

## Research Paper

## Mediating Role of Spiritual Wellbeing in the Relationship Between Cognitive Flexibility and Metacognitive Beliefs of Students

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**Citation** Rezaei Rad M, Hosseini Tabaghdehi SL, Imani SZ. Mediating Role of Spiritual Wellbeing in the Relationship Between Cognitive Flexibility and Metacognitive Beliefs of Students. *Iranian Journal of Health Sciences*. 2023; 11(4):239-248. <http://dx.doi.org/10.32598/ijhs.11.4.971.1>

**doi** <http://dx.doi.org/10.32598/ijhs.11.4.971.1>

**ABSTRACT**

**Background and Purpose:** The critical position of spirituality and spiritual wellbeing has drastically been recognized in recent decades, and cognitive flexibility and metacognitive beliefs play an essential role in health-related behaviors. The present study investigated the mediating role of spiritual wellbeing between cognitive flexibility and the students' metacognitive beliefs.

**Materials and Methods:** The research method was descriptive-correlational. The statistical population included all students of Islamic Azad University, Sari branch, Sari City, Iran, in the 2022-2023 academic year. A total of 364 students were selected by stratified random sampling based on their education level and were asked to answer the questionnaires about spiritual wellbeing (Palotzian and Ellison, 1982), cognitive flexibility (Dennis and Vanderwaal, 2010), and metacognitive beliefs (Wells and Cartwright-Houghton, 2004). Data analysis was done by structural equation modeling using SPSS software, version 24 and AMOS software, version 23.

**Results:** In this study, 69% of the participants were women and 31% were men. About 57% were 25 years or younger, 63% were undergraduate students, 30% were postgraduate (Master's degree), and 7% were PhD students. The results indicated that all direct paths between study variables were significant ( $P < 0.01$ ). The relationships of the indirect paths were significant through the mediating role of spiritual wellbeing ( $P < 0.01$ ).

**Conclusion:** According to the research results, spiritual wellbeing mediates cognitive flexibility and metacognitive beliefs in university students. Thus, it is possible to design special programs in order to improve metacognitive beliefs and strengthen cognitive flexibility through spiritual health.

**Keywords:** Spiritual health, Cognitive flexibility, Metacognitive beliefs

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## 1. Introduction

**M**etacognition is a multidimensional term consisting of knowledge, processes, and the ability to evaluate, monitor, and control cognition [1]. It comprises self-knowledge of internal states and effective coping strategies [2] that affect many human behaviors, especially in learning [3].

Metacognitive beliefs are divided into positive and negative beliefs and generally into positive beliefs about anxiety, negative beliefs about worry, cognitive certainty, belief about the need to control thought, and cognitive self-awareness [4, 5]. Positive metacognitive beliefs, beliefs about the practicality of worry, rumination, and other cognitive processes are associated with one's positive beliefs about the efficacy of worry-based coping methods despite inconsistent methods. For example, worry means that I am prepared, and if I am worried, I can better deal with risks [6]. Negative metacognitive beliefs include uncontrollability, meaning, importance, the danger of thoughts, and cognitive experiences, which cause the person to use incompatible coping strategies in future social situations [4]. Metacognitive beliefs are among the most important underlying and preserving factors for normal and abnormal behaviors [7]. Kouhzadi and Makundi [8] reported positive beliefs about worry, uncontrollable and dangerous thoughts, cognitive certainty, and the need to control thoughts in students with pathological levels of worry compared to typical students.

Metacognitive beliefs adjust people's thinking and behavior by increasing cognitive flexibility in response to changes in environmental conditions [9]. Cognitive flexibility is the key motive of behavior in complex and unpredictable tasks and social interactions about the person's positive compatibility with the environment [10]. Cognitive flexibility is one's ability to experience thoughts and accept negative emotions with awareness and guidance [11]. Also, it helps people to act in harmony with values [12] and change thoughts and actions based on flexibility and belief in self-efficacy and awareness to respond to different situations [13]. People with high cognitive flexibility react successfully toward internal and external stimuli and can better maintain their adjustment and psychological balance [14]. In addition, cognitive flexibility enables people to change their cognitive processing strategies to deal with new and unexpected situations [15]. In this regard, students with high cognitive flexibility can evaluate different conditions from various aspects and show more curiosity

[16]. When they face problems in student life, they try to consider other points of view and do not take hasty action before obtaining enough information [17]. Cognitive flexibility increases people's ability to face emotional, social, and physical challenges. Accepting failures empowers people to face various problems in life and focus on metacognition [9].

Cognitive flexibility plays an essential role in engaging in health-related behaviors. Health plays an essential role in other psychological issues [18]. The importance of spirituality and spiritual wellbeing has grown significantly in recent decades. Hence, the [World Health Organization \(WHO\)](#) emphasizes the spiritual dimension as the fourth dimension, along with physical, mental, and social dimensions [19]. Spirituality is an attitude based on beliefs about the relationship with oneself, others, the surrounding world, and a higher power (God) [20]. Spiritual wellbeing is one of the fundamental dimensions of health and wellbeing. It acts as the coordinating and complementary force between other dimensions of human health: Physical, psychological, social, and emotional. Spiritually talks about believing in something greater than oneself and faith in the purposefulness of life [21].

Spiritual wellbeing consists of two components: Religious health and existential health. Religious health signifies a connection with the higher power, God. Existential health is a psychosocial element and signifies who a person is, what he does, why he does it, and where he belongs. Religious health guides us in reaching God, while existential health leads us beyond ourselves and toward others and the environment [22]. In addition, spiritual wellbeing has a supportive effect and results in physical and mental health acquisition. It encompasses caring behaviors such as meaning, purpose, hope, and optimism [23]. People with high spiritual wellbeing adjust to their problems and respond more efficiently. Spiritual wellbeing creates a new and positive attitude in people towards themselves, others, and the surrounding world. Because metacognitive beliefs involve people's positive and negative beliefs, it can be said that people's high level of spiritual wellbeing helps them experience less disturbed metacognitive beliefs with a positive view of themselves [24]. Canada et al. [25] also found that cognitive strategies of positive coping against life events are more prevalent in people with higher spiritual intelligence than in people with low spiritual intelligence.

According to the literature, study time at university is an exciting, challenging, and stressful period. The students will be responsible for ensuring and improving the health level of society in the future; their attitudes, behaviors, and educational processes, especially the realm of learning and thinking, are influenced by metacognitive beliefs. The change in students' metacognitive beliefs effectively controls their behaviors. Much literature is found about every concept in cognitive flexibility, metacognitive beliefs, and spiritual wellbeing separately. Also, some studies investigated the importance of students' cognitive flexibility in educational systems, spiritual wellbeing, and the impact on metacognitive beliefs. However, few studies have explored the linking paths of these constructs, and there is a gap in this regard. Therefore, the current research seeks to examine the mediating role of spiritual wellbeing between cognitive flexibility and the metacognitive beliefs of students.

## 2. Materials and Methods

This descriptive-correlational study investigates the relationships between research variables by structural equation modeling. The statistical population included all students of Islamic Azad University, Sari branch, Sari City, Iran, in the academic year of 2022-2023 (n=7000). The stratified random sampling method was performed on the level of education (bachelor's, master's, and doctorate). Based on Klein's view [26], for each of the 21 parameters of the research model, 10 to 15 were selected. Considering the possibility of incomplete questionnaires, the number of samples was considered to be at least 364. Finally, the sample included 228(63%) undergraduate students, 109(30%) master's students, and 27(7%) doctoral students. Data analysis was done by calculating the Mean±SD, Pearson correlation coefficient, and structural equation modeling. A bootstrap test was used to check the role of the mediator, and all statistical analyses were done using SPSS software, version 26 and AMOS software, version 23 with maximum likelihood estimation.

### Research instruments

#### Spiritual wellbeing questionnaire (SWB)

Paloutzian and Allison prepared the SWB in 1982. This questionnaire includes 20 questions (10 on religious health and 10 on existential health). The total scores range between 20 and 120. SWB is scored based on a 6-point Likert scale [27]. Ellison [28] reported the internal reliability of the test re-test from 0.73 to 0.99 and its validity from 0.78 to 0.94 in the initial studies. In

the study by Rezaei et al. [29], its validity was reported as 0.87 using the Cronbach  $\alpha$  method. In the study of Dehshiri et al. [30], the reliability coefficient of the SWB was calculated by the Cronbach  $\alpha$  method as 0.9 and the test re-test method as 0.85. The tool's reliability was obtained using the Cronbach  $\alpha$  calculation of 0.84 in the present study.

#### Cognitive flexibility index (CFI)

Dennis and Vanderwaal designed the CFI [31]. It is a short self-report instrument of 17 questions. Its scoring method is based on a 7-point Likert scale and measures three aspects of cognitive flexibility: Perception of controllability, perception of the justification of behavior, and perception of different options. Dennis and Vanderwaal [31] reported that CFI has a good factorial structure with convergent and concurrent validity. The concurrent validity of this questionnaire with the Beck depression inventory was -0.39, and its convergent validity with Martin and Robin's cognitive flexibility scale was 0.75. These researchers obtained 0.84 and 0.91 reliability and 0.81, 0.77, and 0.75, respectively with the test re-test method. In Iran, in a study by Soltani et al., the coefficient of the current questionnaire using the Cronbach  $\alpha$  method for the whole scale, the perception of controllability and perception of different options was 0.91, the test re-test reliability of the whole scale was 0.71, and the subscales of perception of controllability, perception of different options and perception. They have reported the behavior as 0.55, 0.72, and 0.57, respectively. These researchers have reported the Cronbach  $\alpha$  coefficients of 0.90 for the whole scale and 0.87, 0.89, and 0.55 for the subscales, respectively. Also, this tool has good factorial, convergent, and concurrent validity in Iran [32]. In the current study, the Cronbach  $\alpha$  coefficient of the questionnaire was 0.89, which indicates the appropriate reliability of the research tool.

#### Metacognitive beliefs questionnaire-30 (MCQ-30)

The MCQ-30 is a 30-item self-report scale designed by Wells and Cartwright-Houghton [33] to measure people's beliefs about their thinking. The answers in this scale are scored based on a 4-point Likert scale (1=I do not agree to 4=I completely agree). Regarding the questionnaire validity, the range of Cronbach  $\alpha$  coefficient is from 0.73 to 0.93 for its subscales, and its validity by the test re-test method for the total score after an 18 to 22 days period is 0.75 and for subscales 0.59 to 0.87. For the reliability of this scale, Wells, Cartwright Hutton [33] have reported the range of the Cronbach  $\alpha$  coefficient for the total scale and subscales from 0.93 to 0.76, and the test re-test reliability is 0.75 and for the subscales, 0.87 to 0.59. Shirinzadeh et al. [34] translated

and prepared this questionnaire for the Iranian population. The Cronbach  $\alpha$  coefficient of the whole scale was reported as 0.91 in the Iranian sample and for the subscales of uncontrollability, positive beliefs, cognitive self-awareness, cognitive confidence, and the need to control negative thoughts as 0.87, 0.86, 0.81, 0.80, and 0.71, respectively. In the current study, the reliability coefficient based on Cronbach  $\alpha$  is 0.82 for general metacognitive beliefs, 0.78 for positive metacognitive beliefs, 0.76 for the uncontrollability and risk, 0.79 for cognitive certainty, 0.63 for the need to control thoughts and 0.70 for cognitive confidence.

### 3. Results

The findings of demographic variables indicated that participants' mean age was  $24.84 \pm 6.15$  years; 63% of the participants were undergraduate students, 30% were master's students, and 7% were doctoral students. Descriptive, skewness, and kurtosis indices of research variables are presented in Table 1.

Table 2 presents the Pearson correlation coefficient results for the research variables. According to the results, there were significant relationships between all research variables ( $P < 0.01$ ).

Structural equation modeling assumptions, including missing data, normality of data, multiple collinearity, and outlier data, were checked to test the proposed research model. This research used the method of replacing missing data with variable mean to manage missing data. The skewness and elongation indices of the variables were used to check the normality of the variables. The range of skewness and kurtosis values was  $\pm 2$ , indicating data normal distribution. Multiple co-collinearities of the predictor variables were also investigated using the tolerance statistic and the variance inflation factor. Examining the tolerance index (0.85) and variance inflation factor index (1.21) showed that collinearity between predictor variables is not evident. To identify single variable outlier data (by checking the frequency table), 4 participants were excluded from the

**Table 1.** Descriptive, skewness, and kurtosis indices of research variables

Variables	Min	Max	Mean $\pm$ SD	Skewness	Kurtosis
Religious health	10	57	89.51 $\pm$ 7.43	-0.57	-1.97
Existential health	17	60	82.54 $\pm$ 9.51	0.72	-1.12
Spiritual wellbeing	27	117	106.71 $\pm$ 23.9	-0.21	1.53
Alternatives	13	68	46.29 $\pm$ 9.37	0.69	-1.63
Control	8	52	30.42 $\pm$ 6.11	0.4	0.31
Substitutes for human behavior	2	4	7.62 $\pm$ 1.82	-0.27	1.89
Total cognitive flexibility	23	124	84.33 $\pm$ 16.02	0.11	1.73
Positive metacognitive beliefs	15	64	55.18 $\pm$ 12.21	-0.45	-1.29
Negative metacognitive beliefs	9	41	15.39 $\pm$ 4.89	-0.63	-1.87

**Table 2.** Correlation matrix of research variables

Variables	1	2	3	4
1 Spiritual health	-			
2 Cognitive flexibility	0.37**	-		
3 Positive metacognitive beliefs	0.41**	0.32**	-	
4 Negative metacognitive beliefs	-0.41**	-0.44**	-0.38**	-

\*\* $P < 0.01$

**Table 3.** The model fit indicators

Fit indicators	$\chi^2$	df	$\chi^2/df$	CFI	GFI	AGFI	RMSEA
Model fit	-	-	2.28	0.96	0.91	0.96	0.044
Cut off	-	-	<3	>0.90	>0.90	>0.90	<0.08

Abbreviations: df: Degrees of freedom; CFI: Comparative fit index; GFI: Goodness-of-fit index; AGFI: Adjusted GFI; RMSEA: Root mean square error of approximation.

**Table 4.** Direct, indirect, and total effects of variables in the final research model

Path	Effect		
	Indirect	Direct	Total
Cognitive flexibility on positive metacognitive beliefs	0.22**	0.02**	0.24**
Cognitive flexibility on spiritual wellbeing	0.24**	-	0.24**
Spiritual wellbeing based on positive metacognitive beliefs	0.11*	-	0.11*
Cognitive flexibility on negative metacognitive beliefs	-0.14*	-0.04*	-0.18*
Spiritual wellbeing on negative metacognitive beliefs	-0.16*	-	-0.16*

\* $P < 0.05$ , \*\* $P < 0.001$

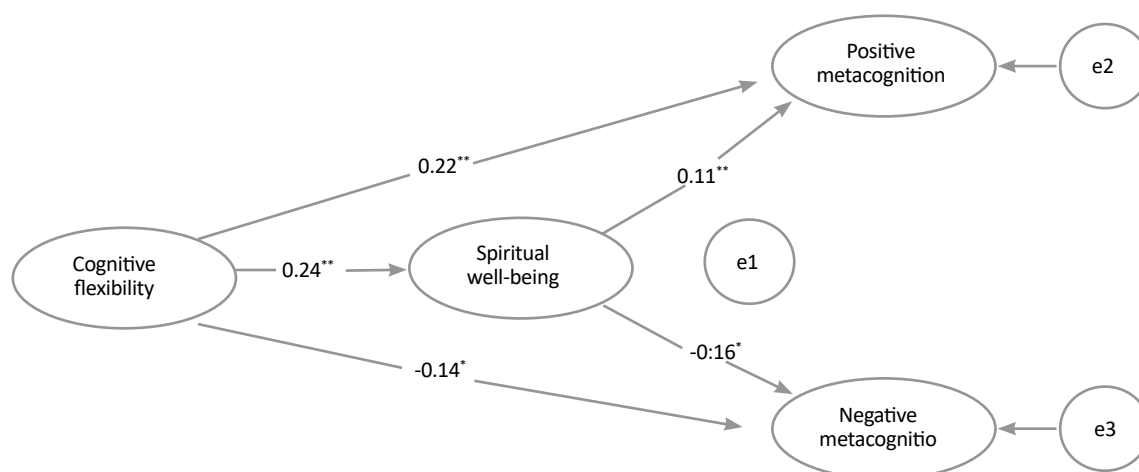
analysis, and to evaluate multivariable data (by checking the mahala nobis statistic), 2 participants were excluded from the analysis, and the analysis was performed on the data from 364 samples.

After implementing the structural equation modeling method, the model fit indices were examined, and the results indicate a good fit of the model (Table 3).

The fitted and final model of the research are presented in Figure 1, and the standard coefficients for direct,

indirect, and total effects by variables are presented in Table 4.

According to the results of Figure 1 and Table 4, the findings about the first to third hypothesis showed that cognitive flexibility on positive metacognitive beliefs ( $P < 0.001$ ,  $\beta = 0.22$ ), cognitive flexibility on spiritual wellbeing ( $P < 0.001$ ,  $\beta = 0.24$ ) and spiritual wellbeing on positive metacognitive beliefs ( $P < 0.05$ ,  $\beta = 0.11$ ) have positive and significant direct effects. The results of the fourth and fifth hypotheses also showed that cognitive

**Figure 1.** The initial model of the mediating role of spiritual wellbeing in the relationship between cognitive flexibility and metacognitive beliefs of students

**Table 5.** The significance of the indirect effect of cognitive flexibility on positive and negative metacognitive beliefs with the mediation of spiritual wellbeing using the bootstrap test

Path	$\beta$	t	P
The indirect effect of cognitive flexibility on positive metacognitive beliefs with the mediating role of spiritual wellbeing	0.31	5.13	0.001
The indirect effect of cognitive flexibility on negative metacognitive beliefs with the mediating role of spiritual wellbeing	-0.39	6.79	0.001

flexibility has a negative impact on metacognitive beliefs ( $P < 0.05$ ,  $\beta = -0.14$ ) and spiritual wellbeing has a negative effect on metacognitive beliefs ( $P < 0.05$ ,  $\beta = -0.16$ ). Also, the results of the sixth and seventh hypotheses of the research showed that the indirect effect of cognitive flexibility on positive beliefs ( $P < 0.001$ ,  $\beta = 0.02$ ) was positive and significant but negative and significant on metacognitive beliefs ( $P < 0.05$ ,  $\beta = 0.04$ ).

Afterward, the bootstrap test was used to assess the significance of the mediating role of the mediating variable in the model (Table 5). Based on this, the indirect effect of cognitive flexibility with the mediating role of spiritual wellbeing on positive metacognitive beliefs ( $P = 0.001$ ,  $\beta = 0.31$ ) and on negative metacognitive beliefs ( $P = 0.001$ ,  $\beta = -0.39$ ) is significant.

#### 4. Discussion

The present study was conducted to investigate the mediating role of spiritual wellbeing between cognitive flexibility and the metacognitive beliefs of students. The research findings showed that cognitive flexibility affects spiritual wellbeing, strengthens positive metacognitive beliefs, and reduces negative ones. So far, no research has investigated the relationship between these three variables using a structural equation model. Nevertheless, in explaining this finding, it can be said that cognitive flexibility has been proposed as a framework for understanding psychopathology and spiritual wellbeing, and the role of this variable in reducing anxiety, depression, and stress and increasing spiritual wellbeing has been confirmed in several studies [35-37]. Therefore, students with stronger cognitive flexibility use optimal strategies by reconstructing their mental framework. They understand challenging situations [38], control their behavior and thoughts in response to environmental changes, and accept challenging situations or stressful events. Also, they strengthen their inner beliefs, insight, and self-awareness toward life, making it purposeful, and by using available spiritual resources, interpret life events and change them to achieve life goals, alter and adjust metacognitive beliefs, and finally confront events. Metacognitive beliefs also provide

a field of scientific engagement, a source of internal control, positive documents, motivation for further progress, creativity, and self-responsibility in people. It strengthens self-confidence in people, resulting in their solving problems. The people re-identify, examine, and test their abilities, act freely and independently, and try the most appropriate solutions for various issues [39].

Another research finding indicates that cognitive flexibility positively and significantly affects students' positive metacognitive beliefs. This finding is in line with the research findings of Pourfaraj and Mahmoudian [9], Carbonella and Timpao [17], Huber et al. [14], and Roshani et al. [15]. The results of these studies suggest that by increasing cognitive flexibility, people focus on meta-cognition and encounter life's problems. In explaining this finding, it can be said that cognitive flexibility is one of the dimensions of executive functions, which is the ability to change actions and thoughts according to environmental conditions. In other words, a person uses flexible cognition to respond to external stimuli, understands difficult life situations and events to change behavior and adapt to the environment. Since the university period is exciting and challenging, students need flexibility in the cognitive model. With the development of cognitive flexibility, students determine the meaning of life and their future goals by focusing on what is good in life and strengthening the understanding of different options for life events. They earn the ability to create several alternative solutions, develop positive metacognitive beliefs such as usefulness, reinforce ruminative worry and threat monitoring, and other similar strategies. Also, people with stronger cognitive flexibility can protect themselves against external and internal stimuli and better manage stressful situations. They find efficient problem-solving strategies by being aware of their capabilities, strengthening positive metacognitive beliefs, and evaluating different problems from various angles. Cognitive processing strategies increase their ability to face social, physical, and emotional challenges by focusing on metacognition.

Another research finding indicates cognitive flexibility's significant and direct effect on spiritual health. This finding is consistent with the research findings of some studies [18]. In explaining this finding, it can be said that people who perceive life situations as controllable are more motivated to solve problematic situations through cognitive strategies [31]. People with higher cognitive flexibility can handle challenging situations as they seem controllable. They can make several alternative justifications and use alternative solutions under challenging situations. Their capacity to deal with life's difficult choices increases, and their mental and physical health improves. In addition, they accept challenging events by thinking flexibly, using alternative justifications, positively reconstructing the mental framework, increasing physical and mental health, and taking action to solve the challenges. In this regard, spirituality gives a person deep insight and self-awareness. It makes it purposeful so that goals beyond the material world are drawn, and their flexibility is increased. They achieve high self-awareness and the ability to face problems [32].

Another finding of the research was the direct and significant effect of spiritual health on the positive metacognitive beliefs of students. These findings are consistent with the findings of Canada et al. [25]. In explaining this finding, it can be said that spiritual health plays an essential role in creating a new and positive attitude toward oneself, God, and others. On the one hand, spirituality acts as a provider of goal-oriented energy. On the other hand, a positive influence on the interpretation of events leads people toward positive thoughts. It is effective in achieving goals by defining new goals in a person's life and providing different solutions. It can also be said that students with high spiritual health believe that God helps man in hardships and that man is created free, responsible for his behavior, and can reach peace through paying attention to spirituality and tolerating psychological pressures and challenges. In addition, religious people evaluate stressful events differently due to their inner beliefs. Religious beliefs can moderate the effects of severe crises in life. A person can have more control over his actions and behavior. The meanings people give to themselves and the world around them will be combined with a sense of value and purposefulness. The purpose acts as a shield when tension and life challenges arise. A person moderates psychological pressure through positive metacognitive beliefs [24].

Also, the research results showed that cognitive flexibility has a significant negative direct effect on students' negative metacognitive beliefs. In this case, by searching scientific sources, no research was found that

dealt with the effect of cognitive flexibility on negative superstitions. So, it is impossible to compare the research findings with other research studies directly. Nevertheless, in explaining this finding, it can be said that cognitive flexibility is the ability of a person to refrain from a dominant but ineffective and inappropriate response. Instead, it is the ability to achieve alternative responses [35] by creating several alternative solutions for difficult situations and understanding several alternatives. Life events and challenges and the desire to understand complex situations can effectively change negative metacognitive beliefs and deal with internal events. In addition, with the increase in cognitive flexibility, students try to overcome their negative beliefs and not take hasty actions by focusing on the current situation and using the opportunities to achieve valuable life goals and evaluate through various aspects.

Another finding of the research indicates the significant negative direct effect of spiritual health on the negative metacognitive beliefs of students. This finding aligns with the results of Heydarzadegan and Kochzaei [24]. In explaining this finding, it can be said that the stressful period of being a university student causes the formation and strengthening of negative beliefs in people. It is determined by cognitive evaluations influenced by individual beliefs and values such as individual control and existential and spiritual beliefs. Negative superstitions include two subgroups, including beliefs related to the uncontrollability of thoughts and beliefs related to the danger, importance, and meaning of these thoughts, leading to negative and threatening interpretations of mental events due to the inability to control thoughts and events. In addition, negative metacognitive beliefs weaken coping skills and lead to irrational beliefs and ineffective behaviors. Spiritual health helps people by using available resources and various ways such as prayer, helping others, being grateful, being patient with problems, asking for forgiveness from God and others, and accepting criticisms and opinions of others through communicating with oneself, others, and God. They evaluate different life events in various ways, and by understanding spiritual and religious factors, they reduce negative beliefs related to the interpretation of life events and challenges [36].

## Conclusion

In general, it can be said that by increasing cognitive flexibility, students get stronger in dealing with social, emotional, and physical issues and problems, adapt to the changing environment, and use the optimal opportunities of current situations. By strengthening their

inner and religious beliefs through numerous religious and spiritual sources, they take important steps in promoting their metacognitive beliefs in line with the values and goals of life. Recognizing problems highlights their activities and provides the best solutions for various issues.

Because the measurement tool is self-reported, the current research faces limitations, so caution should be taken in generalizing the results. Therefore, it is suggested to use interview, qualitative, and experimental methods. Also, this study uses the correlational relationship, which does not imply definite causality in the model. The current research sample of the Islamic Azad University of Sari students limits its generalization to other communities. It is also suggested that this research be conducted in different universities, cities, provinces, and different contexts. In addition, considering the importance and role of cognitive flexibility and spiritual health in changing the metacognitive beliefs of students, it is suggested to provide brochures and books in simple terms for students so that they can become familiar with issues such as mental health, cognitive flexibility, and metacognitive beliefs. Health psychologists and consultants should organize educational workshops and seminars.

## Ethical Considerations

### Compliance with ethical guidelines

Informed consent forms were completed by the participants and the confidentiality of the identification information was observed throughout the research process.

### Funding

This study received no specific support from public, private, or non-profit funding bodies.

### Authors contributions

All authors participated equally in this study.

### Conflict of interest

The authors declared no conflict of interest.

### Acknowledgements

The authors express their gratitude to all who contributed to the research process.

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