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Corona Anxiety Prediction Model Based on Social Support and Cognitive Flexibility: Mediating Role of Emotion Regulation

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Article Info	ABSTRACT				
Article type:	Objective: A prevalent complication associated with the COVID-19 pandemic is anxiety,				
Research Article	particularly affecting women employed within the healthcare sector, who represent a				
	vulnerable demographic susceptible to COVID-related anxiety. Consequently, the objective				
	of this research was to explore the correlation between COVID-induced anxiety and both				
Article history:	social support and cognitive flexibility, while also assessing the mediating role of emotion				
Received 12 Oct. 2023	regulation within this context.				
Received in revised form 25 Jan. 2024	Methods: This investigation employed a descriptive correlational design utilizing the				
Accepted 19 Mar. 2024	structural equation modeling approach. The target demographic for this study comprised all				
Received 12 Oct. 2023 Received in revised form 25 Jan. 2024 Accepted 19 Mar. 2024 Published online 01 Dec. 2024 Keywords: Corona Anxiety, Social Support, Cognitive Flexibility,	personnel engaged in health services at Kermanshah health centers during the autumn of				
rublished offithe 01 Dec. 2024	2022, from which a sample of 364 individuals was selected through cluster random sampling				
	techniques. The research instruments incorporated the Corona Disease Anxiety Scale				
Keywords:	(CDAS) (Alipour et al., 2018), the multidimensional social support scales established by				
Corona Anxiety,	Zimet et al., Cognitive Emotion Regulation Questionnaire (CERQ) (Garnefski and Kraaij,				
Social Support,	2006) and Cognitive Flexibility Inventory (Dennis & Vander Wal, 2010). Analytical				
Cognitive Flexibility,	procedures for the collected data were conducted using SPSS and PLS Smart software.				
Emotion Regulation	Results : The outcomes revealed a significant direct effect of social support (β = - 0.377, P				
	<0.01) as well as an indirect effect mediated by emotion regulation (β = 0.039, P <0.01) on				
COVID-related anxiety. Furthermore, the direct influence of cognitive flexibility (β = -					
	P <0.05) and its indirect effect mediated by emotion regulation ($\beta=~0.128,~P$ <0.05) on				
	COVID-related anxiety were also found to be significant.				
	Conclusions: Social support and cognitive flexibility have a negative and significant				
	relationship with corona anxiety, and emotion regulation plays a mediating role in this				
	relationship. By providing appropriate educational and supportive interventions, working				
	women's anxiety in healthcare fields can be reduced during the epidemic of contagious				
	diseases.				
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Introduction

On December 31, 2019, the emergence of a viral disease characterized by respiratory symptoms was officially communicated to the World Health Organization, and the infectious disease subsequently resulted in fatalities, mental health disorders, and unprecedented challenges globally for several months (Padovan-Neto et al., 2023). Since that time, there has been a notable escalation in mental health issues among women, suggesting a deterioration in their psychological well-being attributable to the interpersonal dynamics and challenges engendered by the ramifications of the COVID-19 pandemic. Populations deemed vulnerable, particularly women and healthcare practitioners, represent the primary risk group for the manifestation of diverse psychological disorders, including anxiety, during the prevalence of COVID-19 (Septiasari & Viandika, 2021). Anxiety can be defined as a negative emotional state experienced by individuals under conditions of tension (Protudjer et al., 2021), and the anxiety associated with COVID-19 encompasses concerns regarding the virus and its associated hazards (Zangrillo et al., 2020).

While it is imperative to maintain physical distancing from others amidst the outbreak of COVID-19, it remains equally crucial to foster appropriate interpersonal relationships (Cacioppo & Cacioppo, 2014). Social support has been recognized as a mitigating variable during stressful occurrences (Henry et al., 2019), and the absence of social support is identified as a significant risk factor for anxiety and depression during the COVID-19 crisis (Mahamid et al., 2023). Social support is comprised of two facets, namely, the cognitive appraisal of support from friends, family, and other significant individuals, which serves as a crucial protective factor against anxiety, and the actual quantifiable support received by individuals (Özmete & Pak, 2020). Consequently, the correlation between anxiety related to COVID-19 and social support is of considerable significance (Akdeniz & Gültekin Ahçı, 2023; Button et al., 2023). The social isolation resulting from measures to curb the transmission of COVID-19 has considerably undermined social support, which is vital for the psychological well-being of individuals. On a related note, perceived social support may be intricately associated with the regulation of anxiety and distress stemming from COVID-19 (Erden & Sarı, 2022).

Another significant determinant influencing anxiety related to the Coronavirus pandemic is cognitive flexibility (Yıldırım & Ashraf, 2023). Prevailing scholarly literature underscores the importance of cognitive flexibility in alleviating anxiety associated with the Coronavirus (Akdeniz

& Gültekin Ahçı, 2023). Cognitive flexibility is defined as the capacity to adapt to varying circumstances, the ability to conceptualize issues from multiple perspectives, and the employment of particular strategies for topic adaptation (Sahin & Yığman, 2022), which is crucial in mitigating the impact of stressful life variables. Furthermore, it appears to be a promising and pragmatic approach for comprehending and anticipating the manner in which individuals are influenced by the enduring challenges presented by prolonged epidemics (Dawson & Golijani-Moghaddam, 2020). Cognitive flexibility serves as a protective mechanism for individuals' mental health during the pandemic and facilitates their adaptation to evolving conditions and demands. Individuals exhibiting lower degrees of cognitive flexibility encounter challenges in employing adaptive emotional strategies in response to stressful circumstances, which consequently results in heightened levels of psychological pathology; thus, enhancing flexibility through educational interventions may facilitate better emotional regulation in the context of mental health protection against stressors (Godara et al., 2023).

Numerous studies have investigated the correlation between anxiety related to the Coronavirus and cognitive flexibility, revealing a negative relationship between chronic anxiety and cognitive flexibility. Specifically, cognitive flexibility is directly associated with both Coronavirus-related anxiety and cognitive emotional regulatory strategies, with the latter fully mediating the relationship between cognitive flexibility and anxiety as well as psychological difficulties (<u>Sayinta et al.</u>, 2022).

Emotional regulation encompasses cognitive, emotional, and behavioral strategies, often applied unconsciously, to sustain, enhance, or diminish emotional experiences (<u>Strauss et al., 2019</u>); it similarly reflects an individual's adaptation to stressful situations and adverse occurrences. It is posited that emotional regulation skills play a protective role against anxiety associated with the Coronavirus (<u>Erden & Sari, 2022</u>).

Given the prolonged effects of Coronavirus anxiety in the post-epidemic context, particularly among women employed in healthcare, the formulation of a model aimed at identifying the primary factors influencing anxiety, along with strategies for safeguarding and equipping this demographic against the recurrence of infectious diseases, emerges as a critical concern. Consequently, the model presented in this study endeavors to explore these factors and delineate the interrelationships among them.

Material and Methods

The current investigation was a correlational descriptive study. The statistical population encompassed all female employees within the health centers of Kermanshah during the autumn of 2022, from which a sample of 364 individuals was obtained utilizing cluster random sampling techniques. The criteria for inclusion in the study mandated female gender and an age range between 20 and 60 years; exclusions were due to non-cooperation and incomplete questionnaires. Ethical considerations governing the research included the provision of comprehensive information to all participants regarding the study, with the option for voluntary participation. Participants were assured of the confidentiality of their data, which would solely be employed for research purposes and would remain unrecorded to safeguard their privacy. This research article possesses an ethical committee code number IR.KUMS.REC.1400.826, granted by Kermanshah University of Medical Sciences, and the instruments utilized in this study comprised the following questionnaires.

The Corona Disease Anxiety Scale (CDAS): The Corona Disease Anxiety Scale developed by Alipour et al. (2020) was designed and validated specifically to assess Corona-related anxiety within the Iranian context. The finalized iteration of this questionnaire comprises 18 items and encompasses two distinct components. Items 1 to 9 assess mental symptoms, while items 10 to 18 evaluate physical symptoms. Responses to this questionnaire are measured on a four-point Likert scale. The scoring range for respondents extends from 0 to 54, with higher scores indicative of elevated anxiety levels among individuals. The structural validity of this instrument has been established through confirmatory factor analysis, while its reliability was determined using Cronbach's alpha, yielding values of 0.87 for the first factor, 0.86 for the second factor, and an aggregate reliability of 0.91 for the entire questionnaire.

MSPSS Multi-Dimensional Social Support Questionnaire: The Multidimensional Scale of Perceived Social Support (Zimet et al., 1988) represents a 12-item instrument employed to gauge the perceived adequacy of social support from three sources: family, friends, and other significant individuals, utilizing a five-point Likert scale for responses. The validity and reliability of this scale have been documented by Zimet et al. (1988). Salimi et al. (2009) corroborated the scale through factor analysis, reporting reliability coefficients for the three dimensions of support—family, friends, and significant others—at 89%, 86%, and 82%, respectively.

Cognitive Flexibility Inventory (CFI): The Cognitive Flexibility Inventory (CFI) was conceptualized by Dennis and Vander Wal (2010) and comprises a succinct instrument consisting of 20 items designed for both clinical and non-clinical applications in order to assess individuals' cognitive flexibility in their ability to confront and supplant ineffective cognitive patterns with more effective cognitive processes. The scoring mechanism employs a 7-point Likert scale ranging from 1 to 2. The concurrent validity of this instrument, when juxtaposed with the Beck Depression Inventory, is quantified at 0.39, while its convergence with the cognitive flexibility scale developed by Martin and Robin is also noted. The Cronbach's alpha coefficient has been reported at 0.90 for total scale, with subscale coefficients of 0.55 0.89, and 0.87, respectively. Furthermore, cognitive flexibility exhibits both convergent and concurrent factors within the Iranian context. Share et al. (2014) determined the reliability coefficient to be 0.90. In contrast to the original scale, the Persian adaptation yields only two factors, as opposed to three, which typically include the dimensions of control management, perception of alternative options, and the justification of behavioral responses.

Cognitive emotion regulation questionnaire (CERQ): The Cognitive emotion regulation questionnaire (CERQ) is an evaluative tool encompassing 18 items aimed at investigating individuals' emotional cognitive regulatory strategies in response to adverse events and life stressors, utilizing a five-point Likert scale that ranges from (1: never to 5: always), thus measuring cognitive regulatory strategies pertaining to emotional responses. The minimum and maximum scores obtainable for each subscale are 2 and 10, respectively, where higher scores signify a greater propensity for individuals to employ cognitive strategies. The emotional adjustment cognitive strategies delineated within this instrument are classified into two categories: adaptive (constructive) strategies and maladaptive (non-constructive) strategies. This instrument demonstrates commendable validity, with the Cronbach's alpha coefficients for its subscales reported by the developers ranging from 0.71 to 0.81 (Garnefski & Kraaij, 2007). The Persian iteration of this questionnaire has undergone standardization and validation by Abdi et al. (2012), and through the examination of the correlations between the subscales of the tool and the Beck Depression Inventory, the instrument's validity has been substantiated, with Cronbach's alpha coefficients reported to be between 0.68 and 0.82.

Results

Table 1 presents the empirical results regarding the correlations among social support, cognitive flexibility, and emotion regulation in relation to Corona anxiety. The findings indicate that all correlation coefficients computed at the alpha significance level of 0.01 are statistically significant (P < 0.01). The relationships observed between cognitive flexibility, social support, and emotion regulation with Corona anxiety are characterized by a negative correlation. The investigation of the research hypotheses is conducted utilizing the structural equation modeling approach through the Partial Least Squares (PLS) method. The assessment of Average Variance Extracted (AVE) serves as a diagnostic measure of validity within the Structural Equation Model, which represents one of the narrative methodologies employed by Smart-PLS software.

Table 1. The correlation coefficient matrix between the research variables

Variable	1	2	3
Social support	1		
2. cognitive flexibility	0.26	1	
3. emotion regulation	0.23	0.59	
4. Corona anxiety	-0.57	-0.16	-0.43

Table 2. AVE values for diagnostic validity

Structure (latent variable)	AVE
Social supports	0.53
Cognitive flexibility	0.51
Excitement regulation	0.56
Corona anxiety	0.50

The reliability index alongside Cronbach's alpha was utilized to assess reliability, as presented in Table 3. The methodology employed in the structural equation modeling incorporates a composite reliability coefficient, which serves as an indicator of the adequacy of reliability for each structural component.

Table 3. Composite Reliability and Cronbach's alpha Values

Structure (latent variable)	Composite Reliability	Cronbach's alpha
Social supports	0.85	0.82
Cognitive flexibility	0.76	0.74
Excitement regulation	0.74	0.74
Corona anxiety	0.81	0.73

Through the application of structural equation modeling, the minimum partial constituency analyzed the theoretical framework of the study to investigate the interrelationships among the research variables, alongside the validity and reliability metrics, as well as the model's quality as determined by the empirical findings. Table 4 delineates the direct and indirect impacts of the research variables on anxiety related to the Coronavirus.

Table 4. The direct and indirect effects of research variables on Corona anxiety

Direct effect		β	T value	P
Cognitive flexibility to Corona anxiety	0.054	-0.246	2.52	0.035
Cognitive flexibility to emotion regulation	0.087	0.481	4.04	0.001
Social support to Corona anxiety	0.113	-0.377	3.32	0.001
Social support to emotion regulation	0.071	0.186	2.63	0.009
Emotion regulation to Corona anxiety	0.074	-0.209	2.80	0.005
Indirect effect				
Cognitive flexibility to Corona anxiety through Emotion regulation	0.086	0.128	2.14	0.03
Social support to Corona anxiety through Emotion regulation	0.018	0.039	2.01	0.035

Discussion

The objective of this research was to examine the anxiety associated with the COVID-19 pandemic among women employed in health centers in Kermanshah, with a particular focus on the dimensions of social support, cognitive flexibility, and the mediating function of emotional regulation. The findings indicated that the initial hypothesis of this investigation was substantiated through the mediating role of emotional regulation in the connection between social support and COVID-19 anxiety. In essence, strategies for emotional regulation influence the interplay between COVID-19 anxiety and social support, suggesting that increased levels of social support and the application of emotional regulation techniques correspond to reduced anxiety. The outcomes of this investigation align with the findings of Akdeniz and Gültekin Ahçı (2023) (Validation of the Role of Emotional Regulation in the Link between Social Support and COVID-19 Anxiety), Judy et al. (2022) (Cognitive Structuring of Emotion in Relation to COVID-19), and Rakhman and Oktiawati (2022) (the association between emotional states and health-related anxiety stemming from COVID-19). In elucidating this phenomenon, it is important to recognize that social support serves as a critical determinant of both physical and mental well-being, functioning as a protective barrier

against stressors in accordance with the stress-buffering hypothesis (Akdeniz & Gültekin Ahçı, 2023). Individuals who receive substantial social support tend to experience diminished anxiety through the employment of effective coping strategies, such as problem-solving; consequently, they exhibit lower levels of anxiety during potentially stressful occurrences, such as COVID-19, due to the assurance that assistance from others is available when necessary (Eyni et al., 2020). Moreover, social support mitigates stress and anxiety by fostering a sense of self-esteem in the context of illnesses like COVID-19, thereby enabling individuals to feel more in control and better manage adverse emotions (Akdeniz & Gültekin Ahçı, 2023). Additionally, a significant correlation exists between emotional styles and COVID-19 anxiety. In interpreting the findings, individuals who adopt a constructive perspective towards challenges and exhibit a willingness to confront them tend to employ a problem-focused approach during acute situations. Rather than becoming engulfed in the emotional turmoil of the issue, they concentrate on the problem itself and seek viable solutions. Furthermore, they actively seek guidance from others, facilitating a more proactive approach to resolving conflicts favorably (Judy et al., 2022).

The second hypothesis of the research was likewise validated, demonstrating the mediating role of emotional regulation in the association between cognitive flexibility and COVID-19 anxiety. In conclusion, emotional regulation functions as a mediating variable in the association between cognitive flexibility and anxiety stemming from COVID-19, thereby suggesting that cognitive flexibility exerts an influence on emotional regulation strategies, which subsequently mitigates anxiety related to COVID-19. Furthermore, the findings of this investigation align with those presented by Sayinta et al. (2022) in Turkey, who demonstrated that emotional regulation strategies entirely mediated the connection between cognitive flexibility and anxiety linked to the pandemic. Additionally, Garavand (2023) corroborated the relationship between cognitive flexibility and anxiety due to COVID-19 through the mediation of emotional regulation within the framework of the Corona Anxiety Model.

The results suggest that individuals exhibiting a greater capacity for cognitive flexibility, rather than evading unpleasant and unwanted experiences, demonstrate enhanced acceptance and adaptability across diverse situations, enabling them to swiftly acclimate to novel conditions (Sahin & Yığman, 2022). In elucidating the interplay between cognitive flexibility and emotional regulation in the context of anxiety reduction, it is pertinent to emphasize that the application of appropriate emotional regulation strategies facilitates the execution of more consistent behaviors and the tolerance of distressing experiences. Emotional regulation is integral to the enhancement of mental health and the attenuation of anxiety (Mohammadpour et al., 2021), with the inability to manage emotions leading to numerous psychological issues that may significantly influence this dynamic (Sayinta et al., 2022). The necessity for proficient communication and social skills to navigate isolation post-epidemic is distinctly apparent, with emotional regulation emerging as one of the most robust predictors of an individual's social psychological competencies, influenced by cognitive processes (Garavand, 2023). During the prevalence of the coronavirus, individuals encounter adverse circumstances such as quarantine, social isolation, alterations in daily routines, and heightened stress levels. In these contexts, cognitive flexibility can serve as an essential asset for individuals to effectively cope with these challenges and alleviate anxiety, as it aids in the management of negative emotions and the navigation of more unfavorable situations. Cognitive flexibility empowers individuals to address daily stressors more adeptly and mitigate anxiety (Dawson & Golijani-Moghaddam, 2020).

This study provides important insights into the relationship between social support, cognitive flexibility, and COVID-19-induced anxiety among women in the healthcare sector. However, several limitations must be acknowledged. First, the study's cross-sectional design limits the ability to establish causal relationships between the variables. The findings only reflect associations at a single point in time, which means that changes in anxiety, social support, or cognitive flexibility over time could not be assessed. Additionally, the sample was drawn from healthcare workers in a specific geographical location (Kermanshah), which may limit the generalizability of the results to other regions or populations, especially given the unique cultural and systemic differences in healthcare environments. The reliance on self-report measures for data collection also introduces the potential for response bias, particularly in the context of sensitive topics like anxiety and emotion regulation.

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Future research should consider adopting a longitudinal design to better understand the causal relationships and temporal dynamics between social support, cognitive flexibility, emotion regulation, and anxiety, particularly during prolonged public health crises like the COVID-19 pandemic. Expanding the study to include a more diverse sample across different regions and healthcare settings would also enhance the generalizability of the findings, providing a broader understanding of how these factors interact across various contexts. Furthermore, incorporating qualitative methods could offer deeper insights into the lived experiences of healthcare workers, allowing for a more nuanced understanding of how social support and cognitive flexibility influence anxiety and how emotion regulation strategies are employed in real-world settings. Finally, interventions aimed at enhancing social support and cognitive flexibility should be developed and tested to determine their effectiveness in reducing anxiety among healthcare workers during future pandemics or similar crises.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by ethics committee of Islamic Azad University.

Author contributions

All authors contributed to the study conception and design, material preparation, data collection and analysis. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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