specific components addressed in each ACT session has been provided in Table 1. The therapist delivering the ACT intervention was a licensed mental health professional with two years of experience specializing in cognitive behavioral therapies, including ACT. The therapist received additional training and supervision in ACT to ensure fidelity to the intervention model.

Table 1. Summary of the ACT Sessions

Sessions	Objectives	Content
1	Introduction and establishing structure and rules	Introduce participants to each other and establish ground rules for the sessions. Begin creative helplessness exercises.
2	Continuing creative helplessness	Continue creative helplessness exercises.
3	Introduction to control	Introduce control as an issue and discuss the inner world and its differences.
4	Introduction to acceptance	Introduce acceptance and the expression of pure and impure emotions.
5	Explaining fusion	Familiarize participants with the hidden characteristics of language that lead to fusion.
6	Introducing the self as context	Introduce different types of selves and the conceptualization of overcoming the past and the conceptualized future.
7	Identifying values	Move towards a valuable life with a self-accepting and observant self. Identify and assess client values.
8	Committed action: review, summary, and conclusion	Move clients to action. Assess commitment to action. Assign a final assignment.

3.3. Statistical Analysis

Data analysis was conducted using analysis of covariance in the SPSS-25 statistical software. Prior to conducting the covariance analysis, the assumptions of normality and homogeneity of variances were verified. The Kolmogorov-Smirnov normality test was employed to assess whether the data for each study variable were normally distributed.

Levene's test was then utilized to evaluate the homogeneity of variances assumption.

4. Results

In the present study, nine participants (30.0%) had an associate's degree, 15 participants (50.0%) had a bachelor's degree, and six participants (20.0%) had a master's degree.

The frequency and percentage frequency of the work experience of the participating nurses were as follows: 1 year (1 participant) (3.3%), 2-4 years (7 participants) (23.3%), 5-7 years (4 participants) (13.3%), 8-10 years (11

participants) (36.7%), and more than 10 years (7 participants) (23.3%). Table 2 presents the means, Standard Deviations (SD), and Kolmogorov-Smirnov normality tests for the study variables in the pre-test and post-test stages.

Table 2. Means, SD, and Kolmogorov-Smirnov tests for Meta-worry, Irritable Mood, and Emotional Experience Processing

Variables	Groups	Pre-test	Post-test	Kolmogorov-Smirnov	
		Mean \pm SD	Mean \pm SD	Z	P
Meta-worry	ACT group	47.68 \pm 9.45	36.25 \pm 8.13	0.52	0.957
	Control group	48.56 \pm 8.39	48.18 \pm 7.78	0.49	0.965
Irritable mood	ACT group	33.18 \pm 7.88	23.62 \pm 7.97	0.48	0.970
	Control group	34.06 \pm 6.74	34.56 \pm 6.95	0.50	0.964
Emotional experience processing	ACT group	10.75 \pm 3.13	15.31 \pm 3.17	0.41	0.997
	Control group	10.18 \pm 4.38	9.75 \pm 3.97	0.35	0.999

The results indicated changes in meta-worry, irritable mood, and emotional experience processing following ACT intervention. For meta-worry, the ACT group showed a significant decrease from the pre-test (47.68 \pm 9.45) to the post-test (36.25 \pm 8.13), while the control group exhibited minimal change (pre-test: 48.56 \pm 8.39, post-test: 48.18 \pm 7.78). Similarly, the ACT group reported a decrease in irritable mood scores (pre-test: 33.18 \pm 7.88, post-test: 23.62 \pm 7.97), whereas the control group showed a slight increase (pre-test: 34.06 \pm 6.74, post-test: 34.56 \pm 6.95). In terms of emotional experience processing, the ACT group showed improvement from the pre-test (10.75 \pm 3.13) to the post-test (15.31 \pm 3.17), while the control group's scores slightly decreased (pre-test: 10.18 \pm 4.38, post-test: 9.75 \pm 3.97). These results suggest that ACT intervention may be beneficial for reducing meta-worry and irritable mood, and improving emotional experience processing in anxious female nurses (Table 2).

Before conducting the covariance analysis, its assumptions were checked. Initially, the absence of influential outliers in the study variables was confirmed using the Kolmogorov-Smirnov normality test. The results showed that the assumption of normality of data distribution was met for conducting the covariance analysis (Table 2). Additionally, Levene's test was used to examine the assumption of homogeneity of variances, which yielded F-values of 2.73 ($P = 0.109$) for meta-worry, 1.35 ($P = 0.296$) for irritable mood, and 2.33 ($P = 0.138$) for emotional experience processing.

To compare the experimental and control groups based on their post-test scores; while controlling the effect of pre-test scores, analysis of covariance was used in order to determine the effect of ACT intervention on meta-worry, irritable mood, and emotional experience processing in anxious nurses. The results of the post-test stage have been presented in Table 3.

Table 3. Results of Analysis of Covariance on Post-test Scores of Meta-worry, Irritable Mood, and Emotional Experience Processing

Variables	SS	df	MS	F	P	η^2
Meta-worry	1160.22	1	1160.22	170.50	0.001	0.85
Irritable mood	815.75	1	815.75	91.11	0.001	0.75
Emotional experience processing	204.16	1	204.16	118.89	0.001	0.80

As shown in Table 3, the F-values from the covariance analysis for the variables of meta-worry ($F = 170.50$, $P = 0.001$), irritable mood ($F = 91.11$, $P = 0.001$), and emotional experience processing ($F = 118.89$, $P = 0.001$) were all significant. These findings indicate that there were significant differences between the experimental and control groups in their post-test scores on these variables, even after controlling the effect of pre-test scores ($P = 0.001$). Specifically, the experimental group showed a significant decrease in meta-worry and irritable mood, and a significant increase in emotional experience processing, compared to the control group ($P = 0.001$). These results suggest that ACT intervention was effective in improving the mental health outcomes of anxious nurses.

5. Discussion

The present study aimed to investigate the effectiveness of ACT on meta-worry, irritable mood, and emotional

experience processing in anxious female nurses in Ahvaz, Iran. The results demonstrated that ACT was effective in improving meta-worry, irritable mood, and emotional experience processing in these nurses. The first finding indicated that ACT was effective in reducing meta-worry in anxious female nurses. These findings are consistent with previous research.³³ Meta-worry is the process of worrying about worry itself, which can significantly impact mental health. It can lead to the intensification and persistence of worry and the development of pathological worry. Individuals with high levels of meta-worry may view worry as a coping strategy and make no effort to break the cycle of worry.⁷ ACT, which focuses on individuals' cognitions, a crucial component in meta-worry treatment, enables individuals to view their experiences from different perspectives and in relation to various contexts. This allows individuals to develop a better self-definition and perceive problems as overarching

experiences that can be addressed using appropriate methods.³³ ACT emphasizes the positive aspects and various dimensions of individuals' lives, generating ideas that reflect their ability to control their emotions and reinforcing the belief that life is controllable. This encourages and empowers individuals to set life goals.²¹ The findings further demonstrated that ACT was effective in improving irritable mood in anxious female nurses. These results are consistent with a previous research.³⁰ Irritable mood is characterized by increased anger proneness and is a predictor of anxiety, depression, and functional impairment. Recurrent episodes of intense anger occur in response to frustration and manifest verbally or behaviorally. They occur frequently (at least once a week) for at least one year and in at least two different settings (e.g., home, work). They are disproportionate to the individual's age. Persistent and chronic angry or irritable mood persists between episodes of acute anger and is not attributable to personality traits. It is present most of the day, most days, and is noticeable to others.³⁰ The effectiveness of ACT in reducing irritable mood in nurses suggests its potential as a valuable intervention for this population. ACT equips individuals with skills to accept difficult emotions like anger and frustration, without judgment, while also helping them focus on living a meaningful life aligned with their values. This approach may help nurses manage their emotional responses more effectively, leading to a reduction in overall irritability and improved well-being.¹⁸

The study further demonstrated that ACT was effective in improving emotional experience processing in anxious female nurses. These results are consistent with previous research by Zandkarimi and Ghahremany.³⁴ Emotional experience processing refers to the ability to observe and accept current thoughts and emotions without judgment, leading to effective processing and integration of these experiences. The nurses in this study learned to enhance their psychological flexibility through six ACT processes: acceptance, defusion, self-as-context, committed action, values, and connection with the present moment. These techniques improved their emotional experience processing. Difficulty in understanding and utilizing emotions for effective thinking can lead to impaired functioning and, in severe cases, psychopathology. Research on emotions and emotional experience processing emphasizes the concept of stress vulnerability.³⁴ Individuals with strong emotional experience processing skills learn in ACT therapy that attempts to avoid or control unpleasant and unwanted subjective experiences are not only ineffective but can also worsen stress. ACT helps individuals with anxiety disorders view intrusive thoughts as just that – thoughts – and recognize their counterproductive nature.²³ Instead of reacting to these thoughts, individuals are encouraged to engage in activities that align with their values and goals. This shift in perspective and

relationship with internal experiences allows individuals with anxiety disorders to redirect their attention to their activities, goals, and plans, leading to more positive and beneficial emotional outcomes.

ACT aims to enhance the psychological flexibility of nurses in their current situations, enabling them to move towards their life values. It actually effectively reduces anxiety symptoms.³⁵ This approach contrasts with the tendency to avoid anxiety-provoking situations. In learning and behavioral theories, anxiety is viewed as a response to a stimulus, maintained and perpetuated by reinforcing consequences. However, this relief is short-lived.²⁰ ACT aims to help individuals engage with a wide range of behaviors, rather than avoiding them, to move towards their goals. Acceptance in practice involves strategies to cultivate a willingness to accept unpleasant emotions when they arise, such as fear, distress, and the urge to avoid such situations and anxiety responses like heart palpitations, shortness of breath, and tremors. Acceptance is initially introduced by highlighting the drawbacks of controlling methods inappropriately applied to internal experiences. Individuals are then shown that self-control is a problem, not a solution. It is worth mentioning that acceptance exercises focusing on unpleasant emotions and thoughts foster psychological flexibility in nurses.¹⁸

The present study has limitations that should be considered when interpreting the findings. First, the study utilized a convenience sample of female nurses recruited from Imam Khomeini Hospital in Ahvaz, Iran. This sampling approach limits the generalizability of the results to the specific population studied and restricts our ability to draw conclusions about the applicability of ACT to a broader population of nurses. Additionally, the study design focused on immediate post-intervention effects and lacked a follow-up period to assess the intervention's long-term efficacy.

Beyond addressing sample diversity and long-term effects, future research can further explore the mechanisms underlying ACT's effectiveness in this population. One avenue for exploration could be identifying potential moderators of treatment response. Moderators are variables that can influence the strength or direction of the relationship between the intervention and the outcome. For example, investigating whether nurses with higher levels of baseline mindfulness benefit more from ACT compared to those with lower baseline mindfulness could be informative. Furthermore, future studies could also examine potential mediators of change. Mediators are variables that explain how the intervention produces its effects. For instance, research could explore whether the intervention's impact on meta-worry and emotional processing is mediated by changes in cognitive defusion skills, a core component of ACT. By investigating moderators and mediators, future research can provide a more nuanced understanding of how ACT works for

anxious female nurses and for whom it may be most effective.

6. Conclusion

The current study yielded promising findings regarding the effectiveness of ACT in addressing anxiety-related mental health concerns among nurses. Specifically, the ACT intervention group demonstrated significant improvements in three key areas: meta-worry, irritable mood, and emotional experience processing. The observed decrease in meta-worry among nurses receiving ACT suggests its potential to help individuals break the cycle of unproductive worry and rumination. These findings suggest that ACT empowers individuals to regulate their emotional responses, leading to a decrease in overall irritability. Finally, the study demonstrated that ACT intervention effectively improved the nurses' ability to process their emotions. By promoting emotional awareness and acceptance, ACT may contribute to the development of emotional intelligence, enabling individuals to navigate challenging emotions in a more constructive manner. Based on these results, incorporating ACT into the mental healthcare of nurses, particularly those experiencing anxiety, appears to be a promising strategy. Mental health professionals are encouraged to consider integrating ACT techniques into their treatment plans for nurses struggling with anxiety. This integration could involve individual therapy sessions or group workshops designed to develop ACT skills and enhance emotional well-being in this population.

Research Highlights

What Is Already Known?

Anxiety is a well-established mental health concern that negatively impacts various aspects of life. Traditional approaches to managing anxiety often emphasize avoiding or controlling situations that trigger anxiety. Additionally, research suggests that difficulty processing emotions can contribute to the development and persistence of anxiety, along with other mental health problems.

What Does This Study Add?

This study expands our understanding of how to address anxiety in nurses by demonstrating the effectiveness of ACT. Specifically, the research found that ACT offers a three-pronged approach: it reduces meta-worry, the excessive rumination about worry itself, by equipping individuals with more productive coping mechanisms for anxiety. Additionally, ACT improves irritable mood, characterized by anger proneness, by teaching skills to manage emotional responses and reduce overall irritability.

Author Contributions

Authors contributed equally to this work.

Conflict of Interest Disclosures

All authors declared that they have no conflict of interest.

Ethical Approval

This research adhered to ethical principles and received approval from the Ethical Committee of Islamic Azad University (code: IR.IAU.D.REC.1402.121).

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