Original Article

Mediating role of self-regulated learning strategies in the relationship of mindfulness and responsibility with interpersonal relationships and social acceptance in undergraduate medical students

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Abstract

Background & Objective: Every society tries to improve its educational systems to educate students to face their problems in daily life easily. Therefore, it is essential to provide optimal learning conditions and situations in the learning process to achieve the best results. The study aimed to investigate the mediating role of self-regulation learning strategies in the relationship of mindfulness and responsibility with interpersonal relationships and social acceptance in general practitioner students.

Materials & Methods: This cross-sectional study was conducted from January to August 2022. Based on structural equation modeling methodology, 384 medical students of Zanjan University of Medical Science participated in this study by simple random sampling. The questionnaires used included Baer's Mindfulness, Responsibility, Interpersonal Communication Skills, Crown's Social Acceptance, and Self-Regulated Learning Strategies questionnaire. The questionnaire was made electronically using the native Porsline system. Standard equation modeling was used by SPSS (version 24) and Lisrel (version 8.8) software packages to analyze the data with a 95% confidence interval.

Results: The findings demonstrated that mindfulness directly affects interpersonal relationships (P=0.03, β=0.31). The direct effect of mindfulness on social acceptance revealed a positive and statistically significant effect of P=0.04, β =0.28. With a standard beta of 0.33, the results indicated a direct and significant impact of accountability on interpersonal relationships (P=0.03). The results also suggested that the direct effect of responsibility on social acceptance was positive and statistically significant (P=0.01, β=0.45).

Conclusion: According to the findings of the model analysis, responsibility and mindfulness directly affected interpersonal relationships and social acceptance while simultaneously fostering solidarity. Furthermore, the indirect path of responsibility on social acceptance was significant; that is, self-regulation was able to serve as a mediator between responsibility, and social acceptance, and the final model could explain, on average, 50% of the distribution of "interpersonal relations and acceptance" in the student population. Therefore, it is suggested to pay attention to such factors as self-regulation and interpersonal skills in the education of students.

Keywords: Interpersonal Relationships, Medical Students, Mindfulness, Social Acceptance

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Introduction

Modern education systems aim to educate students to easily navigate their problems in daily life and the social environment; therefore, it is of utmost importance in the learning process to provide optimal learning conditions and situations to achieve the best results. Consequently, preparation for this position requires the provisions of

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specific psychological, social, and cognitive contexts (1, 2). Self-regulated learning is an active and structured process through which learners set goals for their learning and then attempt to monitor, regulate, and exert control over their cognition, motivation, and behavior. This process requires learners to independently design, monitor, and evaluate their learning.

Researchers apply self-regulation principles to academic study and other types of learning. In the meantime, it is believed that self-regulation can be enhanced by granting the learner greater autonomy in the learning process and employing new techniques (3). Practitioners and trainees are expected to self-regulate since future doctors are responsible for their work. Moreover, medical students are expected to identify what they do not know when caring for patients and seek help from supervisors when needed (4). Self-regulation plays a crucial role in interpersonal functions. The interaction between self-regulation and interpersonal skills has recently received the attention of researchers. Interpersonal relationships build the person's capacity for self-regulation; moreover, self-regulation is a moderator of interpersonal relationships (5, 6).

Interpersonal communication is a process by which one conveys information and emotions to others in verbal and nonverbal messages. This ability strengthens close interpersonal relationships and resolves conflicts; moreover, it is more prevalent among friends than family members and among women than men (7). Interpersonal relationships are completely acquired and can be strengthened under the influence of family and other environmental factors (8). Most formal medical school admission systems tend to primarily assess academic achievement in science domains and cognitive abilities, such as verbal reasoning (9).

One of the advantages of having higher social skills is the achievement of higher social acceptance. Research demonstrated a significant relationship between appropriate social skills and social acceptance among college students. That is, students who have appropriate social skills have higher social acceptance. It is noteworthy that this relationship is two-way (10, 11). Social acceptance is an umbrella term that encompasses all segments of society, including students. Students' interpersonal relationships and social acceptance are thought to be influenced by their levels of mindfulness and sense of responsibility (12).

Mindfulness means paying attention to the present in a specific, purposeful, and non-judgmental way; that is to say, experiencing pure reality without explanation (13). This process involves creating a particular way of paying attention to experiences, which is somewhat distinct from the ordinary and routine practice of attending to one's life (14, 15). One of the most prominent features of mindfulness is a complete connection with a theory and research about the nature of language and human cognition (16). The results of the studies indicate that self-regulation can foster social acceptance and interpersonal relationships in learners (17). self-regulation is significantly correlated with relationships and social acceptance in learners, according to a study (18). Mindfulness, which has gained popularity in medical education, can prevent fatigue since a self-aware doctor is more likely to engage in self-care activities and manage stress. Nonetheless, mixed evidence was found regarding the use of mindfulness to reduce distress in undergraduate medical students (19, 20, 21).

Along the same lines, Mansovu et al. indicated that social-emotional skills, through mindfulness mediation, predicted active-empathic listening. Active-empathic listening, mediated by social-emotional skills and mindfulness, predicted relationship quality. In addition, there was a negative mediating relationship between social sensitivity and mindfulness. Moreover, the study by Downey et al. pointed to a positive relationship between the understanding of emotions and the control and management of emotions with interpersonal communication skills in young adults. Furthermore, a study was conducted on the relationship between mindfulness and social acceptance in young adults, and the results illustrated that the inability to use mindfulness has a predictive role in relation to social acceptance (22, 23).

To this date, no study has encompassed all the variables of this investigation. Nevertheless, examining the results of the stated studies reveals that they are inconsistent. In addition, these studies do not mention the mediating role of self-regulation learning. In the present study, the mediating function of this variable was investigated. In light of the aforementioned issues, the present study aimed to find the mediating role of self-regulation learning strategies in the relationship of mindfulness and responsibility with interpersonal relationships and social acceptance among professional doctoral students at Zanjan University of Medical Sciences.

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Materials & Methods

Design and setting(s)

This study is conducted based on a cross-sectional design as structural equation modeling at Zanjan University of Medical Science.

Participants and sampling

According to the number of questionnaire items and similar studies (24), 384 students were selected and participated in completing the questionnaire. Students from different disciplines were selected by stratified random sampling. Simple random sampling was used to select the students based on the availability of the membership list. Based on the number of students in the list, even numbers were selected from number 2 onwards. All undergraduate medical students enrolled at Zanjan University of Medical Sciences from January to August 2022 were included in the study.

Data collection method

Firstly, the necessary permits, including the ethical code, were obtained from the Islamic Azad University. Thereafter, the statistical population and the sample size were determined. Electronic questionnaires were sent to the student's social groups. The questionnaire was made electronically using the native Porsline system, and its link was placed in virtual student groups. Students could only complete one questionnaire from one device, also an email or unique code used to verify identity.

Tools/Instruments

The demographic characteristics form included gender, age, and socioeconomic status. Baer Mindfulness Questionnaire: It is a 39-item self-assessment scale designed by Baer et al. (2006). On a 5-point Likert scale ranging from 1 (never or very rarely) to 5 (often or always), respondents should indicate agreement or disagreement with each statement. This questionnaire measures five aspects of mindfulness, including observation, description, aware actions, non-judgmental inner experience, and non-reactivity. The higher score is indicative of higher mindfulness. The alpha coefficient of this questionnaire was estimated at 0.83, and its validity was calculated at 0.90 by Armani Kian in Iran (24, 25). Moreover, in this study, the validity and reliability of this instrument were examined using face validity and internal consistency through Cronbach's alpha method. Finally, the internal consistency coefficient was calculated at 0.62, which is moderate.

Karami and Nemati's responsibility questionnaire: It is a 50-item self-assessment scale. The subjects must express their agreement or disagreement with each statement on a 5-point Likert scale from 1 (very rarely) to 5 (often). This questionnaire includes the components of self-management, orderliness, legality, trustworthiness, responsibility, organization, and progressivism, which have personal and social dimensions. A higher score signifies higher responsibility. The validity of the scale was 0.78, and the reliability of the questionnaire was 0.92 using Cronbach's alpha method (26). In the present study, Cronbach's alpha method was used to confirm the reliability, and the reliability coefficient was calculated at 0.75.

Interpersonal Communication Skills Questionnaire: This questionnaire measures interpersonal communication skills and consists of 19 questions and one interpersonal skill component. Higher scores indicate that the respondent has superior interpersonal communication skills and vice versa. The concurrent validity of the questionnaire was equal to 0.69, and its Cronbach's alpha coefficient was reported as 0.75 (27, 28). In the present study, internal consistency was measured, rendering a Cronbach's alpha of 0.82.

Crown and Marlow Social Acceptance Test: This questionnaire consists of 33 items. The subjects must express their agreement or disagreement with yes or no. The scale key corresponds with the responses, and the sum of the responses in conjunction with the scale key determines the overall result for each individual. Cronbach's alpha was reported as 0.70 with validity as 0.81 (29, 30). The internal consistency of this tool was also checked, reporting a Cronbach's alpha of 0.68.

Self-Regulated Learning Strategies Questionnaire: This questionnaire, created by Pintrich and Der Groot, consists of 22 statements and measures three aspects of academic self-regulation, namely cognitive strategies, metacognitive strategies, and resource management. Cognitive systems have 13 terms, and metacognitive strategy and resource management have 9 terms. Cronbach's alpha is 0.89, and its content validity was reported as 0.79 (31, 32). Finally, the face validity and internal consistency of the questionnaire were checked in this study, and the results were favorable in both cases. Therefore, the internal consistency coefficient of the questionnaire was 0.72.

Data analysis

The collected data were analyzed in SPSS software (version 24) and Lisrel software (version 8.8). In the descriptive section, statistical analyses were used, such as frequency, percentages, tables, and graphs. In the

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inferential section, according to the level of measurement of variables, firstly, the Kolmogorov-Smirnov test, Skewness, and Kurtosis were used to check the normal distribution of the data. Subsequently, the Pearson correlation test and Structural Equation Model were used. After the implementation of the model, the fit indices were examined. In addition to confirming the indicators related to the model, the path coefficients were analyzed, and their significance level was tested with a 95% confidence interval.

Results

Examining the gender distribution of the participants demonstrated that 68% of the participants were male. Moreover, the mean age in the two groups was almost the same. In terms of marital status, 60% of participants were married. To investigate the direct and indirect effects of mindfulness and responsibility on interpersonal relationships and social acceptance by mediating self-regulation learning in male and female students, the maximum likelihood method (ML) was used to adapt the conceptual model to the data. In addition, to check the quality of the model, chi-square indices, incremental fit index (IFI), root mean square error of approximation (RMSEA), the goodness of fit index (GFI), comparative fit index (CFI), fit index Keri-Mental (IFI), and Tucker-Lewis fit index (TLI) were employed. Based on the majority of sources, GFI, IFI, CFI, and TLI indices should be equal to or greater than 0.90 to indicate the appropriate fit of the model, with df/c2 index smaller than 3 being acceptable and values closer to 1 suggestive of an ideal model (it should be noted that due to the effectiveness of the chi-square statistic of the sample size, this index is considered alone). Finally, RMSEA smaller than 0.08 indicates the acceptability of the model, and the closer we get to 0 (zero), it signifies the ideal fit of the model.

After the implementation of the model, to examine the indices related to the improvement of the model, the examination of the fit indices was carried out. In addition to confirming the indicators related to the model, examining the path coefficients and their significance level illustrated that all the remaining paths are significant. In general, according to the final model and the quality indicators of the model, it can be stated that the modified model was able to explain 0.62 of the variances of social acceptance and 0.40 of the distribution of interpersonal relationships of the studied subjects. Therefore, research hypotheses are examined through direct and indirect effects.

The findings pointed out that mindfulness directly affects interpersonal relationships (P=0.03, β=0.31). Investigating the direct effect of mindfulness on social acceptance also pointed to a positive and significant impact of β=0.28, P=0.04. The results demonstrated the direct and consequential effect of accountability on interpersonal relationships with a standard beta of 0.33. The results also displayed that responsibility had a positive and significant effect on social acceptance (P=0.01, β=0.45).

Investigating the mediating role of self-regulation in the relationship between mindfulness and responsibility in interpersonal relationships indicated that the exogenous variables of the model (i.e., mindfulness and responsibility) were 0.19 (mindfulness) and 0.22 (responsibility). In addition, the examination of the tenth research hypothesis based on the indirect effects of responsibility and mindfulness on social acceptance demonstrated that the indirect effect of responsibility (P=0.04, B=0.25) and mindfulness (P=0.01, B=0.53) with the mediation of self-regulation was confirmed. Furthermore, the modified model with the sum of direct and indirect effects could average half of the variance of social acceptance (P=0.01, B=0.62) and interpersonal relations explain (P=0.02, B=0.40) (Table 1, Figure 1).

Table 1. Total effects of standardized coefficients

Variables	Responsibility	Mindfulness	Self-regulatory
Self-regulation	0.67	-	-
Social acceptance	0.51	0.28	0.09
Interpersonal relationships	0.33	0.31	-

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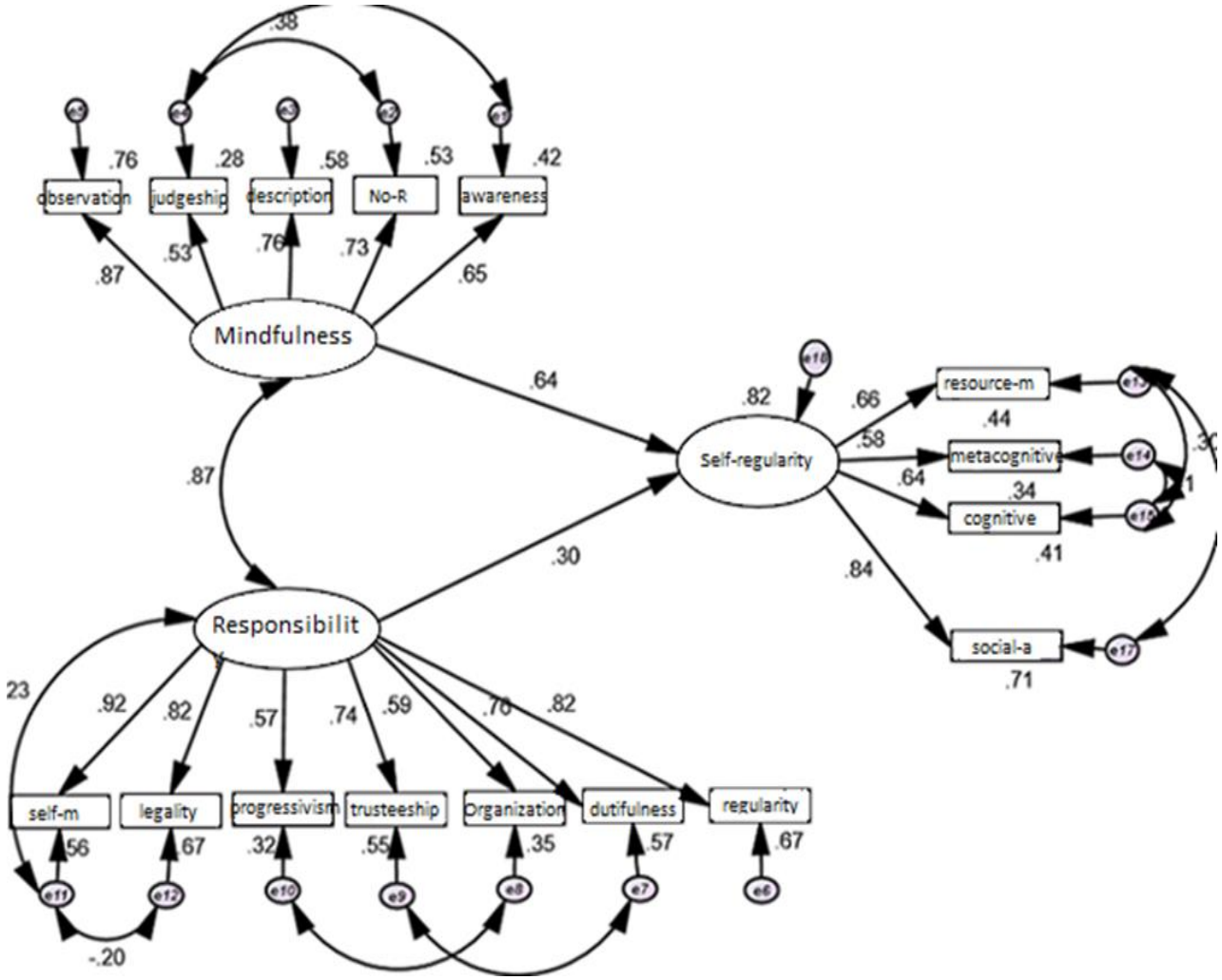

Figure1. Final model of the effects of mindfulness and responsibility on interpersonal relationships with the mediation of self-regulation

Discussion

As evidenced by the obtained results, mindfulness had a direct effect on impersonal relationships. Although few studies have examined the direct effect of mindfulness on interpersonal relationships, the present finding is implicitly consistent with research examining the role of mindfulness in a wide range of positive (concurrent) and negative (diverse) relationships with psychological constructs (33). In the present model, the effectiveness of mindfulness in interpersonal relationships may be attributable to the role of psychological health. This implies that mindfulness, consisting of several components, such as "observation, description, conscious action, lack of reaction, and lack of judgment," can be used against traumatic factors, such as rumination and anxiety (34). The review of prior studies demonstrates that the current research is implicitly consistent with studies that have investigated the role of consciousness in various social components (35).

Psychological health provides an explanation for the role of mindfulness in social acceptance. A person with high mental awareness and psychological well-being can be said to have constructive interactions with his/her social environment and to receive appropriate responses from society in the form of acceptance or support for his/her actions. In addition, the role of mindfulness in social acceptance can be ascribed to the enhancement of an individual's emotional regulation skills. Therefore, some modern approaches view mindfulness as a form of top-down emotion regulation processing, whereas others express mindfulness as a bottom-up emotion regulation strategy. Accordingly, being mindful of feelings, thoughts, and emotions makes individuals less susceptible to the adverse effects of a sequence of negative emotions and thoughts; as a result, they will

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have positive relationships with their society. Moreover, research confirms the importance of emotion regulation training for social acceptance (36). As a result, mindfulness is important for medical students' interpersonal skills. Programs for teaching mindfulness are beneficial in reducing negative emotions and stress, enhancing mindfulness, empathy, and self-compassion, and increasing interpersonal skills, leading to a higher quality of diagnosis and interventions (19).

Multiple researchers have suggested that communication skills are essential during the referral consultation process. As future members of the treatment teams, medical students need to acquire interpersonal skills to shape an effective and determined relationship with patients (37). It is possible that the role of responsibility in interpersonal relationships can be attributed to the exceptional dedication of responsible individuals to the responsibilities associated with their roles. This signifies that some of the conflicts and tensions that may arise in interpersonal relationships due to people's lack of accountability would be reduced. On the other hand, the meta-analysis reveals that responsibility is one of the most significant factors related to job performance, which is the most significant factor in determining job levels across all positions, given that the majority of those studied are experts in their fields and are responsible for a variety of tasks (38).

Self-regulation was found to be a potential mediator between responsibility and social acceptance. A review of the conducted studies demonstrates an implicit congruence between the current findings and the research in which the mediating role of self-regulation in social acceptance was confirmed with similar and converging structures (7). Responsibility is one of the fundamental skills for establishing and maintaining interpersonal relationships, which is a prerequisite for social relationships and can lead to social acceptance (39). New educational structures, such as student-centered ones, rely heavily on self-regulation. This factor increases students' engagement with the educational environment when it is considered. It also enhances self-directed learning. Examining the indirect relationship between responsibility and mindfulness in interpersonal relationships with the mediation of self-regulation revealed the significance of the mentioned path. It can be stated that mindfulness is not only a way to deal with psychological problems, but it also provides a platform for psychological health and makes a person more responsible in his/her personal and social roles. As a result, impairment in social, occupational, and other essential areas is recognized as a primary criterion for the vast majority of psychological disorders.

The role of self-regulation as a mediator in the relationship between mindfulness and responsibility revealed that self-regulation account for a substantial portion of responsibility. The investigation of the research context also pointed to the implicit alignment of the current findings with those of earlier studies (40). There is a focus on self-regulation as a requirement of medical professionals who are expected to identify and engage in ongoing professional development activities. In a similar vein, in preparation for joining the medical practice, medical trainees are expected to engage in medical education as capable and self-regulating learners (4).

Finally, the examination of the general model indicated that mindfulness and responsibility directly explain social acceptance (and the mediation of self-regulation) and interpersonal relationships. It can be argued that the remaining paths in the implicit model are in line with previous studies (41). In line with previous findings, perhaps the explanation of the final model can be clarified based on the principles of responsibility and mindfulness. The meta-analysis reports a positive correlation between responsibility and mindfulness (42). There may be some standard components between responsibility and mindfulness or both may be influenced by a third factor when explaining their relationship. For instance, some believe that responsible and conscious people respond to environmental factors (43). This issue may arise from being conscious; however, discipline is one of the characteristics of responsible people, affecting their performance in self-regulation. In addition, research indicated that mindful individuals are better able to self-regulate. Lifelong learning demonstrates the significance of self-regulation in education. This ability contributes to the ongoing development of students and graduates. The first limitation of the research can be attributed to the sample size allocation to a specific educational category; therefore, generalizations to other groups and educational levels should be made with caution. Moreover, the data collected through a questionnaire might lack the required depth. The use of computer-based electronic tools, along with the high volume of questionnaires, and the fatigue caused by it, could create a template response pattern in the participants. Demographic data illustrated that the predominant socioeconomic position of the sample is higher than the

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average. Therefore, it is probably better to generalize to the same classes as the sample.

Conclusion

According to the findings of the model analysis, responsibility and mindfulness directly affected interpersonal relationships and social acceptance while simultaneously fostering solidarity. Furthermore, the indirect path of responsibility on social acceptance was significant; that is, self-regulation was able to serve as a mediator between responsibility and social acceptance, and the final model could explain, on average, 50% of the distribution of "interpersonal relations and acceptance" in the student population. As mentioned, interpersonal skills are essential for future physicians and can increase their acceptance among patients. As the results denoted, such factors as self-regulation and mindfulness are related to these skills. Therefore, the results of this research can be a guide for setting up interpersonal training programs for medical students.

Ethical considerations

The current research is from the doctoral thesis of the first author, which was approved by the Ethics Committee of the Islamic Azad University of Zanjan (IR.IAU.Z.REC.1401.031). In this research, the ethical considerations related to the subjects were observed. These considerations were as follows: 1) Written consent was received from the participants before the study began; 2) before starting the study, the subjects were informed about the topic and the study method; 3) The researcher undertook to protect the private and personal information of the subjects; 4) The obtained results were interpreted for the subjects; 5) The subjects were given the necessary instructions to complete the questionnaire; 6) Participation in this study did not entail any financial burden for the participants; and 7) this research did not have any contradictions with the religious and cultural standards of the subject and society.

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Disclosure

The authors declare no conflict of interest and have not received any funds.

Author contributions

Seyede Zahra Safavi contributed to the conception and design of the study, conducted the study, collected, organized, analyzed, and interpreted data, and wrote the initial and final draft of the manuscript. Homam Moayedfar contributed to the provided study materials organized, analyzed. Qamar Kiani contributed to the supervised, critically reviewed, and approved Manuscript publishing, and she agrees to be accountable for the accuracy of the work.

Data availability statement

The raw data-sheet can be available from the corresponding author upon reasonable request.

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