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The mediating effect of Covid-19 risk perception on the correlation between levels of mindfulness and preventive health behavior in nursing students

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ABSTRACT

Objective: This study aimed to investigate nursing students' levels of mindfulness and its effect on developing preventive health behaviors, and to examine the mediating role of COVID-19 risk perception on this effect.
Design and measures: This study used a descriptive and correlational study design.
Results: The level of mindfulness, accompanied by COVID-19 risk perception caused a.104-unit increase in developing preventive health behavior.
Conclusions: The findings revealed that the indirect effect of the level of mindfulness on developing preventive health behavior was at a significant level; therefore, it is concluded that COVID-19 risk perception mediates the correlation between level of mindfulness.
Practice implications: The present study is important to investigate nursing students' levels of mindfulness and the effect of these on developing preventive health behaviors.

Introduction

The World Health Organization (WHO) first declared COVID-19 to be a "public health emergency of international concern" on 30 January 2020 and a pandemic on 11 March 2020 (Director-General, 2020; WHO, 2005). The first case in Turkey was detected on 11 March 2020; however, the total number of cases and the number of deaths were reported to have reached nearly 15 million and 100,000 respectively by March 2022 (Ministry, 2022). Healthcare professionals, who have been treating COVID-19 patients on the front lines since the beginning of the pandemic, are at high risk of becoming infected with COVID-19. In addition, nursing students attend clinical rotations as part of their professional education and may be assigned to various inpatient clinics in accordance with the requirements of the curriculum. Therefore, nursing students are at a high risk of infection and transmission as they provide nursing care to different patients during COVID-19 pandemic (Annamma et al., 2020; Ulenaers et al., 2021). In contrast to nurses assigned to a specific service, the risk of infection for nursing students attending clinical rotations is high and unpredictable in pandemic conditions (Annamma et al., 2020).

Quarantine, curfews and social isolation imposed during the pandemic have not only caused concern and anxiety in individuals but also led individuals to feel themselves at risk of catching COVID-19 (Yıldırım & Guler, 2020). Risk perception refers to the psychological assessments of individuals regarding the probability and consequences of a negative outcome (Lennart, 2000). Ulenaers et al. (2021) reported in their study that the risk perceptions of students participating in clinical practice about being infected with the COVID-19 virus were moderate, and that actively participating in the care of COVID-19 patients increased the perceived risk (Ulenaers et al., 2021). A recent study revealed that the perceived risk associated with COVID-19 was higher compared to other diseases that threaten human health (Zhong et al., 2021). Perceived risk is an important factor affecting risk-taking behavior (Ding et al., 2020). People with lower risk perception tend to engage in high-risk behaviors or avoid preventive behaviors (Adedeji et al., 2009), while people with a high perception of risk tend to adopt preventive actions (Brug et al., 2004). Thus, individuals with a high perception of COVID-19-related risk are expected to be more attuned to developing preventive health behaviors, due to their desire to avoid the danger (Mukhtar, 2020).

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Previous studies revealed that higher levels of mindfulness, in addition to preventive health behaviors, made it easier to cope with a stressful situation such as COVID-19; they also improved well-being (Conversano et al., 2020; Saricali et al., 2020). Mindfulness is the ability to pay attention to the present moment, which involves deliberately focusing attention on what is currently happening and observing one's internal experiences without judgment (Ludwig and Kabat-Zinn, 2008). Mindfulness is reported to be associated with well-being, self-compassion and self-efficacy; it is further reported to be a good predictor for determining depression, anxiety and stress (Conversano et al., 2020; Soysa and Wilcomb, 2015). In a systematic review, Gilmartin et al. (2017) concluded that short-term mindfulness interventions (5–20 min/day) may be effective in improving the well-being of health professionals and reducing their anxiety and stress levels (Gilmartin et al., 2017). From this point of view, mindfulness can be said to be associated with individuals' perception of COVID-19-related risk and the tendency to develop preventive health behaviors. Nursing students, the healthcare professionals of the future, should be knowledgeable and experienced, particularly in terms of biological and psychological matters, and social issues, in order to protect and improve the health of individuals, families and communities, and to take responsibility for their care and treatment (Li and Hasson, 2020). A literature review revealed no previous studies examining COVID-19-related risk perception, preventive health behaviors and mindfulness levels of nursing students. This study thus aimed to investigate nursing students' levels of mindfulness and the effect of these on developing preventive health behaviors, and also to examine the mediating role of COVID-19 risk perception levels in this respect.

Design and methods

This study used a descriptive and correlational study design.

Population and sampling

The study was carried out through an online survey between 17 April and 31 July 2021 at state and foundation universities in Turkey which currently provide nursing education.

The population of the study was composed of nursing students studying in Turkey, whereas the sample covered 423 nursing students who were studying at state and foundation universities and were willing to participate in the study. A literature review revealed that the number of participants required to perform Structural Equation Modeling (SEM) analysis should be within the range of 200–500 (Kline, 2015). For this reason, we aimed to ensure the participation of more than 200 students in the study and sampling was finalized when responses to the questionnaire were completed.

Inclusion criteria for the study were:

- To be currently studying on a bachelor's degree program in nursing
- To be willing to fill out the questionnaire

Exclusion criteria for the study were:

- To have filled out the questionnaire incompletely or to have refused to fill it out

Study model

This study aimed to investigate the nursing students' levels of mindfulness and their effect of on developing preventive health behaviors and to examine the mediating role of COVID-19 risk perception levels on this effect. Fig. 1 shows the theoretical model and hypotheses of the study based on the causal and correlational relationship between the variables.

H1. Level of mindfulness affects COVID-19 risk perception.

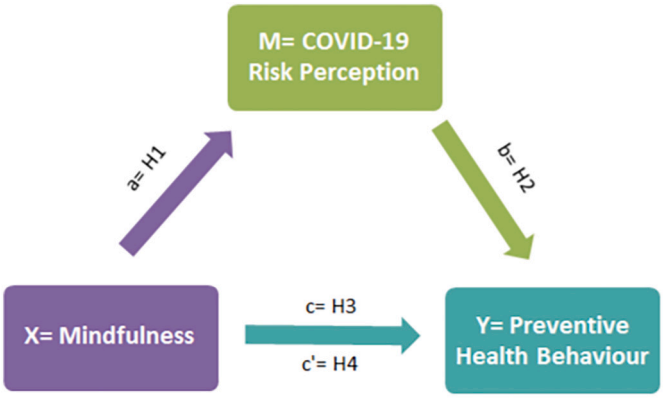

Fig. 1. Research model and hypotheses.

H2. COVID-19 risk perception affects the tendency to develop preventive health behavior.

H3. There is a correlation between level of mindfulness and developing preventive health behavior.

H4. COVID-19 risk perception is the mediating variable considering the correlation between mindfulness and developing preventive health behavior.

Instruments

The data collection instruments used within the context of the study were a Personal Information Form (PIF) on the socio-demographic and educational status of individuals, the COVID-19 Perceived Risk Scale (CPRS), which evaluates the perceived risk levels of individuals, the Mindful Attention Awareness Scale (MAAS), assessing the level of mindfulness of individuals, and the Preventive Health Behaviors Questionnaire (PHBQ).

Personal Information Form (PIF)

The PIF, prepared by the researchers, included a total of 16 questions covering socio-demographic characteristics (age, gender, educational status, marital status etc.), health status, and the form of education received during the pandemic (Ding et al., 2020; Soysa and Wilcomb, 2015; Zhong et al., 2021).

COVID-19 Perceived Risk Scale (CPRS)

The CPRS, which consists of eight items, was developed by Yıldırım and Guler (2020) by adapting the items of the SARS Risk Perception Scale developed by Brug et al. (2004) (Brug et al., 2004; Yıldırım & Guler, 2020). The five-point Likert-type (1: unimportant; 5: very important) scale has two sub-dimensions: cognitive and emotional. The cognitive dimension refers to the possibility of being infected with the COVID-19 virus, while the emotional dimension refers to the fear of infecting family members or other people with whom one has contact. Higher scores obtained from the scale indicate that the perceived risk of COVID-19 is high. In the original scale; the Cronbach alpha value of the cognitive sub-dimension of the scale was found to be 0.73, and the Cronbach alpha value of the emotional sub-dimension was found to be 0.88. The Cronbach alpha values of the CPRS for the present study are shown in Table 1 (0.79).

Mindful Attention Awareness Scale (MAAS)

The scale, which was developed Brown and Ryan (2003), measures the overall tendency of individuals to be aware of the moment-to-moment experiences occurring in their daily lives and to pay attention to them (Brown and Ryan, 2003). The scale consists of a total of 15 six-point Likert-type items (“always”, “usually”, “often”, “occasionally”,

Table 1
Normality distribution of variables, correlation values and reliability.

Variable	X	S.S.	Skewness	Kurtosis	1	2	Cronbach's Alpha
1. Mindfulness	56.8	17.256	−0.257	−0.855	1		0.95
2. COVID-19 risk perception	27.1	5.641	−0.600	0.237	−0.165	1	0.79

"rarely", and "never") and high scores indicate a high level of mindfulness. The validity and reliability study of the scale in Turkish was conducted by Özyeşil et al. (2011) and the Cronbach alpha value was found to be 0.80 (Özyeşil et al., 2011). The Cronbach alpha values of the MAAS for the present study are shown in Table 1 (0.95).

Preventive Health Behaviors Questionnaire (PHBQ)

This questionnaire is a 16-statement form comprising the behaviors that students engaged in to prevent COVID-19 infection. Each statement was assessed with a five-point Likert-type scale ranging from "never" to "always", which tries to determine how often the students developed the preventive behavior in question. In the next stage, the answers provided by each student for the 16 statements were collected and the total score of the questionnaire was obtained accordingly.

Data collection

Data were collected after sending the prepared data collection forms to the students and observing the principle of voluntary participation. Throughout the data collection process, the students who constituted the population were communicated with through smartphone applications such as WhatsApp® and Telegram®, as well as via social media. Approximately 6 min were needed to answer all questionnaire forms.

Statistical analysis

Statistical analysis of the study data was performed using the SPSS 23.0 software. The effect of mediating variables was examined using the "Process Macro" developed by Hayes (2017). Before proceeding to data analysis, the Kolmogorov-Smirnov test was used to determine whether or not the variables were normally distributed and it was observed that the data exhibited a normal distribution ($p > .005$). As a practical rule, skewness and kurtosis values between ±1.0 or ±1.5 are considered to point to a normal distribution of variables (Bayram, 2010). The skewness and kurtosis values of the variables in this study revealed that the data were distributed normally or close to normal. It was further concluded that there was no multicollinearity, nor an autocorrelation between the variables in the model. The reliability levels of the scales used in the study were tested by examining the Cronbach's alpha values respectively, and it was found that the Cronbach's alpha values were sufficient for working out that the scales were reliable (Table 1).

A regression analysis was then performed based on the bootstrap method in order to test whether the COVID-19 risk perception had a mediating role on the effect of students' level of mindfulness in developing preventive health behavior. It has been suggested that the bootstrap method gives more reliable results than the traditional method of Baron and Kenny (1986) and the Sobel test (Gürbüz and Şahin, 2014; Hayes, 2017; Preacher et al., 2007; Zhao et al., 2010). Analyses were carried out using the "Process Macro" developed by Hayes (2017). 5000 bootstrap re-sampling options were chosen in the analyses (Hayes, 2017). For the purpose of the mediation analysis performed via the bootstrap technique, the values within the 95 % confidence interval (CI) derived as a result of the analysis should not include the value of zero (0) in order to support the study hypothesis (MacKinnon et al., 2004).

Ethical consideration

Permission to conduct the study, was obtained from the Non-Interventional Clinical Research Ethics Committee of University (Date: 30 April 2021 No: E-18457941-050.99-10603). A written statement describing the study was included in the introduction to the data collection form, and students who agreed to participate in the study after reading it were included in the study. In addition, the answers and the data set on the data collection form were copied to a separate external memory card upon completion of the data analysis, to ensure the confidentiality of the personal data collected. All relevant data was deleted from the local computer. The external memory drive created for this purpose will be retained for a period of five years in accordance with the ethical rules.

Results

The mean age of the nursing students participating in the study was 20.92 ± 1.76. 35.7 % of the students were in the second year of their university education. 67.6 % had an economic status where their income met their expenses, and the majority (92.7 %) lived with their parents. 83.7 % of the sample consisted of female students. 14.9 % of the sample had previously been diagnosed with COVID-19. The majority of students (98.6 %) did not have a chronic disease, and 56.6 % of the students declared that no individuals they were living with had a chronic disease. 85.6 % of the students declared that they did not live with individuals over the age of 65. 85.1 % of the students had not previously been diagnosed with COVID-19 (Table 2).

With regard to the characteristics of the nursing education received by nursing students during the pandemic outbreak, approximately 80 % of the students declared that they had not attended any clinical practice during the spring semester of 2020, whereas this figure decreased to 63.6 % for spring semester of 2021. The percentages of students declaring that they had received face-to-face theoretical education in the 2020 and 2021 academic years were 30.3 % and 36.9 % respectively (Table 3).

Table 4 shows the results of the regression analysis, performed based on the bootstrap method, to test whether the COVID-19 risk perception has a mediating role on the effect of students' level of mindfulness on developing preventive health behavior. Whether mindfulness had an indirect effect on developing preventive health behavior was determined in accordance with confidence intervals derived with the bootstrap technique. The findings revealed that the indirect effect of the level of mindfulness on developing preventive health behavior was at a significant level; therefore, it was concluded that COVID-19 risk perception mediates the association between mindfulness and the tendency to develop preventive health behavior (b = −0.016; %95 BCA CI [−0.0332, −0.0035]). Bootstrap-adjusted bias and bootstrap-accelerated confidence interval values (BCA CI) do not cover the value of 0 (zero). The complete standardized effect size of the mediation effect (K^2) was −0.027, which indicated a lower mediation effect. The findings obtained indicated that a one-unit increase in the level of mindfulness caused a − 0.054-unit decrease in COVID-19 risk perception and a 0.120-unit increase in developing preventive health behavior. On the other hand, a one-unit increase in the COVID-19 risk perception caused a 0.295-unit increase is in developing preventive health behavior. Level of mindfulness accompanied by COVID-19 risk perception caused a 0.104-unit increase in developing preventive health behavior (Fig. 2). As the level of mindfulness increased, the degree of COVID-19 risk perception decreased. Accordingly, it was concluded that these two variables jointly led to a decrease in the tendency to develop preventive health behavior.

Table 2
Socio-demographic characteristics of nursing students (n = 423).

Socio-demographic characteristics	n	%
Age (Mean (SD)	20.92 (1.76)	
Male	20.8 (1.7)	
Female	21.3 (2.0)	
Gender		
Male	69	16.3
Female	354	83.7
Class		
First	122	28.8
Second	151	35.7
Third	83	19.6
Forth	67	15.8
Financial status		
Low	82	19.4
Moderate	286	67.6
High	55	13.0
Life style		
Alone	22	5.2
With family	392	92.7
With friends	9	2.1
Presence of chronic diseases		
No	6	1.4
Yes	417	98.6
Presence of chronic disease in individuals living together		
Yes	184	43.5
No	239	56.6
Presence of individuals over the age of 65 among individuals living together		
Yes	61	14.4
No	362	85.6
Previously diagnosed with COVID-19		
Yes	63	14.9
No	360	85.1

Table 3
Features regarding the education received during the pandemic (n = 423).

Educational features	N	%
2020 Spring Semester face-to-face course		
Yes	128	30.3
No	295	69.7
2020 Spring Term clinical practice		
Yes	87	20.6
No	336	79.4
2020 Fall Semester face-to-face course		
Yes	156	36.9
No	267	63.1
2020 Fall Term clinical practice		
Yes	101	23.9
No	322	76.1
2021 Spring Semester face-to-face course		
Yes	131	31.0
No	292	69.0
2021 Spring Term clinical practice		
Yes	154	36.4
No	269	63.6

Table 4
Regression analysis for mediation testing (n = 423).

Prediction variables	Result variables					
	M (Covid-19 risk perception)			Y (preventive health behavior)		
		B	S.E.		B	S.H.
X (Mindfulness)	a	−0.054*	0.016	c’	0.120*	0.028
M (COVID-19 risk perception)	–	–	–	b	0.295*	0.086
Constant	İM	30.104*	0.933	İY	49191*	3.063
	R^2 = 0.027			R^2 = 0.058		
	F(1;421) = 11.817; P < .01			F(2;420) = 15.430; P < .001		

Note. *p < .001; S.H.: Standard Error. Non-standardized beta coefficients (b) were reported.

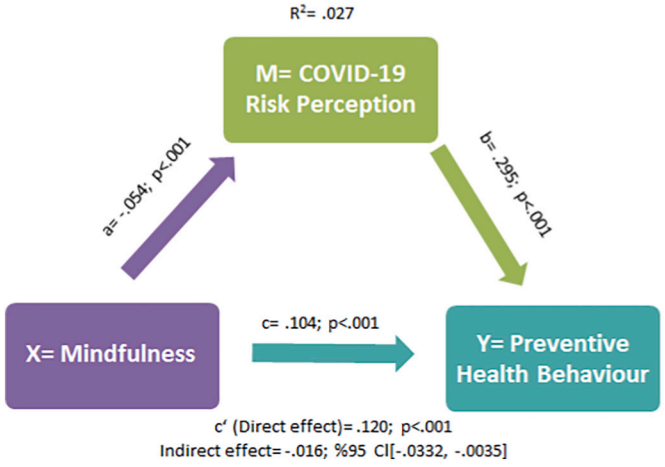

Fig. 2. Diagram of the mediation tests.

Discussion

This study investigated nursing students' levels of mindfulness and its effect of on the tendency to develop preventive health behaviors, and assessed the mediating role of the level of COVID-19 risk perception on this effect. In accordance with the findings of our study, we concluded that level of mindfulness is an influential factor on the tendency to develop preventive health behavior. As the level of mindfulness increases, the tendency to develop preventive health behavior improves accordingly. Haliwa et al. (2020) reported that level of mindfulness positively affected the tendency to develop preventive health behaviors towards COVID-19 (Haliwa et al., 2020). At the end of the literature review, we found out that increased levels of mindfulness or mindfulness interventions decreased individuals' stress levels and also improved positive health outcomes such as attention span, concentration and well-being (Girma et al., 2020; Iorfa et al., 2020; Renner et al., 2008). Therefore, in the light of the similar situation obtained in the current study, we worked out that increased levels of mindfulness improve a person's selective attention towards the problems they are momentarily facing. Improving mental and physical well-being may further help individuals to develop preventive health behaviors against COVID-19.

Previous studies indicate that another variable that helps individuals to develop preventive health behaviors against COVID-19 is an increased perception of risk (Haliwa et al., 2020; O'Brien et al., 2021). The findings of the current study were in parallel with the results of in

the literature. It was observed that preventive health behaviors of students with regard to COVID-19 were also positively affected by increased levels of COVID-19 risk perception. This may be related to the fact that individuals avoided risky behaviors throughout the pandemic, in order to protect their health. On the other hand, the fact that the sample consisted of nursing students may have led to an increase in the perception of COVID-19 risk and influenced the increase in the tendency to develop preventive health behaviors. El Hadi et al. (2020) reported in their study that the majors of students and their seniority may affect their knowledge and their tendency to develop preventive health behaviors related to COVID-19 (El Hadi et al., 2020).

Although the higher levels of COVID-19 risk perception observed throughout the pandemic seem to have been effective in terms of protecting against COVID-19, a long-term continuation of risk perception may lead to negative effects in individuals (Arslan et al., 2021). On the other hand, mindfulness, which focuses on moment-to-moment experiences, improves a person's well-being and reduces impulsive reactions, thus ensuring that the individual can effectively cope with a challenging situation instead of having to make a decision between fight-or-flight responses (Atalay, 2018). It was determined that COVID-19 risk perception was associated with mindfulness and preventive health behaviors. Our study revealed a negative correlation between mindfulness and COVID-19 risk perception. Therefore, H1, H2 and H3 of our study were confirmed. In addition, H4 of our study, which was "COVID-19 risk perception is the mediating variable considering the correlation between mindfulness and developing preventive health behavior", was confirmed and it was concluded that this mediating effect negatively affected the tendency to develop preventive health behavior. Similarly, Haliwa et al. (2020) reported in their study that social isolation, which is one of the COVID-19 preventive health behaviors, had a strong positive correlation with an increase in the level of mindfulness; however, it is not associated with other preventive behaviors such as wearing masks and avoiding touching others (Haliwa et al., 2020). This inverse relationship, which was also observed in our study, is thought to be associated with the tendency of individuals with a high level of mindfulness to attach importance to preventive behavior and the fact that ensuring self-control over this health-related condition reduces risk perceptions. Nursing students with higher levels of mindfulness tend to adopt effective coping behaviors by developing preventive health behaviors instead of giving in to fear-based impulsive reactions to COVID-19.

Limitations

Despite the interesting information derived, the current study has a number of limitations. In this study, which was carried out as a cross-sectional study, we examined the correlation between the variables; however, no causal analysis was performed regarding the variables or the characteristics of the sample. In addition, the generalizability of the study results varies due to the fluctuating course of the pandemic. Nevertheless, the fact that the findings were evaluated using structural equation analysis still constitutes a strength of the study.

Conclusion

Finally, we conclude that the increase in the level of mindfulness of nursing students improved their potential to develop preventive health behaviors against COVID-19, and that COVID-19 risk perception was a mediating variable which negatively influenced the effect of mindfulness on preventive health behavior.

Implications for psychiatric nursing practice

The present study is important to investigate nursing students' levels of mindfulness and the effect of these on developing preventive health behaviors, and also to examine the mediating role of COVID-19 risk perception levels in this respect. In the light of the results obtained from our study, we suggest that future researchers conduct repetitive studies examining the factors that have an impact on developing preventive health behavior, and plan new studies focusing on other variables that may have a mediating or regulatory effect on the relationship between the level of mindfulness and preventive health behavior.

CRediT authorship contribution statement

The details of authorship of the work are as follows:

- Canan Karadas and Yalcin Kanbay conceived and designed the study.
- Ayse Ay and Cansu Akdag Topal collected the data and worked on the database.
- Sevil Cinar Ozbay and Yalcin Kanbay analyzed, interpreted the data and wrote the article.
- Canan Karadas, Ayse Ay, Cansu Akdag Topal, Sevil Cinar Ozbay supervised the whole process and reviewed the article, with important intellectual contributions.
- The final version of the article was approved by the entire team.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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