Medical Sciences' Students Responses During the Late Phase of the COVID-19 Pandemic in Iran: A Comprehensive Investigation of the Risk Perception and Information Exposure

Mahan Shafie[1,2], Mahsa Mayeli[1,2], Hamed Hosseini[3], Mahnaz Ashoorkhani[4,5]

[1] *School of Medicine, Tehran University of Medical Sciences, Tehran, Iran*

[2] *NeuroTRACT Association, Students' Scientific Research Center, Tehran University of Medical Sciences, Tehran, Iran*

[3] *School of Public Health, Tehran University of Medical Sciences, Tehran, Iran*

[4] *Department of Health Promotion and Education, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran*

[5] *Community Based Participatory Research Center, Iranian Institute for Reduction of High-Risk Behaviors, Tehran University of Medical Sciences, Tehran, Iran*

Received: 21 Apr. 2021; Accepted: 11 Oct. 2021

Abstract- COVID-19 pandemic obligated applying population-level behavioral modifications to effectively prevent the spread of the disease. This necessitated investigating those measures that determine population behavior. Herein we have studied risk perception and information exposure that are among those determinants in Iran. 402 cases from medical sciences students were enrolled during the last week of September 2020. Using an online questionnaire, risk perception and sources of information about COVID-19 were investigated. Although most students considered COVID-19 preventable, merely a few considered the disease curable. A higher risk was perceived concerning the families compared to themselves. Moreover, most of them believed the prognosis good even in high-risk patients. Social media was the most informative source used; however, health professionals were considered the most reliable. The risk perception was equal between those diagnosed with COVID-19 or had a family member diagnosed compared to those without such exposure in most questions. Also, no significant difference was observed in risk perception between those students with serious underlying medical conditions and those without one regarding most items. Lastly, major and grade were the most significant demographic contributors to the risk perception. Moderate risk was perceived overall among the cases in which major and grade were the only remarkable demographic contributors. Unexpectedly, underlying medical history was not significantly correlated with the perceived risk. Lastly, previous COVID-19 exposure merely altered the curability and preventability perception.

Acta Med Iran 2021;59(12):704-712.

Keywords: Coronavirus disease 2019 (COVID-19); Risk perception; Information exposure; Medical sciences' students

Introduction

The outbreak of the coronavirus infection, first detected in China in December 2019, was declared a public health emergency by WHO as soon as January 2020. The disease was officially declared a global pandemic on February 12, 2020 (1).

The lack of a definite treatment or vaccines at the beginning of an epidemic necessitates the rapid development of non-pharmacological interventions, including modifying human behavior to manage the spread of disease. The most important behaviors in this regard are taking preventive measures such as compliance in wearing masks, hand hygiene, and social distancing (2). Understanding the various influencers of the individuals' behaviors and their perceived risk are

Corresponding Author: M. Ashoorkhani
Department of Health Promotion and Education, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran
Tel: +98 2188896692, Fax: +98 2188896696, E-mail address: ashoorkhani@tums.ac.ir

important to effectively control the epidemic. Whether individuals voluntarily engage in precautionary behaviors depends on their perceived risk of the current health threat. Risk perception is the main theme in common health behavior theories and is considered crucial for making health system decisions (3). Perceptions or beliefs about a specific risk are important in determining compliance with official advice. The current literature on the COVID-19 pandemic suggests that people may be more likely to comply with health-related recommendations if they perceive themselves to be at high risk (4).

Perceived risk is different in various educational and occupational groups. Health care workers are at higher risk compared to others in an infectious outbreak (5). Hospital-associated transmission was the most reported cause of infection in about 29% of health professionals (6). Therefore, perceived insecurity of the workplace for health care workers is understandable.

Medical sciences' students have close contact with the infected patients during their training course and are generally the first visit line in Iran. Therefore, acquiring the proper knowledge, risk perception, and right preventive behaviors are pivotal in this group. Therefore, this study was designed aiming to examine the risk perceptions and information exposure of these students at Tehran University of Medical Sciences (TUMS) during the COVID19 epidemic.

Materials and Methods

Design and participants

In this cross-sectional study, 402 students from TUMS were enrolled and completed the online questionnaire (developed on porsline.ir). The survey was conducted in the last week of September 2020. To ensure good coverage of all students from all four schools (medicine, dentistry, pharmacology, and public health) the survey was shared by the official social medias of each school. To avoid duplicated responses from the same respondent, the survey could only be taken once from the same electronic device.

The questionnaire was developed based on the concept of public risk perceptions and the epidemiological characteristics of COVID-19 for information exposure and was validated beforehand.

Measurements and definitions

Three domains of demographics, risk perception, and information exposure were investigated.

Demographics included age, sex, marital status, school of education, level of education, place of birth, history of a serious medical condition, and history of COVID-19 infection in the student or any family member.

Risk Perception was measured in both aspects of sensitivity and severity. Questions were on a 5-point Likert-type scale (totally disagree to strongly agree). Sensitivity was assessed using two questions: If you do not take precautions, how likely are you and your family to become infected with the COVID-19 virus? Severity was assessed by asking: how likely are high-risk patients to survive the COVID-19 virus? How lethal is COVID-19 in high-risk patients? Is COVID-19 curable or preventable?

Besides, Individuals were asked to compare the relative severity of COVID-19 and non-communicable diseases (cancer and diabetes) and other previous outbreaks (SARS and Influenza).

Then, respondents were asked about the sources from which they had obtained information about COVID-19. Seven options were presented: 1- Health system workers; 2- Family and friends; 3- National television; 4- International television; 5- Online search engines; 6- Official health websites; 7- Social networks. They were asked to choose three options for each question.

They also were asked about titles that they have searched for gathering information about COVID-19 in two periods of time: the early phase of the epidemic (first four weeks of COVID-19 epidemic) and the recent period of the epidemic (only last week). Eleven options were presented: 1- How the virus spreads; 2- How to prevent the disease; 3- What is the treatment of the COVID-19; 4- What happens if we infected; 5- Signs and symptoms of the COVID-19; 6- What should we do if we have been infected; 7- High-risk patients; 8- Number of people infected; 9- National government interventions; 10- International health organizations interventions; 11- WHO recommendations. They were asked to choose three options for each question.

Statistical analysis

The data were statistically analyzed using SPSS, Version 25, for Windows (SPSS Inc., Chicago, IL, USA). Kolmogorov-Smirnov test was applied to confirm the normality of the data. The demographics were summarized using means and standard deviations. Analysis of variance (ANOVA), t-tests, and chi-square was applied for comparing the sub-groups. A P of $P< 0.05$ was considered statistically significant in all

tests.

Results

Participants aged from 16 to 54 (mean age of cases 24.6±6.5). The male to female ratio was 173 to 229. Table 1 illustrates the demographics of the cases.

Table 2 shows the risk perceived by our participants in different areas of risk perception. It shows that students perceived a higher risk for their families rather than themselves. Although 258 students (65.1%) considered COVID-19 preventable, only 39 of them (9.7%) considered the disease curable. Moreover, most of them believed that even in high-risk patients, the prognosis is good, and COVID-19 is not very mortal. The total score of perceived risk by our participants was calculated 0.45 which has been considered moderate COVID-19 risk perception. In the section on relative risk perception, our participants thought COVID-19 is more lethal than Flu and diabetes and less lethal in comparison to SARS and cancer.

Table 1. Demographic characteristics of students (N=402)

Characteristics		N	%
Gender	Male	173	43
	Female	229	57
Marital status	Single	338	84.1
	Married	64	15.9
Major	Medicine	175	43.5
	Dentistry	55	13.7
	Pharmacology	67	16.7
	Public health	105	26.1
Grade	Undergraduate (year 1 to 4)	145	36.1
	Master (year 5, 6)	83	20.6
	Doctorate (7+)	174	43.3
Home location	Tehran	203	50.5
	Other cities of Iran	199	49.5
History of COVID-19 infection	Yes	94	23.4
	No	308	76.6
Previous medical condition	Yes	30	92.5
	No	372	7.5

Table 3 shows the most popular and the most trusted sources of information. Social networks were the most used (253 students). 198 students reported asking health system workers for information, and the online search engine was in the third rank, with 153 students using it. The most trusted source, though, was health system workers. Official health websites and online search engines gained the most trust in the next rank.

Table 4 shows the related searches during the first four weeks of the pandemic compared to the last week before the study. During the first four weeks, the most searched title was signs and symptoms of COVID-19 (211 cases). 193 participants reported that their main question during the first four weeks was how to prevent the disease and after those 156 participants searched for the number of people infected. While in the last week before the study, the most searched title was the number of people infected. Questions about signs and symptoms of COVID-19 were also still at the top of the list.

The risk perception was equal between the students that were diagnosed with COVID-19 or had a family member diagnosed with COVID-19 compared to those

without such exposure regarding the total score of sensitivity, severity, and total risk perception score (*P*=0.996, 0.230, and 0.371, respectively). We also compared risk perception between students who reported having serious medical conditions with those without any medical issues. Participants with positive medical history had a significantly higher score of risk perception sensitivity (*P*=0.004). However, there was no statistical difference between these groups regarding severity of risk perception and total risk perception (Table 5, 6).

Table 7, 8 illustrates the comprehensive correlation analysis regarding the demographic characteristics of the cases with each question of the COVID-19 risk perception questionnaire. Significant correlations were found between the followings: Total sensitivity of risk perception and gender, total sensitivity of risk perception and educational grade, total risk perception, and gender. Sensitivity of risk perception and total risk perception were significantly higher among women (*P*=0.001, 0.029, respectively). However, there was no significant difference between men and women regarding the severity of risk perception (*P*=0.803). Besides, total sensitivity of risk perception was associated with grades in such a way that students with higher grades had higher scores in the sensitivity domain (*P*=0.008).

Table 2. Risk Perception of COVID-19 (N=402)

Risk Perception		Score					
		-2	-1	0	1	2	M (SD)
Sensitivity	How likely are you to become infected with the COVID-19 virus?	24 (6%)	60 (14.9%)	182 (45.3%)	77 (19.2%)	59 (14.7%)	0.21 (1.05)
	How likely are your family to become infected with the COVID-19 virus?	5 (1.2%)	17 (4.2%)	69 (17.2%)	130 (32.3%)	181 (45%)	1.15 (0.93)
	How likely are high-risk patients to survive the COVID-19 virus if you have been infected?	5 (1.2%)	5 (1.2%)	45 (11.2%)	192 (47.8%)	155 (38.6%)	1.21 (0.78)
	Total Sensitivity of Risk Perception						0.69 (0.88)
Severity	COVID-19 is curable	74 (18.4%)	126 (31.3%)	163 (40.5%)	33 (8.2%)	6 (1.5%)	0.56 (0.93)
	COVID-19 is preventable	10 (2.5%)	31 (7.7%)	103 (25.6%)	163 (40.5%)	95 (23.6%)	0.75 (0.98)
	How lethal is COVID-19 in high-risk patients?	24 (6%)	123 (30.6%)	203 (50.5%)	45 (11.2%)	7 (1.7%)	0.27 (0.80)
	Total Severity of Risk Perception						0.33 (0.54)
	Total Risk Perception						0.45 (0.48)
Relative Severity	The lethality of Flu is higher than COVID-19	47 (11.7%)	133 (33.1%)	111 (27.6%)	94 (23.4%)	17 (4.2%)	0.24 (1.06)
	The lethality of SARS is higher than COVID-19	11 (2.7%)	74 (18.4%)	121 (30.1%)	155 (38.6%)	41 (10.2%)	0.35 (0.98)
	The lethality of Diabetes Mellitus is higher than COVID-19	38 (9.5%)	103 (25.6%)	120 (29.9%)	117 (29.1%)	24 (6%)	0.03 (1.07)
	The lethality of Cancer is higher than COVID-19	11 (2.7%)	50 (12.4%)	101 (25.1%)	155 (38.6%)	85 (21.1%)	0.62 (1.03)

M, mean; SD, standard deviation

Table 3. Information exposure (asked to choose three options) (N=402)

Information sources	Which sources they used n	Which sources they trusted n
Doctors, Nurses, and other health system workers (HSW)	198	212
Family and friends	78	22
National television	125	49
International television	45	37
Online search engines	153	102
Official health websites	146	160
Social networks	253	62

Table 4. What our participants were looking for COVID-19 during the first four weeks and the last week of the epidemic (asked to choose three options) (N=402)

Searched titles	First four weeks n	Last week n
How the virus spreads	138	108
Number of people infected	156	214
How to prevent the disease	193	104
What is the treatment of the COVID-19	59	101
Signs and symptoms of the COVID-19	211	110
International health organizations interventions	14	11
What should we do if we have been infected	58	51
High-risk patients	42	21
What happens if we infected	70	48
National government interventions	15	47
WHO recommendations	84	102

Table 5. Analysis of risk perception among students with a different medical history

Risk Perception	Do you have any serious medical condition	Risk perception score M (SD)	*P*
How likely are you to become infected with the COVID-19 virus?	Yes No	0.73 (1.04) 0.17 (1.05)	0.005
How likely are your family to become infected with the COVID-19 virus?	Yes No	1.53 (0.77) 1.13 (0.94)	0.022
Total Sensitivity of Risk Perception	Yes No	1.13 (0.80) 0.65 (0.88)	0.004
How likely are high-risk patients to survive the COVID-19 virus if you have been infected?	Yes No	-0.20 (0.84) -0.28 (0.80)	0.580
COVID-19 is curable	Yes No	-0.67 (0.99) -0.56 (0.92)	0.554
COVID-19 is preventable	Yes No	1.00 (0.87) 0.73 (0.98)	0.150
How lethal is COVID-19 in high-risk patients?	Yes No	1.07 (0.86) 1.22 (0.77)	0.294
Total Severity of Risk Perception	Yes No	0.23 (0.46) 0.33 (0.54)	0.260
Total Risk Perception	Yes No	0.53 (0.38) 0.44 (0.49)	0.310
The lethality of Flu is higher than COVID-19	Yes No	-0.30 (1.31) -0.24 (1.04)	0.030
The lethality of SARS is higher than COVID-19	Yes No	0.17 (0.83) 0.37 (0.99)	0.016
The lethality of Diabetes Mellitus is higher than COVID-19	Yes No	-0.30 (1.17) -0.01 (1.07)	0.395
The lethality of Cancer is higher than COVID-19	Yes No	0.73 (0.90) 0.62 (1.04)	0.202

M, mean; SD, standard deviation

Table 6. Analysis of risk perception among students with different COVID-19 exposure

Risk Perception	You or any other person in your family have been diagnosed with COVID-19	Risk perception score M (SD)	*P*
How likely are you to become infected with the COVID-19 virus?	Yes	0.24 (1.06)	0.768
	No	0.20 (1.05)	
How likely are your family to become infected with the COVID-19 virus?	Yes	1.12 (0.89)	0.732
	No	1.16 (0.95)	
Total Sensitivity of Risk Perception	Yes	0.69 (0.85)	0.996
	No	0.69 (0.89)	
How likely are high-risk patients to survive the COVID-19 virus if you have been infected?	Yes	-0.08 (0.89)	0.008
	No	-0.34 (0.76)	
COVID-19 is curable	Yes	-0.50 (1.06)	0.454
	No	-0.59 (0.88)	
COVID-19 is preventable	Yes	0.71 (1.11)	0.692
	No	0.76 (0.94)	
How lethal is COVID-19 in high-risk patients?	Yes	1.20 (0.81)	0.896
	No	1.21 (0.77)	
Total Severity of Risk Perception	Yes	0.27 (0.58)	0.230
	No	0.34 (0.53)	
Total Risk Perception	Yes	0.41 (0.49)	0.371
	No	0.46 (0.48)	
The lethality of Flu is higher than COVID-19	Yes	-0.42 (1.09)	0.063
	No	-0.19 (1.05)	
The lethality of SARS is higher than COVID-19	Yes	0.47 (0.93)	0.186
	No	0.31 (0.99)	
The lethality of Diabetes Mellitus is higher than COVID-19	Yes	0.05 (1.04)	0.367
	No	-0.06 (1.09)	
The lethality of Cancer is higher than COVID-19	Yes	0.58 (1.06)	0.637
	No	0.64 (1.02)	

M, mean; SD, standard deviation

Table 7. Risk Perception by demographic characteristics

		How likely are you to become infected with the COVID-19 virus?	How likely are your family to become infected with the COVID-19 virus?	How lethal is COVID-19 in high-risk patients?	COVID-19 is curable	COVID-19 is preventable	How likely are high-risk patients to survive the COVID-19 virus if	The lethality of SARS is higher than COVID-19	The lethality of Flu is higher than COVID-19	The lethality of Diabetes Mellitus is higher than COVID-19	The lethality of Cancer is higher than COVID-19
		Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Sex	**Male**	0.05 (1.07)	0.99 (1.03)	1.25 (0.77)	-0.62 (0.97)	0.82 (1.00)	-0.21 (0.86)	0.42 (1.00)	-0.24 (1.14)	0.09 (1.16)	0.77 (1.07)
	Female	0.34 (1.03)	1.28 (0.84)	1.18 (0.79)	-0.53 (0.91)	0.70 (0.97)	-0.33 (0.76)	0.30 (0.97)	-0.25 (1.01)	-0.13 (1.01)	0.52 (0.99)
P		0.479	0.275	0.845	0.332	0.703	0.278	0.791	0.032	0.004	0.420
Marital status	**Single**	0.16 (1.05)	1.16 (0.94)	1.19 (0.80)	-0.59 (0.91)	0.74 (0.97)	-0.27 (0.82)	0.34 (0.97)	-0.26 (1.07)	0.01 (1.08)	0.67 (1.01)
	Married	0.50 (1.05)	1.16 (0.95)	1.31 (0.71)	-0.45 (1.05)	0.81 (1.05)	-0.33 (0.74)	0.42 (1.05)	-0.19 (1.08)	-0.28 (1.05)	0.42 (1.13)
P		0.320	0.358	0.936	0.087	0.271	0.372	0.361	0.800	0.455	0.042
Major	**Medicine**	0.05 (1.03)	1.08 (1.00)	1.19 (0.82)	-0.60 (0.91)	0.59 (1.10)	-0.26 (0.88)	0.31 (1.03)	-0.27 (1.05)	0.19 (1.02)	0.77 (1.02)
	Dentistry	0.40 (1.01)	1.31 (0.79)	1.15 (0.89)	-0.70 (0.92)	0.75 (0.86)	-0.42 (0.71)	0.31 (0.79)	-0.25 (1.14)	-0.22 (1.12)	0.49 (1.02)
	Pharmacology	0.10 (0.92)	1.21 (0.93)	1.27 (0.75)	-0.54 (0.88)	0.84 (0.81)	-0.24 (0.68)	0.34 (0.93)	-0.07 (1.09)	0.13 (1.10)	0.90 (0.89)
	Public health	0.47 (1.15)	1.17 (0.90)	1.25 (0.69)	-0.47 (1.00)	0.96 (0.90)	-0.27 (0.80)	0.44 (1.04)	-0.31 (1.06)	-0.43 (1.03)	0.30 (1.06)
P		0.006	0.416	0.774	0.476	0.020	0.583	0.761	0.528	0.000	0.000
Grade	**Undergraduate**	0.01 (1.01)	1.01 (1.02)	1.15 (0.88)	-0.59 (0.89)	0.77 (0.96)	-0.30 (0.81)	0.36 (1.01)	-0.24 (1.13)	0.03 (1.15)	0.82 (1.01)
	Master	0.28 (1.11)	1.14 (0.93)	1.24 (0.76)	-0.36 (0.98)	0.71 (1.05)	-0.37 (0.86)	0.35 (1.04)	-0.34 (1.07)	-0.20 (1.01)	0.37 (0.98)
	Doctorate	0.36 (1.06)	1.28 (0.86)	1.25 (0.71)	-0.65 (0.94)	0.75 (0.97)	-0.22 (0.77)	0.34 (0.93)	-0.21 (1.02)	-0.01 (1.04)	0.59 (1.05)
P		0.013	0.039	0.519	0.063	0.902	0.335	0.992	0.658	0.264	0.006
Home location	**Tehran**	0.26 (1.05)	1.14 (0.90)	1.27 (0.75)	-0.54 (0.95)	0.81 (0.97)	-0.30 (0.87)	0.38 (0.94)	-0.22 (1.12)	-0.09 (1.09)	0.56 (1.09)
	Other cities	0.17 (1.07)	1.17 (0.98)	1.16 (0.81)	-0.60 (0.91)	0.69 (0.99)	-0.26 (0.73)	0.32 (1.02)	-0.28 (1.02)	0.02 (1.07)	0.70 (0.99)
P		0.576	0.376	0.544	0.871	0.494	0.015	0.232	0.174	0.261	0.103

Table 8. Total Risk Perception by demographic characteristics

		Total Risk Perception Sensitivity	Total Risk Perception Severity	Total Risk Perception
		Mean (SD)	Mean (SD)	Mean (SD)
Sex	Male	0.52 (0.93)	0.32 (0.56)	0.39 (0.49)
	Female	0.81 (0.83)	0.33 (0.52)	0.49 (0.47)
P		0.001	0.803	0.420
Marital status	Single	0.66 (0.88)	0.33 (0.54)	0.44 (0.48)
	Married	0.83 (0.90)	0.32 (0.53)	0.49 (0.49)
P		0.162	0.913	0.442
Major	Medicine	0.57 (0.90)	0.36 (0.58)	0.43 (0.50)
	Dentistry	0.85 (0.77)	0.38 (0.55)	0.54 (0.47)
	Pharmacology	0.66 (0.78)	0.30 (0.48)	0.42 (0.45)
	Public health	0.82 (0.94)	0.25 (0.50)	0.44 (0.47)
P		0.051	0.343	0.520
Grade	Undergraduate	0.51 (0.90)	0.32 (0.54)	0.38 (0.46)
	Master	0.71 (0.91)	0.32 (0.59)	0.45 (0.50)
	Doctorate	0.82 (0.83)	0.34 (0.52)	0.50 (0.49)
P		0.008	0.910	0.098
Home location	Tehran	0.67 (0.91)	0.33 (0.52)	0.45 (0.51)
	Other cities	0.70 (0.85)	0.32 (0.56)	0.45 (0.46)
P		0.746	0.840	0.963

Discussion

This study was conducted aiming to assess risk perception and information exposure among medical sciences students in various subgroups. The study took place in the last week of September 2020, when the number of newly diagnosed COVID-19 cases was descending, and some of the quarantine policies were replaced by normal conditions.

Medical sciences students were chosen as the study population due to their high exposure that necessitates early evaluation and intervention. The nature of student life, particularly dorm life, as well highlights their role as a viral carrier in spreading the pandemic. Early assessment of these students can help to define functional strategies against the vaster spread of the pandemic.

In the course of a pandemic, populations' risk perception is the lead cause of appropriate behavioral modifications. Cognitive risk perception was shown to remarkably alter individualized norms regarding certain social activities (7). This necessitates the evaluation of risk perception in high-risk groups.

Former works conducted at the initial days of the pandemic on the general population have reported remarkably high rates, with 89% perceived susceptibility in one study (8). In our study, however, sensitivity and severity of risk perception were moderate among participants. One former research conducted in Iran in February 2020 was in agreement with our results (9). In another recent work, most of the participants reported uncertainty and fear about the spreading of COVID-19, and the study showed that the role of social media on risk perception was notable (10). Risk perception investigation of COVID-19 among Chinese students as well showed high-risk perception in college students, while the risk perception was higher among non-medical students compared to medical students (11). This decreased perceived risk might suggest the possible role of desensitization. However, further works are required to better illustrate the possible correlation between time passing and reduced risk perception independent of the mortality rate in the course of a pandemic.

A comprehensive investigation of the correlations between demographic features was conducted with each question of the COVID-19 risk perception questionnaire (Table 8). The students' major was significantly correlated with their assessment of the likelihood of getting infected by COVID-19. Based on our results, medical students scored less on this item than pharmacy, dentistry, and public health students respectively, which is unexpected regarding the nature of these occupations. This finding is in agreement with former evaluations on the correlation between the major and fear of getting infected by COVID-19 (12). Major was also significantly correlated with the cases' evaluation of the preventability of the COVID-19 and also in comparing the lethality of

diabetic mellitus and cancer with the COVID-19. Also, single participants found cancer to be significantly more lethal than COVID-19. Grade was another significant correlate of cases' estimate of the likelihood of getting infected by COVID-19 and having their families infected by COVID-19, in the way than doctorate level students found this likelihood remarkably higher both for themselves and for their families. Moreover, master students scored the least regarding finding cancer to be more lethal than COVID-19. Lastly, those living in the capital found the role of the underlying medical conditions significantly higher in the mortality of the COVID-10 compared to the other cities. Overall, major and grade are the most remarkable contributors to the COVID-19 risk perception, particularly regarding the sensitivity assessment.

Social networks were the most used sources reported by students, however, it was in the fourth rank after health system workers, official health websites, and online search engines in trusted sources. Information obtained from health system workers were the second most used source and the most trusted source among our participants. Our results overall suggest that online search engines and official health websites were considered as frequently used and reliable sources among students. Other studies conducted on general population samples as well revealed social networks to be the most used information source (up to 81% in one study) (13).

Signs and symptoms of COVID-19 were the most common question during the first four weeks of the epidemic and also the second most repetitive search title during the last week before the study. The number of infected people was the most searched question during the last week and the third one during the first four weeks. Besides, the mechanism of virus spreading and prevention of the disease were important and common questions in both periods. Also, more students searched for treatment options in the last week of this study compared to the early days.

Also, our results indicated that students perceived higher risk of acquiring the disease for their family and parents compared to themselves. This might be due to the age-related susceptibility of COVID-19. Moreover, applying behavioral modifications is remarkably easier for younger generations, which also emphasizes the higher risk of COVID-19 for elderlies. In agreement with our results, a former study on risk perception in China, students considered higher risk perception about their family in contrast to their own risk as well (11).

Our results demonstrated no statistically significant difference between the risk perceptions measures of those students whose family members have been diagnosed with COVID-19 compared to those without such exposure in almost all areas of risk perception. The students whose family members have been diagnosed with COVID-19, however, believed COVID-19 to be more curable and less preventable in comparison to those whose family members had not been exposed. As opposed to our results, a former study conducted on the general Iranian population reported a higher score for different domains of risk perception except for susceptibility in those participants with confirmed COVID-19 diagnosis. Moreover, there was no difference in perceived susceptibility and severity between participants with a history of COVID-19 in their family members and participants without a history (14). Moreover, another prior work examining the variations in COVID-19 related anxiety perception between those medical students who had a close relative infected by COVID-19 compared to those without such experience yielded a significantly higher rate in those with a close experience (15). Considering those prior studies being conducted as early as the first months of the pandemic compared to ours in the late phase of the pandemic, time passing might have led to this observed desensitization. Furthermore, prior works have emphasized the role of personality traits, including conscientiousness, neuroticism and etc., in predicting the COVID-19 risk perception (16). Since the data regarding these traits were not obtained in this study, selection bias might have led to this result, and future studies are required to thoroughly investigate the possible correlates.

We also compared risk perception between students who reported having serious medical conditions and those without any medical issues. Unexpectedly, the difference between these two groups was statistically insignificant. Since both cognitive and emotional dimensions are influential in risk perception, both should be considered to yield valid and reliable results (17). Therefore, this result might be due to the mere utilization of questionnaires for assessing risk perception. Eventually, further studies are required to better elaborate on this finding. It is noteworthy that in the study of risk perception in the Iranian general population, they reported that participants with no chronic disease had a significantly higher score for risk perception (14).

Also, Students with serious medical conditions believed that COVID-19 is more lethal than both SARS and seasonal Flu. This finding is in accordance with former studies, indicating that COVID-19 risk perception was remarkably higher compared to other potential health threats, particularly in the early phase of the pandemic

(18). This necessitates applying tailoring measures when communicating information to various socio-economic and educational groups of the general population.

Eventually, considerable limitations remain to overcome to better understand this aspect of this pandemic. An online survey was utilized in this study due to the epidemic restrictions which although accelerated the data gathering process and reduced the costs, eliminated applying systematic samplings. Moreover, the cross-sectional design was applied in this research, which eliminates interpretations of the results to mere correlations rather than causality. More accurate tests compared to questionnaires are also to be applied to better understand the nature of risk perception and applying preventive measures in the course of this pandemic.

Our overall results indicate moderate perceived risk among the medical sciences' students that is in agreement with those studies conducted in the early phase of the pandemic. Also, major and grade were the only remarkable demographic contributors in forming the risk perception. Unexpectedly, underlying medical history was not significantly correlated with the perceived risk. Lastly, previous COVID-19 exposure merely altered the curability and preventability perception. Further studies are required though to better illustrate the causality of their contributors.

References

1. Sun J, He WT, Wang L, Lai A, Ji X, Zhai X, et al. COVID-19: Epidemiology, Evolution, and Cross-Disciplinary Perspectives. Trends Mol Med 2020;26:483-95.
2. Tomczyk S, Rahn M, Schmidt S. Social Distancing and Stigma: Association Between Compliance With Behavioral Recommendations, Risk Perception, and Stigmatizing Attitudes During the COVID-19 Outbreak. Front Psychol 2020;11:1821.
3. Burns WJ, Slovic P. Risk perception and behaviors: anticipating and responding to crises. Risk Anal 2012;32:579-82.
4. Dryhurst S, Schneider CR, Kerr J, Freeman ALJ, Recchia G, van der Bles AM, et al. Risk perceptions of COVID-19 around the world. J Risk Res 2020;23:994-1006.
5. Nguyen LH, Drew DA, Joshi AD, Guo C-G, Ma W, Mehta RS, et al. Risk of COVID-19 among frontline healthcare workers and the general community: a prospective cohort study. medRxiv. Preprint 2020.
6. Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, et al. Clinical Characteristics of 138 Hospitalized Patients With 2019 Novel Coronavirus-Infected Pneumonia in Wuhan, China. JAMA 2020;323:1061-9.
7. Bae SY, Chang PJ. The effect of coronavirus disease-19 (COVID-19) risk perception on behavioral intention towards 'untact' tourism in South Korea during the first wave of the pandemic (March 2020). Curr Issues Tour 2020;24:1-19.
8. Kwok KO, Li KK, Chan HHH, Yi YY, Tang A, Wei WI, et al. Community Responses during Early Phase of COVID-19 Epidemic, Hong Kong. Emerg Infect Dis 2020;26:1575-9.
9. Taghrir MH, Borazjani R, Shiraly R. COVID-19 and Iranian Medical Students; A Survey on Their Related-Knowledge, Preventive Behaviors and Risk Perception. Arch Iran Med 2020;23:249-54.
10. Motta Zanin G, Gentile E, Parisi A, Spasiano D. A Preliminary Evaluation of the Public Risk Perception Related to the COVID-19 Health Emergency in Italy. Int J Environ Res Public Health 2020;17:3024.
11. Ding Y, Du X, Li Q, Zhang M, Zhang Q, Tan X, et al. Risk perception of coronavirus disease 2019 (COVID-19) and its related factors among college students in China during quarantine. PLoS One 2020;15:e0237626.
12. Zolotov Y, Reznik A, Bender S, Isralowitz R. COVID-19 Fear, Mental Health, and Substance Use Among Israeli University Students. Int J Ment Health Addict 2020;1-7.
13. Asnakew Z, Asrese K, Andualem M. Community Risk Perception and Compliance with Preventive Measures for COVID-19 Pandemic in Ethiopia. Risk Manag Healthc Policy 2020;13:2887-97.
14. Jahangiry L, Bakhtari F, Sohrabi Z, Reihani P, Samei S, Ponnet K, et al. Risk perception related to COVID-19 among the Iranian general population: an application of the extended parallel process model. BMC Public Health 2020;20:1571.
15. Cao W, Fang Z, Hou G, Han M, Xu X, Dong J, et al. The psychological impact of the COVID-19 epidemic on college students in China. Psychiatry Res. 2020;287:112934.
16. Abdelrahman M. Personality Traits, Risk Perception, and Protective Behaviors of Arab Residents of Qatar During the COVID-19 Pandemic. Int J Ment Health Addict 2020;1-12.
17. Yıldırım M, Güler A. Factor analysis of the COVID-19 Perceived Risk Scale: A preliminary study. Death Stud 2020;1-8 .
18. Zhong Y, Liu W, Lee TY, Zhao H, Ji J. Risk perception, knowledge, information sources and emotional states among COVID-19 patients in Wuhan, China. Nurs Outlook 2021;69:13-21.