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Medical Students' Risk Perception of COVID-19 Disease: A Cross-sectional Study

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Abstract

Background: The risk perception of the COVID-19 disease has a direct impact on vulnerability and preventive behaviors. Considering the special position of medical students in society, this research aims to assess the risk perception among medical students.
Objectives: The present study aimed to investigate the medical students' risk perception in regard to COVID-19 Diseases.
Methods: A descriptive-analytical study was conducted in 2020-2021 through an online self-report questionnaire. The data were collected by the Iranian questionnaire on COVID-19-associated risk perception. The questionnaire consisted of two parts the demographics (11 options) and a part for the COVID-19-related risk perception (20 options). The questionnaire included the dimensions of the cognitive factors (5 items), beliefs (6 items), political factors (4 items), social factors (3 items), and cultural factors (2 items). Scoring was done on a 5-point Likert scale (1=Absolutely disagree to 5=Absolutely agree).
Results: A total of 392 students completed the COVID-19-associated risk perception questionnaire. Undergraduates with 278 (71.6%) comprised the majority of the students participating in the study, 237 (60.6%) had the experience of being infected with COVID-19 disease, 262 (66.8%) of the students participated in taking care of the COVID-19 patients, and 242 (61.7%) of the students experienced the COVID-19 incurred death of friends and relatives. The majority of the students, 268 (68.4%) were ranked at the moderate level in terms of the student risk perception of COVID-19. The total mean score of the students' risk perception was 72.98 ± 6.55. Moreover, cognitive dimension was the highest mean score of the risk perception dimensions among the students.
Conclusion: The medical students' risk perception of COVID-19 disease was ranked moderate. Considering the main role of medical students in taking care of hospitalized patients and preventing the disease from spreading in the community, the managers of the educational system are required to plan for promoting the students' risk perception.

Keywords: COVID-19 diseases, Medical students, Risk perception

1. Background

Coronavirus is a large group of viruses and a subset of Coronaviruses, which includes the common cold virus to the cause of more severe diseases such as SARS, MERS, and COVID-19. Coronaviruses were first discovered in 1965. This virus naturally occurs in mammals and birds; however, seven types of human coronaviruses have been discovered so far. Recently, the outbreak of novel coronavirus infection (SARS-CoV-2), as a highly pathological and widespread virus in humans, has been raised as a serious global concern for public health, with high morbidity and mortality (1), which broke out as a human epidemic in December 2019 in Wuhan, China. "SARS-Cov-2" virus is the sixth generation of coronaviruses. The World Health Organization announced the official name of the disease caused by the coronavirus, namely, the COVID-19. The COVID-19 disease is a newly emerging threat affecting many countries, including Iran (2). More than 500 million cases of COVID-19 have been confirmed by July 2022. The death rate is estimated at more than 6.3 million people (3).

In Iran, the first case of COVID-19 was reported on 19 February 2020 in Qom, located 140 km to the south of Tehran, and on 20 February 2020 (4-5).

In most countries across the world, the health systems have been challenged by the waves of the COVID-19 outbreak at different times. High financial and social costs are among the COVID-19 pandemic incurred consequences (6). To move towards more robust and prepared health systems, it is necessary to benefit from improved criteria relevant to resilience (7).

The COVID-19-associated risk perception motivates people to take measures for the prevention and conduct the protective behaviors. The intensity of the risk perception has a fundamental role in reducing the vulnerability of people against the COVID-19 (8). A study performed by Chan et al. (2020) to reflect the challenges and opportunities of controlling the COVID-19 disease revealed that the risk perception of COVID-19 directly impacts vulnerability and preventive behaviors (9).

According to the Health belief mode, the risk perception of disease is the motivation to conduct

preventive behaviors. A realistic risk perception of the COVID-19 infection leads to the correct knowledge and skills to promote and take preventive measures (9).

The increasing number of patients and their hospitalization during the COVID-19 prevalence has resulted in the build-up workload of the medical staff. Many infected cases of nurses and doctors have also led to a lack of human resources in hospitals (10). The mental health outcomes of COVID-19 have also aggravated this problem, referred as lack of hospital workforce (11). Concerning the lack of human resources in the medical centers, the medical and nursing students voluntarily have been taking on various roles in providing medical care in hospitals. To promote the quality of the medical care provided by the students, it is necessary to concentrate more on their preparedness (12). In a review study by Magklara et al. (2020) on the role of medical students during the COVID-19 pandemic, it was reported that although their knowledge of the transmission and symptoms of the virus and the preventive measures were adequate, mask-wearing was not very common among them (13). On the other hand, the lack of the necessary treatment and vaccine for this disease and its excessive spread have made it critical to observe general precautions (14). Medical students are among the frontline staff communicating with the recipients of the medical services. During the pandemic in different countries, volunteer students have assisted to provide medical services in hospitals (15). In a systematic review and meta-analysis performed by Siddiquea et al. (2021) on 84 studies of knowledge, attitude, and practice regarding the COVID-19 disease in 45 countries, the results displayed that the overall knowledge, attitude, and practice in this study estimated as 75% with a positive and significant correlation between attitude and practice (16).

2. Objectives

In the prevention of COVID-19, personal and social protection measures play a vital role. Adherence to preventive measures requires more research (17). Considering the particular status of medical students in society and their auxiliary role in providing medical care in hospitals, the researchers decided to determine the risk perception and its dimensions among the medical students to promote the protective behaviors of the students against the COVID-19 disease by appropriate planning.

3. Methods

3.1.Study design and participants

This paper is a descriptive-analytical study carried out at Mazandaran University of Medical Sciences, Iran, from 27 January 2021 to 26 June 2021. All medical students in different disciplines were included in the present research. The sample size for the average of a community was calculated as 400 samples only by controlling the type 1 error based on the pilot study. (Means and standard deviations of risk perception of a pilot study were calculated at 70.02 ± 0.26, α=0.05, d=0.05, and SD=0.26).

$$n = \frac{[z_{1-\frac{\alpha}{2}}]^2 \times (SD)^2}{(\varepsilon)^2}$$

Random sampling and distribution of online questionnaires by the educational experts of the faculties were between the academic semesters of the students. The Code of Ethics No. IR.MAZUMS.REC.1399.905 was acquired. The inclusion criterion was students studying at Mazandaran University of Medical Sciences. The exclusion criterion was not completing the whole questionnaire.

The questionnaire was sent to the cell phone number of the student representative of the classes through the educational experts of the faculties, and they were requested to send it to the student virtual groups[1]. In the end, 392 questionnaires were completed by the students (Response rate 98%).

3.2.Questionnaire

The data were collected using the COVID-19 associated risk perception questionnaire, designed and psychometrically analyzed by Samadipour and Ghardashi (2019). The questionnaire's reliability was confirmed by Cronbach's alpha coefficient (α=0.787). The construct validity was confirmed by KMO test (0.834), and also the significance of Bartlett's test (0.001) was verified (18). The questionnaire consisted of two parts, i.e., the demographics, including eight options on age, sex, study major, education, and the student's history of the COVID-19 disease, the history of COVID-19 infection or death of the immediate family members or relatives of the student and voluntary participation in providing the medical care in the hospital. The second part consisted of 20 options related to measuring the risk perception of COVID-19. The questionnaire included the following dimensions: 1- Cognitive factors (5 items), 2- Belief factors (6 items), 3- Political factors (4 items), 4- Social factors (3 items), and 5- Cultural factors (2 items). The responses were scored on a 5-point Likert scale from 1 (Absolutely disagree) to 5 (Absolutely agree). The minimum and maximum scores of the questionnaire were 20 and 100. The overall risk perception was qualitatively classified into three categories: low risk perception (score: 20-50), moderate (score: 51-76), and good risk perception (score>100).

3.3. Statistical Analysis

The collected data were analyzed in SPSS-16 (Armonk, New York, USA). To analyze the data, descriptive statistics, including the mean, standard deviation, and confidence interval were used for the

quantitative variables and frequency tables for the qualitative or categorical variables, and in the inferential statistics section, and the Kolmogorov-Smirnov test was utilized to check the normal distribution of the collected data. In case of the assumption of normality was held, the independent t-tests and ANOVA were used in each of the two-level and multi-level quantitative variables, respectively, and if the assumption of normality was not established, Mann-Whitney and Kruskal-Wallis tests were employed in each of the two-level and multi-level quantitative variables, respectively. In addition, Spearman's partial correlation coefficient and regression tests were utilized to explain the dependent variable by the age variable.

4. Results

The mean age of the respondents was 24.29 years. Among the respondents, 207 (53.2%) were male, and 182 (46.8%) were female. Undergraduates with 278 (71.6%) comprised the majority of the students participating in the study, 237 (60.6%) had the experience of being infected with COVID-19, 262 (66.8%) participated in taking care of COVID-19 patients, and 242 (61.7%) of the students experienced the COVID-19 incurred death of friends and relatives.

The majority of the students (68.4%) were ranked at the moderate level in terms of the COVID-19-associated risk perception. The total mean score of the students' risk perception was 72.98 ± 6.55. Moreover, the highest mean score of the students' risk perception resulted from the cognitive dimension (Table 1).

No significant difference was observed between the mean risk perceptions of the women compared to that of the men. Regarding the lack of normal distribution in the variable of the total risk perception in terms of the study major and education, the non-parametric Kruskal-Wallis test was used to compare the mean risk perception of the study major and education levels. The results of the Kruskal-Wallis test showed a significant difference in the mean risk perception in terms of the study major (P<0.001). The nursing students had a higher risk perception score than other study majors (Table 2).

Table 1. Mean and standard deviation of the COVID-19 associated risk perception and its areas among the students of Mazandaran University of Medical Sciences

Variable	Mean±SD	Confidence Interval
Total risk perception	72.98±6.55	72.33-73.64
Cognitive dimension	22.79±2.41	22.55-23.03
Belief dimension	18.97±2.90	18.68-19.26
Political dimension	16.91±2.003	16.71-17.11
Social dimension	9.59±1.36	9.46-9.73
Cultural dimension	4.70±1.08	4.59-4.80

Table 2. Comparing the mean ranking of the COVID-19 associated risk perception among the students of Mazandaran University of Medical Sciences according to study major

Total Risk Perception	Group	Mean±SD	Mean Ranking	*P*-value
Gender	Male	72.74±6.58	188.84	0.248*
	Female	73.36±6.53	202.01	
Faculty	Nursing/Midwifery/Health	72.76±6.10	195.61	0.002**
	Paramedicine	72.33±7.17	181.79	
	Medical/Dental	74.83±5.05	233.09	
Grade	Associate degree	76.50±7.09	242.42	0.003**
	Undergraduate	72.50±6.86	183.01	
	Undergraduate	72.84±6.20	196.65	
	Ph.D.	75.16±4.70	237.94	

*Mann-Whitney, ** Kruskal-Wallis test

Considering that the data in the variable as the total risk perception in terms of the person infected with COVID-19 is not normally distributed, immediate family members being infected with COVID-19 and the participation in taking care of the COVID-19 patients, the non-parametric test of Mann-Whitney was used to compare the total risk perception at the levels of these variables. Because of the normal distribution not occurring in the variable as the total risk perception in terms of friends and relatives getting infected with COVID-19, the COVID-19 incurred death of the immediate family members, the death of friends and relatives due to COVID-19 and voluntary participation in taking care of the COVID-19 patients in the hospital, the independent parametric t-test parameter was used.

According to the results of the Mann-Whitney test, a significant difference was observed in the mean of the total risk perception in terms of individuals infected with COVID-19; therefore, the mean of the total risk perception was higher in the individuals with a history of COVID-19 (P=0.001). The results of the Mann-Whitney test demonstrated a significant difference in the mean of the total risk perception in

terms of the immediate family members infected with COVID-19; consequently, the mean of the total risk perception was higher in the individuals with a history of the COVID-19 among their immediate family members (P=0.001). The results of the independent t-test showed no significant difference in the mean of the total risk perception in terms of the friends and relatives being infected with the COVID-19 (P=0.085). The results of the independent t-test indicated no significant difference in the mean of the total risk perception in terms of the COVID-19 incurred death of the immediate family members (P=0.195). The results of the independent t-test revealed no significant difference in the mean of the total risk perception in terms of the immediate family members' death due to COVID-19 disease (P=0.003).

The results of the Mann-Whitney test reported a significant difference in the mean of the total risk perception in terms of participation in taking care of COVID-19 patients; therefore, the mean of the total risk perception was higher in the individuals with a history of participation in taking care of the COVID-19 patients (P=0.001).

The results of the independent t-test displayed a significant difference in the mean of the total risk perception in terms of voluntary participation in taking care of the COVID-19 patients in the hospital; therefore, the mean total risk perception was higher in the individuals with a history of voluntary participation in taking care of the COVID-19 patients in the hospital [P=0.038, Table 3].

With respect to the lack of normal distribution in the variables such as age, the total risk perception and its dimensions, the non-parametric test of Spearman's correlation coefficient was employed. As Spearman correlation coefficient results suggest, no significant correlation was observed between age and risk perception and its dimensions [P<0.05, Table 4].

It is also demonstrated a significant difference in the total mean of risk perception of the medical students regarding the incidence of COVID-19, and the mean total risk perception was higher in the students who had an immediate family member infected with COVID-19 (P=0.001).

Table 3. Comparing the mean of COVID-19-associated risk perception status of the participants regarding the COVID-19 disease in the hospital

		Dimension	Mean±SD	*P*-value
Total Risk Perception	Individuals' infection with COVID-19	No	71.10±7.06	0.001*
		Yes	74.16±5.88	
	Immediate family members infection with COVID-19	No	70.25±6.71	0.001*
		Yes	74.11±6.16	
	Friends' & relatives' infection with COVID-19	No	70.38±7.42	0.085**
		Yes	73.11±6.50	
	COVID-19 incurred the death of immediate family members	No	73.12±6.64	0.195**
		Yes	71.63±5.57	
	COVID-19 incurred the death of friends & relatives	No	71.74±7.03	0.003**
		Yes	73.76±6.13	
	Participating in taking care of COVID-19 patients	No	70.93±7.04	0.001*
		Yes	74.00±6.06	
	Voluntary participation in taking care of COVID-19 patients in hospitals	No	72.59±6.66	0.038**
		Yes	74.19±6.08	

*Mann-Whitney, ** Independent t-test

Table 4. Correlation between age, total COVID-19 associated risk perception, and its dimensions among the students of Mazandaran University of Medical Sciences

Study Variable	Cultural Dimension	Social Dimension	Political Dimension	Belief Dimension	Cognitive Dimension	Total Risk Perception
Age	r=0.042	r=0.002	r=0.005	r=0.082	r=0.053	r=0.023
	p=0.404	p=0.975	p=0.917	p=0.105	p=0.294	p=0.655

* Spearman's correlation coefficient

5. Discussion

Based on the findings of the present study, the students' risk perception of COVID-19 was ranked at a moderate level, and the mean total score of the students' risk perception was estimated as 72.98. In terms of the students' risk perception dimensions, the cognitive area had the highest score. A study conducted by Fazeli et al. (2022) reported that over 76% of the students had knowledge about the transmission modes and the nature of COVID-19 (19). In another descriptive and cross-sectional study performed online, the students acquired 70% of knowledge on COVID-19, which was at an acceptable level (20). In another study in Egypt that was conducted on the adult community, the mean score of knowledge was 16.39 out of 23. The people's source of knowledge was social media (66.9%) and the Internet (58.3%) (21).

The results of the present study revealed that the mean risk perception of the women did not differ significantly from that of the men, and the mean risk perception was significantly different in terms of their study major. The nursing students had higher risk perception scores than those of other study majors. In a study performed by Kermani et al.

(2019) to evaluate the medical students' knowledge level of COVID-19, the results denoted that the women's knowledge of COVID-19 disease prevention and transmission was significantly higher than that of men (22). In a study carried out by Bani Han et al. (2021) measuring the rate of COVID-19 infection among medical students, the results indicated the COVID-19 infection rate of the female students was slightly different from that of the male students (23). However, in the research of Prathibha et al. (2022), female students scored highly in preventive behaviors against COVID-19 (24).

According to the results of the current study, the mean risk perception revealed a significant difference regarding the study major. The nursing students obtained a higher risk perception score than students majoring in other fields of study. In another study investigating the level of knowledge and attitude of medical students towards COVID-19 in 2020, the total score of knowledge and attitude in nursing was significantly higher than other students of medical sciences (25). In the research of Prathibha et al. (2022), the risk perception score of pharmacy students was lower than that of the rest of the students, and the highest risk perception score was obtained by the nursing students (24).

In a study carried out by Saadat et al. (2021), individuals with a history of suspected COVID-19 symptoms conducted preventive behaviors more than those lacking such a history. The variables, namely, the history of close contact with a person infected with COVID-19 and its related anxiety and preventive behaviors, revealed no significant relationship. The results of the logistic regression displayed only this variable, that is, low-risk perception as a predictor of preventive behavior against COVID-19 (26, 27).

In this study, the results displayed that the total mean of risk perception was higher in the individuals with a history of COVID-19 incurred death of their friends and relatives. On the other hand, the results of a research conducted by Attema et al. (2021) showed that the personal experience of those infected with COVID-19 had no effect on their beliefs and risk perception of COVID-19 (28). Yet, in a study by Jie (2022), the risk perception of people who had contact with COVID-19 patients was higher (29).

In the present research, the findings revealed a significant difference in the total mean of risk perception in terms of participation in taking care of COVID-19 patients. Additionally, the mean total risk perception was higher in the individuals with a history of voluntary participation in taking care of the COVID-19 patients in hospitals. Moniz et al. (2022) reported that those with the experience of taking care of the COVID-19 patients had a higher risk perception than others (30). Kim et al. (2022) reported that more than two-thirds of the medical and nursing students in South Korea were willing to volunteer for taking care of COVID-19 patients. The level of COVID-19 diseases associated knowledge, attitude, and preventive behaviors were related to the students' willingness to participate in taking care of the COVID-19 patients (31). In a research performed in Saudi Arabia, the level of knowledge on COVID-19 disease was associated with preventive behaviors in nursing students. Therefore, the disasters-based educational course is required to be introduced into nursing students' curriculum, so that the nurses get prepared in the response phase to accidents and disasters in the hospitals at the desired level (32).

5.1. Limitations

Due to the quarantine conditions of the COVID-19 pandemic and virtual education conditions at the University of Medical Sciences, it was not possible to complete the questionnaire in person. This point is considered one of the limitations of the study.

6. Conclusion

In this study, the medical students' risk perception of COVID-19 disease was ranked at a moderate level. Risk perception exerts a direct effect on conducting preventive and protective behaviors. Medical students are considered role models in promoting the level of preventive measures against COVID-19 at the community level. Moreover, the medical students volunteer to provide medical care in hospitals and help to compensate the lack of human resources. Efforts needed to be made to boost the risk perception of medical students. It is suggested to put more emphasis on the dimensions of COVID-19-associated risk perception and the role of protective behaviors in reducing disease infection in the educational courses of medical students.

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Footnotes

Conflicts of Interest: None.
Authors' contribution: NA, TY: Methodology, Data collection, Data analysis, Interpretation, Drafting the article, and Revising. AZK: Methodology, Final revision of the manuscript, IA, GA, AJK: Critical Review of the manuscript. All authors contributed substantially to its revision, and TY takes accountability for the paper as a whole.
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Informed Consent: Informed consent was obtained from the respondents before answering the questions. Respondents were also informed that their participation was voluntary and they could withdraw from the study at any time. The involvement and information gathered from the respondents in this research were confidential.

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