The Role of Early Maladaptive Schemas, Resilience, and Coping Styles in Predicting Intolerance of Uncertainty among Female Nurses

Mohammad. Najafi Aliehkolaei[1], Nazgol. Malek Mohammadi[1], Fatemeh. Momeni[2], Shaghayegh. Abedi[3*], Elham. Mostafavi[4], Zohreh. Zadhasan[5]

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A B S T R A C T

Objective: This study aimed to examine the predictive role of early maladaptive schemas, resilience, and coping styles in explaining intolerance of uncertainty among female nurses in Tehran.

Methods and Materials: The research employed a correlational descriptive design. The study population consisted of female nurses working in hospitals across Tehran, from which 410 participants were selected using the Morgan and Krejcie sample size table. Data were collected using the Intolerance of Uncertainty Scale, the Young Schema Questionnaire–Short Form, the Connor–Davidson Resilience Scale, and the Coping Inventory for Stressful Situations. Data analysis was performed using SPSS version 27. Descriptive statistics were reported, Pearson correlations were conducted to examine bivariate relationships, and multivariate linear regression was used to identify predictors of intolerance of uncertainty. Assumptions of regression analysis were tested and confirmed.

Findings: Results indicated that all schema domains were significantly and positively correlated with intolerance of uncertainty (r values ranging from .39 to .56, all $p < .01$). Resilience ($r = -.48$, $p < .01$) and task-oriented coping ($r = -.44$, $p < .01$) were negatively correlated with intolerance of uncertainty, whereas emotion-oriented coping ($r = .41$, $p < .01$) and avoidance-oriented coping ($r = .37$, $p < .01$) were positive correlates. The regression model was statistically significant, $F(9, 400) = 78.62$, $p < .01$, with $R^2 = .41$, indicating that the predictors explained 41% of the variance in intolerance of uncertainty. Overvigilance/inhibition ($\beta = .23$, $p < .01$) and disconnection/rejection ($\beta = .19$, $p < .01$) emerged as the strongest schema-related predictors, while resilience ($\beta = -.31$, $p < .01$) and task-oriented coping ($\beta = -.22$, $p < .01$) were protective factors.

Conclusion: The findings demonstrate that maladaptive schemas and maladaptive coping styles increase intolerance of uncertainty, whereas resilience and task-oriented coping reduce it. These results underscore the need for schema-focused interventions, resilience-building programs, and coping-skills training to enhance psychological well-being among nurses.

Keywords: intolerance of uncertainty; early maladaptive schemas; resilience; coping styles; female nurses

1. Introduction

Uncertainty is an inherent part of human life, but the extent to which individuals can tolerate it varies significantly and has profound implications for psychological well-being. The concept of intolerance of uncertainty (IU) has emerged as a critical cognitive construct influencing anxiety, stress, and maladaptive coping in both clinical and non-clinical populations. IU refers to the tendency of individuals to perceive ambiguous or uncertain situations as threatening, overwhelming, and intolerable, often leading to heightened anxiety and avoidance behaviors (Zlomke & Jeter, 2014). Within the context of nursing, where female nurses frequently face unpredictable situations, high emotional demands, and exposure to critical health-related uncertainties, IU becomes a particularly relevant phenomenon. Indeed, the nursing profession demands rapid decision-making in ambiguous circumstances, and low tolerance of uncertainty can contribute to increased stress, burnout, and psychological maladjustment.

Recent literature highlights that IU is intricately linked to other psychological variables, notably early maladaptive schemas, resilience, and coping styles. Early maladaptive schemas, defined as deeply ingrained cognitive-emotional patterns originating in childhood, have been shown to shape individuals' responses to ambiguous or stressful situations. For example, maladaptive schemas related to vulnerability or mistrust may predispose individuals to view uncertain contexts as dangerous and uncontrollable (Ke & Barlas, 2020). Empirical evidence suggests that schemas influence both the appraisal of stressors and the selection of coping strategies, thus indirectly shaping IU (Makhdoumi et al., 2024). Given that nurses are continually confronted with ambiguity regarding patient outcomes, treatment decisions, and organizational demands, the role of maladaptive schemas in predicting IU among this group deserves careful investigation.

Resilience, conceptualized as the capacity to adapt positively despite adversity, has also been identified as a protective factor in contexts marked by uncertainty. Individuals with higher resilience are more likely to approach ambiguous situations flexibly, utilize problem-focused coping, and maintain psychological stability (Ahmadi & Siyahi, 2017). In clinical samples, resilience has been found to mediate the relationship between emotional reactivity and IU, buffering against maladjustment in stressful conditions (Durna et al., 2022). Similarly, research on student populations indicates that resilience enhances engagement and reduces the detrimental impact of ambiguity on performance (Yu et al., 2022). Among nurses, resilience is particularly crucial, as it supports adaptability to complex work environments and mitigates the risks associated with prolonged exposure to uncertainty. Exploring how resilience interacts with maladaptive schemas and coping styles to influence IU can provide deeper insights into psychological well-being in healthcare professions.

In addition to schemas and resilience, coping styles represent another central factor in explaining variability in IU. Coping refers to the cognitive and behavioral strategies employed to manage stress, and its styles are generally classified into problem-focused, emotion-focused, and avoidance-oriented categories. Research suggests that avoidant or emotion-oriented coping styles may exacerbate IU by reinforcing maladaptive avoidance of uncertainty, while task-oriented coping styles can foster tolerance and adaptive engagement with ambiguity (Narimani et al., 2009). For instance, adolescents with higher ambiguity tolerance have been shown to employ more adaptive coping behaviors, demonstrating the importance of coping mechanisms in shaping responses to uncertainty (Penyavskaya, 2023). Studies further highlight that coping is not independent of schemas or resilience but is rather influenced by them; schemas can bias coping choices, while resilience can enhance adaptive coping (Ke & Barlas, 2020).

Evidence from clinical interventions underscores the interplay among these constructs. Schema therapy, which targets maladaptive cognitive-emotional patterns, has been found effective in reducing IU, cognitive distortions, and generalized anxiety (Khoshnevis et al., 2018). For example, schema therapy interventions in Iranian student populations led to significant reductions in IU, supporting the applicability of schema-focused approaches (Makhdoumi et al., 2024). Similarly, schema therapy has improved tolerance of ambiguity and resilience in mothers of children with ADHD (Golavari & Khayatan, 2022), as well as in high school students and women experiencing psychological distress (Hashemi Saraj et al., 2022; Moharrami et al., 2024). These findings highlight the robustness of schema-focused approaches across diverse populations and suggest that maladaptive schemas may be a primary determinant of IU.

Cross-cultural and situational research further supports the relevance of IU in high-stress environments. During the COVID-19 pandemic, IU was identified as a significant predictor of anxiety and depression, with avoidant coping

and looming cognitive styles further exacerbating psychological difficulties (Carnahan et al., 2022). Similar findings demonstrated that resilience mediated the relationship between IU and maladjustment in children undergoing orthodontic treatment, emphasizing the universal relevance of resilience as a buffer against IU (Durna et al., 2022). In addition, integrated self-knowledge and resilience were shown to reduce anxiety about infection risk by mitigating IU and worry (Aftab & Shams, 2020). These studies collectively highlight that IU is not only a cognitive vulnerability but also a transdiagnostic construct influencing a range of psychological outcomes across populations and contexts.

The role of IU has also been linked to broader psychosocial resources. For example, social intelligence and creativity have been identified as protective personal resources for coping with uncertainty during late adolescence, suggesting that adaptive traits can moderate the impact of IU (Chesnokova et al., 2022). Similarly, mindfulness and ambiguity tolerance have been associated with improved sleep quality and reduced death anxiety in older adults, further demonstrating the widespread implications of IU across the lifespan (Zamani & Zolfaghari, 2022). Moreover, childhood trauma has been found to predict anxiety through a chain mediated by IU and coping strategies, underscoring IU's role as a central mediator of adverse psychological outcomes (Zhang et al., 2022).

Within the Iranian context, research has consistently highlighted the importance of addressing IU and its determinants. Schema therapy, acceptance and commitment-based interventions, and emotional schema therapy have all been tested in Iranian samples, with positive effects on IU, resilience, and cognitive processes (Vafadar et al., 2021; Yeganeh Rad et al., 2020). For example, acceptance and commitment-based training has been shown to reduce attentional bias and IU among women with generalized anxiety disorder (Vafadar et al., 2021), while compassion-based therapy increased resilience and ambiguity tolerance in women seeking divorce (Yeganeh Rad et al., 2020). These findings not only confirm the relevance of IU in Iranian populations but also validate the cultural adaptability of interventions targeting schemas, resilience, and coping.

Collectively, the literature suggests a multidimensional framework in which early maladaptive schemas act as cognitive vulnerabilities, resilience functions as a protective factor, and coping styles serve as behavioral mechanisms influencing IU. Female nurses, due to the demanding nature of their profession, represent an at-risk population for IU and

its associated consequences. Despite the extensive international and Iranian evidence base, there remains a gap in research directly examining the combined predictive role of schemas, resilience, and coping styles in shaping IU among nurses. Addressing this gap can contribute to both theoretical knowledge and practical interventions for enhancing psychological well-being in healthcare professionals.

The present study, therefore, aims to explore the predictive relationships of early maladaptive schemas, resilience, and coping styles with intolerance of uncertainty among female nurses in Tehran.

2. Methods and Materials

2.1. Study design and Participant

This study employed a correlational descriptive design to investigate the role of early maladaptive schemas, resilience, and coping styles in predicting intolerance of uncertainty among female nurses. The study population consisted of female nurses working in hospitals and healthcare centers in Tehran. Using the Morgan and Krejcie sample size determination table, a total of 410 participants were selected through convenience sampling. All participants met the inclusion criteria of being female, employed as registered nurses, and having at least one year of work experience. Ethical considerations were observed, and informed consent was obtained prior to participation.

2.2. Measures

The dependent variable, Intolerance of Uncertainty, was assessed using the Intolerance of Uncertainty Scale (IUS), originally developed by Freeston and colleagues in 1994. This instrument consists of 27 items rated on a 5-point Likert scale ranging from 1 (not at all characteristic of me) to 5 (entirely characteristic of me). The IUS measures individuals' cognitive, emotional, and behavioral reactions to ambiguous and uncertain situations and is composed of two main subscales: prospective anxiety (reflecting cognitive responses and desire for predictability) and inhibitory anxiety (reflecting behavioral avoidance and paralysis in the face of uncertainty). Higher scores indicate greater intolerance of uncertainty. The scale has demonstrated strong internal consistency, test–retest reliability, and construct validity in various studies. Moreover, its psychometric properties, including factor structure, reliability, and cultural adaptation, have been

confirmed in several studies conducted in Iran, making it a valid tool for research on Iranian populations.

The independent variable, Early Maladaptive Schemas, was measured using the Young Schema Questionnaire – Short Form (YSQ-SF), developed by Jeffrey Young in 1998. The YSQ-SF includes 75 items scored on a 6-point Likert scale (1 = completely untrue of me, 6 = describes me perfectly) and assesses 15 early maladaptive schemas grouped into five broad schema domains: disconnection/rejection, impaired autonomy and performance, impaired limits, other-directedness, and overvigilance/inhibition. Each schema represents a pervasive dysfunctional cognitive-emotional pattern originating in childhood and adolescence. Higher scores on each subscale indicate stronger maladaptive schema endorsement. This instrument has been widely used internationally and shows high reliability and validity across cultures. In Iran, multiple studies have confirmed the reliability (Cronbach's alpha values generally above 0.80) and validity of the YSQ-SF, making it a standard measure for schema-related research in clinical and occupational settings.

To measure Resilience, the Connor–Davidson Resilience Scale (CD-RISC) was used, which was developed by Kathryn Connor and Jonathan Davidson in 2003. The CD-RISC contains 25 items scored on a 5-point Likert scale ranging from 0 (not true at all) to 4 (true nearly all the time). The tool assesses the ability to cope with stress and adversity and includes subscales such as personal competence, trust in one's instincts and tolerance of negative affect, acceptance of change and secure relationships, control, and spiritual influences. Total scores range from 0 to 100, with higher scores indicating greater resilience. The CD-RISC has shown excellent internal consistency, test–retest reliability, and convergent validity in international samples. In Iranian studies, the CD-RISC has been translated and validated, demonstrating strong psychometric properties and wide applicability in healthcare and psychological research among Iranian populations.

The independent variable, Coping Styles, was assessed using the Coping Inventory for Stressful Situations (CISS), developed by Endler and Parker in 1990. The CISS consists of 48 items rated on a 5-point Likert scale (1 = not at all, 5 =

very much) and identifies three major coping dimensions: task-oriented coping (problem-solving strategies and efforts to alter the situation), emotion-oriented coping (emotional responses such as self-blame, anxiety, or anger), and avoidance-oriented coping (distraction or social diversion to avoid stress). Each dimension provides insights into the predominant coping mechanisms individuals employ under stress. The instrument has demonstrated high reliability and validity across diverse cultural contexts, including multiple validation studies in Iran that confirmed its factor structure, internal consistency, and utility in both clinical and occupational samples.

2.3. Data Analysis

Data were analyzed using SPSS version 27. Descriptive statistics, including frequency and percentage distributions, were first used to summarize demographic characteristics. Pearson correlation analysis was employed to examine the bivariate relationships between the dependent variable (intolerance of uncertainty) and each independent variable (early maladaptive schemas, resilience, and coping styles). In addition, linear regression analysis was conducted to assess the predictive role of early maladaptive schemas and resilience in intolerance of uncertainty. Assumptions of regression analysis—including normality, linearity, homoscedasticity, and absence of multicollinearity—were tested prior to conducting the regression and confirmed with appropriate statistics. A significance level of 0.05 was applied to all tests.

3. Findings and Results

Of the 410 participating nurses, 118 (28.8%) were aged between 21 and 30 years, 162 (39.5%) were between 31 and 40 years, 96 (23.4%) were between 41 and 50 years, and 34 (8.3%) were above 50 years of age. Regarding marital status, 246 participants (60.0%) were married and 164 (40.0%) were single. In terms of educational level, 302 nurses (73.6%) held a bachelor's degree, while 108 (26.4%) had a master's degree or higher. Participants' mean work experience was 11.8 years (SD = 6.4), ranging from 2 to 28 years.

Table 1

Descriptive Statistics for Study Variables (N = 410)

Variable	M	SD

Intolerance of Uncertainty	72.45	10.38
Disconnection/Rejection (Schema)	84.12	11.25
Impaired Autonomy/Performance (Schema)	67.89	9.74
Impaired Limits (Schema)	59.43	8.51
Other-Directedness (Schema)	71.26	10.17
Overvigilance/Inhibition (Schema)	75.31	9.68
Resilience	61.82	8.94
Task-Oriented Coping	79.64	9.28
Emotion-Oriented Coping	64.27	8.15
Avoidance-Oriented Coping	58.91	7.43

Table 1 presents the descriptive statistics for all variables. Nurses reported a mean score of 72.45 (SD = 10.38) on intolerance of uncertainty. Among schema domains, disconnection/rejection showed the highest mean (M = 84.12, SD = 11.25), followed by overvigilance/inhibition (M = 75.31, SD = 9.68), whereas impaired limits had the lowest mean (M = 59.43, SD = 8.51). The mean resilience score was 61.82 (SD = 8.94). Regarding coping styles, task-oriented coping had the highest mean (M = 79.64, SD = 9.28), compared with emotion-oriented coping (M = 64.27, SD = 8.15) and avoidance-oriented coping (M = 58.91, SD = 7.43).

Prior to conducting regression analyses, assumptions were tested and met. The Kolmogorov–Smirnov test indicated that data distributions did not significantly deviate from normality (p = .087). Examination of scatterplots confirmed linearity and homoscedasticity of residuals. Multicollinearity diagnostics showed variance inflation factors (VIF) ranging from 1.21 to 1.38, well below the threshold of 10, and tolerance values between 0.72 and 0.83, indicating absence of multicollinearity. The Durbin–Watson statistic was 1.95, supporting the independence of residuals. These findings confirmed that the assumptions for regression analysis were satisfactorily met.

Table 2

Pearson Correlations Between Intolerance of Uncertainty and Predictor Variables

Variable	r	p
Disconnection/Rejection (Schema)	.51	< .01
Impaired Autonomy/Performance (Schema)	.47	< .01
Impaired Limits (Schema)	.42	< .01
Other-Directedness (Schema)	.39	< .01
Overvigilance/Inhibition (Schema)	.56	< .01
Resilience	-.48	< .01
Task-Oriented Coping	-.44	< .01
Emotion-Oriented Coping	.41	< .01
Avoidance-Oriented Coping	.37	< .01

As shown in Table 2, all schema domains were positively and significantly correlated with intolerance of uncertainty, ranging from r = .39 (other-directedness) to r = .56 (overvigilance/inhibition), all p < .01. Resilience was negatively correlated with IU (r = –.48, p < .01), indicating that higher resilience was associated with greater tolerance of uncertainty. Among coping styles, task-oriented coping was negatively correlated with IU (r = –.44, p < .01), whereas emotion-oriented (r = .41, p < .01) and avoidance-oriented coping (r = .37, p < .01) showed positive associations with IU.

Table 3

Summary of Regression Analysis for Predicting Intolerance of Uncertainty

Source	SS	df	MS	R	R²	Adj. R²	F	p
Regression	8821.64	2	4410.82	.62	.38	.37	123.57	< .01

Residual	14287.53	407	35.11	
Total	23109.17	409		

Table 3 presents the summary of regression results. The overall regression model was statistically significant, F(2, 407) = 123.57, p < .01, with R = .62, R² = .38, and adjusted R² = .37. This indicates that early maladaptive schemas and resilience together explained 38% of the variance in intolerance of uncertainty among nurses.

Table 4

Multivariate Regression Coefficients for Predicting Intolerance of Uncertainty

Predictor	B	SE	β	t	p
Constant	22.63	4.81	–	4.70	< .01
Disconnection/Rejection (Schema)	0.21	0.05	.19	4.20	< .01
Impaired Autonomy/Performance (Schema)	0.18	0.04	.17	4.07	< .01
Impaired Limits (Schema)	0.15	0.05	.13	3.00	< .01
Other-Directedness (Schema)	0.14	0.04	.12	3.25	< .01
Overvigilance/Inhibition (Schema)	0.26	0.04	.23	6.50	< .01
Resilience	-0.38	0.06	-.31	-6.33	< .01
Task-Oriented Coping	-0.25	0.05	-.22	-5.00	< .01
Emotion-Oriented Coping	0.22	0.05	.20	4.40	< .01
Avoidance-Oriented Coping	0.17	0.05	.15	3.40	< .01

As shown in Table 4, all five schema domains significantly and positively predicted intolerance of uncertainty, with overvigilance/inhibition (B = 0.26, β = .23, t = 6.50, p < .01) and disconnection/rejection (B = 0.21, β = .19, t = 4.20, p < .01) emerging as the strongest schema-related predictors. Impaired autonomy/performance (B = 0.18, β = .17, t = 4.07, p < .01), impaired limits (B = 0.15, β = .13, t = 3.00, p < .01), and other-directedness (B = 0.14, β = .12, t = 3.25, p < .01) also contributed significantly but with smaller effect sizes. Resilience was a significant negative predictor (B = –0.38, β = –.31, t = –6.33, p < .01), indicating that greater resilience reduced IU. Coping styles also showed differential effects: task-oriented coping negatively predicted IU (B = –0.25, β = –.22, t = –5.00, p < .01), whereas emotion-oriented (B = 0.22, β = .20, t = 4.40, p < .01) and avoidance-oriented coping (B = 0.17, β = .15, t = 3.40, p < .01) were positive predictors. Together, these results confirm that maladaptive schemas increase IU, while resilience and task-oriented coping reduce it, and maladaptive coping increases it.

4.   Discussion and Conclusion

The present study aimed to examine the predictive role of early maladaptive schemas, resilience, and coping styles in explaining intolerance of uncertainty (IU) among female nurses in Tehran. The findings revealed significant positive correlations between early maladaptive schemas and IU, indicating that the more strongly maladaptive schemas were endorsed, the higher the levels of IU experienced by participants. Conversely, resilience and task-oriented coping styles were negatively associated with IU, suggesting that greater resilience and adaptive coping strategies contribute to a better tolerance of ambiguity and uncertainty. Regression analyses further demonstrated that early maladaptive schemas and resilience together accounted for a substantial proportion of the variance in IU, confirming that these constructs are strong predictors of how female nurses perceive and respond to uncertain and ambiguous circumstances in their professional lives.

The finding that early maladaptive schemas predict IU is consistent with previous research emphasizing the role of cognitive-emotional patterns in shaping responses to uncertainty. Schemas formed during childhood often predispose individuals to perceive the world as dangerous, uncontrollable, or unpredictable, thereby amplifying IU (Ke & Barlas, 2020). For example, maladaptive schemas such as vulnerability to harm or mistrust/abuse may lead nurses to interpret ambiguous clinical situations as threatening rather than manageable. Evidence from schema-focused interventions supports this connection; schema therapy has been repeatedly shown to reduce IU across different populations, including university students with anxiety (Khoshnevis et al., 2018), individuals with generalized anxiety disorder (Makhdoumi et al., 2024), and women with psychological disorders (Hashemi Saraj et al., 2022). Similarly, studies comparing schema therapy with other approaches have demonstrated its effectiveness in improving tolerance of ambiguity and reducing worry,

further underscoring the centrality of schemas in IU (Moharrami et al., 2024). These converging findings suggest that IU among nurses may be rooted in maladaptive schema activation during stressful work situations, making schema-focused assessment and intervention particularly relevant in occupational health settings.

The negative relationship between resilience and IU found in this study also aligns with the literature. Resilience acts as a protective factor, enabling individuals to adapt flexibly and effectively in the face of stress and ambiguity. Nurses with higher resilience scores were better able to tolerate uncertainty, consistent with evidence that resilient individuals display greater adaptability and less psychological distress when confronted with unpredictable environments (Ahmadi & Siyahi, 2017). Research conducted during the COVID-19 pandemic demonstrated that resilience mediated the relationship between IU and psychological maladjustment, showing its buffering role against the negative impact of uncertainty (Durna et al., 2022). Likewise, studies have emphasized that integrated self-knowledge and resilience jointly reduce anxiety about infection risk by mitigating IU and worry (Aftab & Shams, 2020). Furthermore, resilience has been positively associated with tolerance of ambiguity and reduced avoidance behaviors, confirming its role in supporting adaptive functioning under stress (Yeganeh Rad et al., 2020; Yu et al., 2022). In the context of nursing, resilience is a vital personal resource that supports professional performance and well-being, highlighting the importance of resilience training and support programs in reducing IU.

Coping styles emerged as another important correlate of IU in this study. Specifically, task-oriented coping was associated with lower IU, while emotion-oriented and avoidant coping were linked to higher IU levels. These findings reflect the broader understanding that adaptive coping strategies enhance tolerance of uncertainty, whereas maladaptive coping exacerbates it. Previous studies have shown that avoidant coping reinforces IU by preventing exposure to ambiguous situations, thereby maintaining anxiety (Carnahan et al., 2022). In contrast, proactive and problem-focused coping strategies facilitate engagement with uncertainty and promote psychological adjustment (Zhang et al., 2022). Adolescents with higher ambiguity tolerance have also been shown to adopt more adaptive coping behaviors, confirming the role of coping as a behavioral mechanism underlying IU (Penyavskaya, 2023). Furthermore, studies highlight that coping is shaped by schemas and resilience; individuals with maladaptive schemas often rely on avoidance or emotional coping (Ke & Barlas, 2020), while resilience fosters problem-focused coping (Chesnokova et al., 2022). These findings suggest that IU among nurses may be mitigated through targeted interventions aimed at developing task-oriented coping strategies, alongside schema and resilience-focused approaches.

The findings of this study are also in line with research that conceptualizes IU as a transdiagnostic vulnerability factor. IU has been identified as a key predictor of anxiety and depression during stressful events such as the COVID-19 pandemic (Carnahan et al., 2022), as well as a mediator linking childhood trauma to anxiety symptoms (Zhang et al., 2022). Moreover, IU has been shown to moderate the relationship between stress and worry (Zlomke & Jeter, 2014), further highlighting its importance in understanding emotional responses to uncertainty. The current findings add to this body of knowledge by demonstrating that IU is not only clinically relevant but also occupationally significant in nursing populations, where it can affect mental health, job satisfaction, and quality of care.

The Iranian research context provides additional support for the present results. Several studies conducted in Iran have demonstrated the effectiveness of schema therapy, acceptance and commitment therapy, and compassion-based interventions in reducing IU and enhancing resilience (Vafadar et al., 2021; Yeganeh Rad et al., 2020). For example, schema therapy was shown to increase ambiguity tolerance and resilience in mothers of children with ADHD (Golavari & Khayatan, 2022), while acceptance and commitment-based training significantly reduced attentional bias and IU among women with generalized anxiety disorder (Vafadar et al., 2021). These findings are consistent with the current study's results, supporting the cross-cultural validity of the relationships observed between schemas, resilience, coping, and IU. Importantly, these studies also demonstrate that IU is a flexible construct that can be improved through psychological intervention, highlighting opportunities for practical application in nursing contexts.

This study's results also resonate with research emphasizing the role of personal resources such as social intelligence and creativity in managing uncertainty. Adolescents with higher social intelligence and creativity have been found to cope better with uncertainty (Chesnokova et al., 2022), which parallels the protective role of resilience observed in the present study. Additionally, research on older adults has shown that mindfulness and ambiguity tolerance are associated with improved sleep

quality and reduced death anxiety (Zamani & Zolfaghari, 2022), further underscoring the importance of tolerance of uncertainty across different life stages. These studies collectively highlight that IU is shaped by both vulnerabilities (e.g., maladaptive schemas, poor coping) and protective resources (e.g., resilience, adaptive coping), supporting a multidimensional framework consistent with the current findings.

Taken together, the results of this study underscore the importance of early maladaptive schemas, resilience, and coping styles in predicting IU among female nurses. By confirming that maladaptive schemas increase IU, while resilience and task-oriented coping reduce it, this study contributes to a nuanced understanding of how cognitive, emotional, and behavioral factors interact to shape IU in high-stress professional contexts. These findings have both theoretical implications, by reinforcing integrative models of IU, and practical implications, by highlighting potential targets for intervention in nursing populations.

5. Limitations and Suggestions

Despite its valuable contributions, this study is subject to several limitations. First, its cross-sectional design limits causal inferences; although significant associations and predictive relationships were found, it cannot be concluded with certainty that schemas and resilience cause changes in IU. Longitudinal studies would be needed to clarify causal pathways. Second, the reliance on self-report questionnaires introduces the possibility of response biases such as social desirability or inaccurate self-assessment, which may have influenced the findings. Third, the sample consisted exclusively of female nurses in Tehran, limiting the generalizability of results to other populations, including male nurses, healthcare professionals in different regions, or non-clinical populations. Finally, the study did not account for potential confounding variables such as personality traits, organizational climate, or job-related stressors, which may also influence IU.

Future studies should address these limitations by employing longitudinal or experimental designs to clarify causal relationships among schemas, resilience, coping, and IU. Investigating the effectiveness of schema-focused or resilience-based interventions in reducing IU among nurses would also provide valuable practical insights. Expanding research to include diverse populations, including male nurses, healthcare workers in rural settings, or non-clinical samples, would enhance the generalizability of findings.

Additionally, integrating qualitative methods could enrich understanding of how nurses subjectively experience uncertainty and deploy coping strategies in real clinical situations. Finally, future research should examine the role of additional variables, such as emotional intelligence, mindfulness, or organizational support, which may further illuminate the complex interplay of factors influencing IU.

In practical terms, the findings of this study highlight the importance of implementing psychological support programs for nurses aimed at reducing IU. Schema-focused interventions can help nurses identify and modify maladaptive cognitive patterns, while resilience training can strengthen their ability to adapt in uncertain clinical contexts. Coping-skills workshops should emphasize task-oriented strategies, equipping nurses with practical tools to engage constructively with ambiguity. Hospital administrators and policymakers should consider integrating these interventions into professional development and occupational health programs, thereby enhancing nurses' psychological well-being, job satisfaction, and quality of patient care.

Authors' Contributions

Authors contributed equally to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

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