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The mediating role of ambiguity intolerance and worry in the relationship between resilience and fatigue compassion in the nurses

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A B S T R A C T

This study aimed to determine the mediating role of ambiguity intolerance and worry in the relationship between resilience and fatigue compassion in nurses. The research method employed a descriptive-correlational design, and the statistical population of this study consisted of all nurses working in hospitals in Tehran Province in 2024. A convenience sampling method was used to select 220 nurses from this population. The study tools were included Connor-Davidson Resilience Scale (2003), the Compassion Fatigue Inventory by Saberi et al. (2017), Penn State Worry Questionnaire by Meyer et al. (1990), and the Ambiguity Tolerance Scale-II by McLain (2009). Structural equation modeling was used to analyze the data. The results showed that worry mediates the relationship between resilience and fatigue compassion negatively and significantly (β=-0.096, P=0.001). Ambiguity intolerance mediates the relationship between resilience and fatigue compassion negatively and significantly (β=-0.050, P=0.029). Based on the results of the present study, it seems that the lack of resilience among nurses in ambiguous and worrying situations causes burnout and fatigue compassion.

Introduction

Nurses are at the heart of the healthcare team and play a vital role in maintaining community health. Therefore, safeguarding the well-being of individuals in this profession is essential to ensuring the overall health of society (Salimi et al., 2017). Employment in a specific profession can itself be a source of stress. The work environment includes physical, psychological, and social stimuli, each of which may contribute to stress. Healthcare professionals, including nurses, are often exposed to high levels of occupational stress. As members of the medical team, nurses face stressors that can pose both psychological and psychosocial threats (Khoshnazary et al., 2016). In this context, the findings of Sepahvand and Momeni Mofrad (2020) indicate that depression, apathy, reduced concentration, and anxiety are among the most significant psychological consequences faced by nurses. Similarly, Sarboozi Hoseinabadi et al. (2020) found that the nursing work environment is characterized by prolonged and persistent stress. This is particularly true for those in helping professions, who may feel overwhelmed by the problems of others—ultimately leading to depression and anxiety

Undoubtedly, anxiety is one of the most common social problems among nurses, and the harm and losses caused by it are far greater than those of other social issues. Some researchers consider resilience a necessary capacity for success in the nursing profession. Nurses in the 21st century must skillfully develop

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resilience within themselves to confront professional challenges, overcome negative experiences, and transform them into positive ones. Without resilience, working conditions for nurses become very difficult and may cause psychological and biological harm. Moreover, low resilience in nurses exacerbates the negative effects of a stressful environment (Salimi et al., 2017). Individuals who effectively cope with life's challenges and adverse events also have the ability to inhibit the initial cortisol response to acute stress and reduce exaggerated psychological reactions resulting from cognitive distortions toward threats (Charney, 2003). Those who experience less anxiety and worry and consequently find appropriate coping strategies in unpleasant situations demonstrate better adaptation and resilience in dealing with stressful circumstances (Ahmadi & Sayyahi, 2017). Resilience is the internal capacity to regulate emotions when facing adverse life events, leading to flexibility in managing anxiety (Prout et al., 2019). In this regard, Foroutan et al. (2018) concluded that using a resilient approach is an effective coping strategy in anxiety-provoking situations. Majidpoor Tehrani and Aftab (2021) found that individuals with low resilience tend to worry about contracting COVID-19 and resort to negative cognitive emotion regulation strategies when faced with a high probability of infection, which increases their anxiety. Nurses with higher tolerance for ambiguity experience less anxiety and worry and, as a result, show better adaptation and resilience by finding appropriate solutions and coping strategies in stressful situations (Ahmadi & Sayyahi, 2017). Intolerance of ambiguity is currently regarded as a tendency stemming from a set of negative beliefs about ambiguity or uncertainty and its consequences, serving as an important predictor of worry and the tendency to interpret ambiguous situations negatively (Britton et al., 2019). It is also a cognitive state that increases the risk of anxiety (Chen et al., 2018; Osmanağaoğlu et al., 2018).

Worry is a repetitive chain of thoughts and images that are intense, largely uncontrollable, and focused on a future event whose outcome is uncertain and potentially negative. Its purpose is to reduce the likelihood of feared consequences and their effects. Worry is generally classified as the cognitive component of anxiety (Fialko et al., 2012). Anxiety itself is divided into cognitive and behavioral components: while the behavioral component varies among individuals, the cognitive component—worry—is more stable and tends to follow a similar pattern across different people. Therefore, studying worry is often more precise than studying anxiety as a whole. Worry can be categorized into two types: normal and pathological. Pathological worry differs from normal worry in terms of frequency, intensity, duration, and the individual's ability to control it. It also significantly interferes with daily functioning (Ranjbar Noushari et al., 2013). Consequently, worry can be understood as an ineffective cognitive attempt at problem-solving aimed at eliminating perceived threats, while simultaneously avoiding the unpleasant physical and emotional experiences that naturally arise during the confrontation of fear.

Avoidance theory suggests that worry serves as a coping mechanism when facing anxiety-provoking events. It aims to reduce intrusive thoughts, distressing images, and the physiological arousal linked to negative emotions, helping individuals manage emotional dysregulation and maintain control over their feelings (Borkovec, 1994). Borkovec et al. (2004) argued that worry may be negatively reinforced by lowering autonomic arousal, since pathological worry is characterized by an inability to dismiss or distract oneself from worrying thoughts (McDermott & Cougle, 2020). Resilience plays a crucial role by promoting a positive cognitive style and adaptive emotional and behavioral patterns (Huang et al., 2019). Consequently, it can impact the level of burnout among nurses. Compassion fatigue describes the emotional and behavioral exhaustion experienced by those exposed to others' suffering (Kapoulitsas & Corcoran, 2014). Effectively responding to complex environmental demands requires attention to incoming information, data accumulation and encoding, and the interpretation of environmental signals to produce appropriate and adaptive responses (Durning et al., 2015). Individuals who experience excessive distress and worry often use both implicit cognitive avoidance strategies, such as automatic avoidance of anxiety-inducing situations, and explicit, voluntary avoidance strategies (Borkovec et al., 1998). Anxious individuals may have the knowledge to solve their problems but struggle to apply it due to negative cognitive frameworks that hinder their readiness and ability to engage in problem-solving when faced with challenges (Khodayarifard et al., 2017). Nurses face severe stress due to the pandemic. Those with greater anxiety, stemming from intolerance of ambiguity about their work, the progression of the disease, patient recovery, and poor information processing, are more prone to compassion fatigue. This vulnerability

results from emotional pain and unresolved emotional difficulties, which ultimately increase their anxiety levels.

In this regard, Lynch and Lobo (2012) proposed that compassion fatigue arises when a caring relationship grounded in empathy transforms a deep psychological response into stress, eventually leading to physical, mental, spiritual, and social exhaustion. Figley (1995) described compassion fatigue as the result of repeated and continuous exposure to painful tasks and caring for individuals in severe emotional distress, which causes decreased performance, increased errors, a gradual decline in caregiver morale, and ultimately, a deterioration in overall health. Compassion fatigue stems from the uncontrolled accumulation of compassion-related secondary stress. This secondary stress accumulates due to the increasing daily demands of providing human services to suffering individuals (Figley & Figley, 2017).

Since nurses' physical and mental health is directly linked to the quality of patient care, job satisfaction, interest in work, and overall efficiency, compassion fatigue can severely harm nurses by depleting the positive emotions necessary to cope with the pressures of witnessing patient suffering. Nurses with low resilience, who are unable to effectively self-regulate when facing intolerance of ambiguity, may struggle to maintain empathy and compassion for patients, making them more vulnerable to compassion fatigue and burnout. Therefore, the aim of this study is to answer the following question:

Does intolerance of ambiguity fatigue and worry mediate the relationship between resilience and compassion fatigue in nurses?

Research Method

The research method was descriptive correlational. The statistical population of this study included all nurses working in hospitals across Tehran province in 2024. Based on Kline's (2011) recommendation that the minimum sample size for modeling studies is at least 200 participants, and accounting for potential sample attrition, 220 nurses were initially selected through convenience sampling. Data were collected via online questionnaires distributed through virtual networks such as Instagram, WhatsApp, and Telegram. After accounting for attrition, the final sample size was 216 nurses.

The inclusion criteria were as follows: participants must have no physical disabilities or chronic illnesses, not be taking medication for physical or mental conditions, have not been hospitalized in the past year due to physical or mental health issues, and not be undergoing psychotherapy currently or within the past year. The only exclusion criterion was failure to complete the questionnaires.

Research tools

Connor-Davidson Resilience Scale: The Connor-Davidson Resilience Scale (Connor & Davidson, 2003) consists of 25 items designed to assess resilience on a 5-point Likert scale, ranging from 0 (completely false) to 4 (completely true). Connor and Davidson (2003) reported a Cronbach's alpha coefficient of 0.89, indicating high internal consistency. The internal correlations between factors ranged from 0.30 to 0.70, and the test-retest reliability coefficient was 0.87. Additionally, the scale showed strong convergent validity through a positive correlation of 0.83 with the Kubasa Hardiness Instrument. Kayhani et al. (2015) reported a Cronbach's alpha coefficient of 0.66 for this scale and found its correlations with the Schwartz General Self-Efficacy Scale and the Bass and Perry Aggression Inventory to be 0.22 and -0.17, respectively.

Compassion Fatigue Questionnaire: The Fatigue Questionnaire developed by Sabery et al. (2017) consists of 35 items that assess six subscales related to fatigue. Responses are rated on a 5-point scale ranging from "very low" to "very high." Sabery et al. (2017) reported Cronbach's alpha coefficients for the subscales ranging from 0.61 to 0.90, indicating acceptable to high internal consistency. Additionally, the questionnaire demonstrated convergent validity, with a reported correlation of 0.60 with the Copenhagen Fatigue Questionnaire.

Tolerance of Ambiguity Scale - Second Edition: The Tolerance of Ambiguity Scale – Second Edition, developed by McLain (2009), consists of 13 items rated on a 5-point Likert scale ranging from 1 (strongly

disagree) to 5 (strongly agree). The total score is calculated by summing the scores of all items. McLain (2009) reported a Cronbach's alpha coefficient of 0.82 for this scale, indicating good internal consistency. The scale showed correlations of 0.09 with the Budner Tolerance of Ambiguity Questionnaire and 0.41 with the McDonald Tolerance of Ambiguity Questionnaire. In a separate study, Feizi et al. (2012) reported a construct validity coefficient of 0.48 for this instrument and a Cronbach's alpha of 0.85, supporting its reliability.

Pennsylvania State Anxiety Questionnaire: The Pennsylvania State Anxiety Questionnaire, developed by Meyer et al. (1990), consists of 16 items scored on a 6-point Likert scale ranging from 1 (not at all true) to 6 (very true). Dehshiri et al. (2009) reported a Cronbach's alpha coefficient of 0.88 for this instrument and found a correlation of 0.68 with trait anxiety. In the present study, the Cronbach's alpha coefficient for this questionnaire was 0.90, indicating excellent internal consistency.

Procedure

After the voluntary selection of nurses and explanation of the research objectives, informed consent was obtained from all participants. They completed the questionnaires online. The researcher's contact information was provided to answer any questions that arose during the completion of the questionnaires. Ethical considerations such as obtaining informed consent, ensuring privacy, and maintaining confidentiality were strictly observed. Data analysis was performed using structural equation modeling with AMOS software.

Results

In the present study, there were 216 participants, of whom 13 (6.02%) were under 22 years old, 34 (15.74%) were between 23 and 27 years old, 49 (22.69%) were between 28 and 32 years old, 67 (31.02%) were between 33 and 37 years old, and 53 (24.53%) were over 38 years old.

In the present study, before analyzing the measurement and structural models, the assumptions underlying the modeling were tested. The results indicated that the skewness and kurtosis indices for all variables were within the acceptable range of ±2, suggesting that the data distribution for each research variable was normal. Additionally, no multicollinearity issues were detected among the research variables, as the variance inflation factor (VIF) values for all predictor variables were below 10, and tolerance values were above 0.10. Thus, the assumptions of univariate normality and absence of multicollinearity were met. Furthermore, the assumption of multivariate normality was assessed using Mahalanobis distance plotting. After removing multivariate outliers identified among four participants, the data met the multivariate normality assumption.

Table 1. Goodness of fit indices of the measurement and structural model of the research

Fitness indicators	ϕ^2	(ϕ^2/df)	CFI	GFI	AGFI	RMSEA
Measurement model	180/39	3/06	0/971	0/934	0/898	0/073
Structural model	204/25	2/96	0/968	0/929	0/892	0/072

Table 1 shows that the examination of the goodness-of-fit indices resulting from the test of the measurement and structural models of the research showed that these models had a favorable fit with the collected data.

Table 2. Total, direct, and indirect path coefficients

Effect	Path	B	S. E	β	sig
Total effect	Resilience - Compassion Fatigue	-0/479	0/075	-0/419	0/001
	Resilience- Worry	-0/168	0/022	-0/325	0/001
Direct effect	Resilience - intolerance of ambiguity	-0/489	0/119	-0/250	0/001
	Resilience - Compassion Fatigue	-0/278	0/031	-0/565	0/001

	Intolerance of ambiguity - compassion fatigue	0/083	0/020	0/202	0/001
	Worry-Compassion Fatigue	0/223	0/032	0/298	0/002
	Intolerance of ambiguity - compassion fatigue	0/126	0/057	0/124	0/008
Indirect effect	Resilience - Compassion Fatigue	0/126	0/057	0/146	0/016

Table 2 shows that the direct path coefficients between resilience and worry (β=-0.325, P=0.001), intolerance of ambiguity (β=-0.250, β=0.001), and compassion fatigue (β=-0.565, P=0.001) were negative and significant. Table 2 also shows that the indirect path coefficients between resilience and compassion fatigue were positive and significant (β=0.146, P=0.016).

Table 3. Indirect effects of resilience on compassion fatigue due to intolerance of ambiguity and worry

Path	β	SE_{ab}	Z	sig
Resilience–a –> Worry-b -> Compassion Fatigue	-0/096	0/012	-7/87	0/001
Resilience- a–> Intolerance of ambiguity- b-> Compassion fatigue	-0/050	0/024	-2/05	0/039

Table 3 shows that worry negatively and significantly mediates the relationship between resilience and compassion fatigue (β=-0.096, P=0.001). Intolerance of ambiguity negatively and significantly mediates the relationship between resilience and compassion fatigue (β=-0.050, P=0.029).

Discussion and Conclusion

The aim of the present study was to examine the mediating role of intolerance of ambiguity and worry in the relationship between resilience and compassion fatigue among nurses. The results indicated that both intolerance of ambiguity and worry significantly mediate the relationship between resilience and compassion fatigue. These findings are consistent with previous research conducted by Foroutan et al. (2018), Majidpour-Tehrani and Aftab (2021), Borkovec et al. (2004), Lynch and Lobo (2012), and Figley (1995).

In explaining the direct relationship between resilience and compassion fatigue in nurses, resilience can be understood as a positive pattern of adaptation in response to challenges, which develops and strengthens over time. Individuals with appropriate resilience persist in the face of difficulties, cope more effectively with threatening situations, manage psychological pressures and problems better, and possess a greater capacity to respond to life stressors and daily challenges (Shabahang et al., 2018). Moreover, people who effectively handle life's challenges can inhibit the initial cortisol response to acute stress and reduce exaggerated psychological reactions stemming from cognitive distortions about threats (Charney, 2003). Bonanno (2004) argued that individuals with high resilience maintain relatively stable cognitive and physical functioning when exposed to adversity, which helps mitigate negative emotional experiences. Therefore, resilience appears to protect nurses from developing compassion fatigue and anxiety by sustaining their level of functioning.

In explaining the mediating role of intolerance of ambiguity and worry in the relationship between resilience and compassion fatigue in nurses, it can be said that individuals with low self-resilience are unable to inhibit their intrusive thoughts and images when faced with anxiety-provoking events, which causes worry (Bair et al., 2020). Worry is considered a cognitive mechanism that is used to regulate the emotional and affective reactions and responses of individuals in dealing with threats, anxiety-provoking events and stimuli (Newman et al., 2017). Because humans have the cognitive capacity to create mental representations of past events and also to face future events in order to solve problems, they are able to create mental representations of future unpleasant events that are the cause of anxiety, in situations that have not yet occurred. One of the consequences of worry is the ability to produce and maintain anxiety in the absence of external fear, with catastrophic thoughts and images of non-existent fears and the dangers of facing them in the future. In this sense, worry contributes to the etiology and maintenance of anxiety

(Clark & Beck., 2012). In the hyperarousal-avoidance model of anxiety, Lee, Osmanagaoglu, and colleagues hypothesized that individuals who are unable to tolerate ambiguity are prone to engaging in worry because the inability to tolerate ambiguity triggers a chain of worry, negative orientations to the problem, and cognitive avoidance (Lee, Woodruff-Borden., 2018; Osmanagaoglu et al., 2018). According to the metacognitive model, it is hypothesized that intolerance of ambiguity increases the risk of excessive worry and is also a factor in increasing vulnerability to worry because it causes individuals to tend towards cognitive avoidance and positive beliefs about worry. One of the coping behaviors that leads to the perpetuation of negative evaluations and beliefs about worry is cognitive avoidance, which actually disrupts the self-regulation process by transferring control to external factors. Worry, in turn, leads to cognitive avoidance, which in turn perpetuates worry in a vicious cycle (Aktar et al., 2017; Kertz & Woodruff-Borden., 2013). The metacognitive model focuses on the perpetuation of a range of behavioral and thought control strategies. Behaviors such as avoidance of situations or information, reassurance, and destructive behaviors are carried out with the aim of avoiding worry-triggering situations and preventing the feared consequences of worry. Thought control strategies such as thought suppression are also used with the aim of suppressing thoughts related to worry triggers. However, these strategies are rarely effective. In addition, they interfere with effective mental control, the practice of alternative strategies for appraisal and coping, the development of more adaptive metacognitive beliefs, and the loss of confidence in one's own abilities to control worry. Ultimately, these strategies prevent the experience of events and evidence that contradict the controllability and dangerousness of worry, and as a result, reinforce beliefs about the uncontrollability and dangerousness of worry. In the metacognitive model, there is a distinction between two types of worry, namely type I and type II worry; type I worry is related to external and internal non-cognitive events such as physical symptoms, health-related issues, interpersonal concerns, and other everyday concerns, while type II worry is related to the negative evaluation of thought processes. This type of worry is originally called worry about worry or metaworry. According to the theory, metaworry leads to two other factors that perpetuate the worry process.

First, behaviors such as reassurance-seeking or avoidance of worry-provoking cues perpetuate negative beliefs about the uncontrollability and dangers of worry (Davey & Wells, 2008). This happens because individuals rely on external information to control their thoughts and miss the opportunity to learn that worry is controllable and safe. A second factor that sustains the worry process is the use of thought control strategies (e.g., suppressing thoughts that trigger worry). Examples of metaworry schemas include appraisals related to the loss of control over thoughts and the harmful consequences of worry and negative thoughts (Kraft et al., 2017). This theory hypothesizes that worry is maintained by metacognitive beliefs about the usefulness and dangers of worrying (Sica et al., 2007).

Worry is initially evoked as a coping response to intrusive thoughts and is primarily related to physical health, often characterized as type I worry (Lenzo et al., 2020). Worry, which involves a heightened alertness to threats and dangers and an intolerance for ambiguity (Bair et al., 2020), is significantly associated with perceived anxiety; thus, worry can be seen as an attempt to cope with anxiety (Clarke et al., 2020). In the case of nurses, when individuals lack high resilience and coping resources, ambiguous and worrying situations not only impair their cognitive, emotional, and physical coping abilities but also lead to burnout and compassion fatigue. Lynch and Lobo (2012) noted that compassion fatigue occurs when empathetic caregiving relationships potentially cause psychological harm, leading to profound psychological responses to anxiety-provoking factors and eventually resulting in physical, mental, spiritual, and social exhaustion.

Every study has its limitations. It was not possible to collect questionnaires in paper-and-pencil format or provide the necessary private environment for participants to complete them, although participants were asked to respond individually and away from others as much as possible. Another major limitation of this research was the exclusive use of questionnaires developed in Western countries, due to the lack of culturally adapted tools for the Iranian context. Based on the demographic findings of the present study, it is recommended that future research control for or examine the role of gender. Additionally, general training for nurses is advised to help them develop resilient approaches to facing difficulties and adversity.

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