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ARAŞTIRMA / RESEARCH

Risk perception and preventive behaviors among Turkish medical students during early period of the COVID-19 pandemic

COVID-19 pandemisi erken döneminde Türk tıp öğrencilerinin risk algısı ve korunmaya yönelik davranışları

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Abstract

Purpose: The aim of this study was to assess COVID-19 related risk perception, preventive behaviors among Turkish medical students within the two weeks after the onset of the COVID-19 pandemic in Turkey.

Materials and Methods: This cross-sectional study was conducted among 646 medical students (1st-6th year) in Pamukkale University with an online questionnaire. Forms were collected between 23rd to 31st of March 2020 via Google form. The questionnaire consisted of 39 questions including 12 items about sociodemographic information, 6 questions regarding COVID-19, 11 items about risk perception and 10 items regarding preventive measures about COVID-19.

Results: The mean age of students was 21.77±2.28 years and 413 (63.8%) of them were female. The mean risk perception score of students was 22.70±4.68 (out of 44) and the mean preventive behavior score of students was 32.20±4.70 (out of 40). There was a significantly positive correlation between risk perception and preventive behavior scores. Female students, students with lower income, students whose mothers were highly educated, students who evaluated their health status as poor and who evaluated their knowledge about COVID-19 as insufficient had higher risk perception. Adoption of protective measures were higher in female students, married students, students who have chronic diseases and students who evaluated their health status as poor.

Conclusion: Medical students in Turkey had a moderate risk perception and high preventive behaviors about COVID-19. In order to enhance students' risk perception, educators should be more involved in the process of medical education regarding the pandemic.

Keywords: COVID-19 pandemic; medical student; risk perception; health behavior; prevention.

Öz

Amaç: Bu çalışmanın amacı, Türkiye'de pandeminin başlamasından sonraki iki hafta içinde Türk tıp öğrencilerinin COVID-19 ile ilgili risk algılarını ve korunmaya yönelik davranışlarını değerlendirmektir.

Gereç ve Yöntem: Kesitsel tipteki bu çalışma, Pamukkale Üniversitesi'ndeki 646 tıp öğrencisi (1-6. sınıf) arasında çevrimiçi bir anketle gerçekleştirilmiştir. Formlar 23-31 Mart 2020 tarihleri arasında Google formlar aracılığıyla toplanmıştır. Anket sosyo-demografik bilgilerle ilgili 12 madde, COVID-19 ile ilgili 6 soru, risk algısı ile ilgili 11 madde ve COVID-19 ile ilgili korunmaya yönelik davranışlarla ilgili 10 madde olmak üzere toplam 39 sorudan oluşmaktadır.

Bulgular: Çalışmaya katılan öğrencilerin yaş ortalaması 21.77±2.28 olup, 413'ü (63.8%) kadındır. Öğrencilerin ortalama risk algısı puanı 22.70±4.68 (44 üzerinden) ve öğrencilerin korunmaya yönelik davranış puanı ortalaması 32.20±4.70 (40 üzerinden) idi. Risk algısı ile korunmaya yönelik davranış puanları arasında anlamlı pozitif korelasyon vardı). Kız öğrenciler, düşük gelirli öğrenciler, anneleri yüksek eğitim almış öğrenciler, sağlık durumlarını kötü olarak değerlendiren öğrenciler ve COVID-19 hakkındaki bilgilerini yetersiz olarak değerlendiren öğrencilerin risk algısı daha yüksekti. Kız öğrencilerde, evli öğrencilerde, kronik hastalığı olanlarda ve sağlık durumunu kötü olarak değerlendiren öğrencilerde korunmaya yönelik davranışları daha yüksekti.

Sonuç: Türkiye'deki tıp öğrencilerinin COVID-19 ile ilgili risk algısı orta düzeyde olup korunmaya yönelik davranışları yüksektir. Öğrencilerin risk algısını geliştirmek için, eğitimcilerin salgınla ilgili tıp eğitimi sürecine daha fazla dahil olması gerekmektedir.

Anahtar kelimeler: COVID-19 pandemisi; tıp öğrencisi; risk algısı; sağlık davranışı; korunma.

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INTRODUCTION

A novel Coronavirus type (2019-nCoV) was identified as the cause of an outbreak of acute respiratory illness in Wuhan, a city in the Hubei province of China on 31 December 2019[1]. This virus caused an epidemic in China; also, virus quickly spread in other countries. Many cases have been reported in other countries as well as in Turkey. In view of the growing number of cases, deaths and affected countries, the World Health Organization (WHO) has declared the outbreak COVID-19 as a pandemic on March 11th, 2020[2]. Ministry of Health of Turkey announced its first case of the COVID-19 on March 11, 2020[3]. As of December 9, 2020, there had been 558.517 COVID-19 patients and 15.531 deaths due to the virus in Turkey[4].

On March 12, 2020, it is announced that all primary, secondary schools and universities in Turkey will be closed starting from March 16, 2020[5]. Including medical faculties, on 26 March, 2020 education in universities decided to be carried out via distance and digital learning[6]. So, medical students (1st-6th year) in Turkey did not take active role in hospitals or primary health care settings during early period of COVID-19 pandemic. But, as seen in previous pandemics, shortage of healthcare professionals could occur due to illness and an increased demand for healthcare personnel could arise. In case of healthcare system suffers from a personnel shortage during COVID-19 pandemic, it is essential to determine the perceptions, attitudes and behaviors of medical students and prepare them before utilizing these students during large patient care.

Also, medical students have responsibilities different from those of other students. Their attitudes, activities, behaviors can affect public especially their family, relatives, neighbors...etc. People may see medical students as knowledgeable and may consider them to have the same responsibilities and duties as a doctor[7]. Public awareness of dealing with highly infectious respiratory diseases plays a vital role in limiting the spread of the infection, especially in middle and low-income countries[8]. People's adherence to the recommended preventive measures is essential for controlling the spread of COVID-19 pandemic[9] and it is known that individuals' knowledge, attitudes, and behaviors are important in combating infectious diseases[10,11]. Particularly, due to the large amount of insufficient information, misinformation, and misconceptions about COVID-19 that are available on internet; the awareness, attitude, and behavior assessment of the public toward such pandemics is crucial[12]. Thus, it is important to examine the awareness, attitude, and behaviors of medical students in such an early period of COVID-19 pandemic in terms of education. So, we could correct via distance digital learning any misconceptions that the students may have and also, we can contribute to developing a fit for purpose education program that raise awareness among future practitioners.

This study aimed to assess risk perception and preventive behaviors regarding COVID-19 among Turkish medical students during the early period of the COVID-19 outbreak.

MATERIALS AND METHODS

This cross-sectional study was conducted among Pamukkale University medical faculty students (1st-6th year). The total population of the study was 1364 medical students. The population and sample of the study were shown in Table 1. Study was approved by Pamukkale University Ethics Committee (ref:60116787-020/34284) and Turkey Ministry of Health COVID-19 Scientific Research Platform.

Data collection

The survey was taken from March 23 to 31, 2020, an early period of COVID-19 outbreak in Turkey, within 2 weeks after the first COVID-19 case announced (one week after the universities closed) to 3rd week of outbreak. Data were collected using an online self-administered questionnaire tool (Google forms). The link of Google form was distributed to students directly via class representatives using WhatsApp Group of students for each class. Students were informed about objectives of the study and confidentiality at the beginning of the survey. Online informed consent was obtained from all participants. Participation in this study was voluntary and the identification information of students was not recorded anywhere on the questionnaire. To minimize the missing data, the participants were requested to answer all the questions or else could not proceed to the next page. The total number of participants in this study was 646 (%47.36) medical students. The percentages of students by class were shown in Table 1.

Measures

The questionnaire consisted of four sections with a total number of 39 questions: socio-demographic data (12 questions), COVID-19 related questions (6 questions), risk perception (11 questions) and self-reported preventive behaviors (10 questions). Socio-demographic information included age, gender, marital status, family income status, level of education of students and their parents, accommodation, smoking status, chronic disease status, source of information about COVID-19. The third part evaluated the students' risk perception regarding COVID-19 infection. There were 11 items. These items were rated using a 5-point Likert scale with the options of "absolutely agree (4 point)", "agree (3 point)", "neither agree or disagree (2 point)", "disagree (1 point)", "absolutely disagree (0 point)". There were two reverse coded items. The lowest possible score from the risk perception questions was 0 and the highest was 44 point. As the score increases, students' risk perception about COVID-19 increases. The fourth part evaluated the students' preventive behaviors during COVID-19 pandemic. These items are also rated using a 5-point Likert scale with the options of "always (4 point)", "frequently (3 point)", "occasionally (2 point)", "rarely (1 point)", "never (0 point)". There were 10 items (with no reverse coded items). The lowest possible score from the preventive behavior questions was 0 and the highest was 40 point. Validation of items was established by five experts including two public health specialist, one infectious disease specialist and two epidemiologists.

Statistical analysis

Data were analyzed using the R statistical package (R version 3.6.2). The frequencies and percentages were computed for categorical variables and the means, standard deviations, median and interquartile ranges were calculated for numerical variables. Kolmogorov-Smirnov test was used to assess normality of distribution of continuous variables. None of the major outcomes followed a normal distribution. The Mann–Whitney *U* test was used for comparison of two independent groups, and more than two independent groups were compared with the Kruskal–Wallis test. Spearman's rank-correlation test used for calculation of Spearman rho coefficient between risk perception score and preventive behavior score. $P<.05$ (2-sided) was considered statistically significant.

RESULTS

A total of 646 medical students responded to the questionnaire. Among them, a total of 104 (16.1%), 119 (18.4%), 119 (18.4%), 95 (14.7%), 125 (19.3%) and 84 (13.0%) students were from first, second, third, fourth, fifth and sixth year, respectively (Table 1). The mean age of students was 21.77±2.28 years. Among the participants, 413 (63.8%) were female, 638 (98.8%) were single. 85 students (13.1%) stated that their parents' income was not enough. 35.1% of students' mothers (n=227) had less than a high school education and 22.4% of students' fathers (n=145) had less than a high school education. 18.2% of students (n=118) were current smoker and 7.0% (n=45) were ex-smoker. 13.5% of students (n=87) reported that they have some chronic illness. Only 1.6% of the students (n=10) stated their health status as poor or very poor. 2.6% of students (n=17) stated that they received influenza vaccination in the last season. The socio-demographic and health-related characteristics of the students were presented in Table 2.

While 61.7% of the participants considered their level of knowledge about COVID-19 as very good or good, only 35.4% reported that they attended an informational meeting on COVID-19. Vast majority of students (96.0%) stated that they were following news and updates about COVID-19. Students reported various sources of knowledge about COVID-19. Website/social media account of Ministry of Health was the commonest source (78.6%) followed by the TV news (67.8%), group-based communication via WhatsApp/Telegram groups (46.9%). The least common sources were articles/medical journal/books (22.3%) and meeting/seminar/webinar about COVID-19 (13.6%). When students were asked about measures taken regarding COVID-19 infection, 94.0% of them said that they avoided going crowded places such as malls/markets, 89.9% said they were practicing social distancing, 89.8% avoided using public transport. Only 43.55% of students stated that they bought masks and 36.8% of them bought hand sanitizer/disinfectant, but 62.5% of them bought cologne as a disinfectant. Majority of students (%90.1) said that they were informing their family/relatives who are not healthcare professionals, about protection from COVID-19 infection. Answers given by the students regarding the COVID-19 were presented in in Table 3.

Perceived risk of COVID-19 infection among students were shown in Table 4. It's found that majority of students (85.4%) thought COVID-19 is a preventable disease, and 45.2% of students were in the agreement of hand washing will protect them from infection. Also 89.2% of students agreed that health education has an effect on preventing COVID-19 infection.

Most of the students (74.9%) have fear of being infected with COVID-19. Moreover, almost all students (96.5%) concerned that one of their family members can get infected with COVID-19. But just 59.6% of students stated that they will be vaccinated and 68.3% of them said that they will have their family members vaccinated. Only 4.1% of students stated that they will move to another city if COVID-19 cases started to be reported in their city. 49.4% of participants thought that everyone should be tested whether he/she is suspected/possible case or not, and 55.6% of students thought that a curfew should be declared after the first COVID-19 case is declared in Turkey

Table 5 presents prevention practices of students about COVID-19 infection. Almost all participants (95.9%) stated that they avoid close contact with people who sneeze or cough. Most of the students (75.1%) said they avoid touching their eyes, nose and mouth with their hands. 79.8% of participants indicated that they cover their nose and mouth with a handkerchief/napkin after coughing or sneezing and 85.7% of them stated that they throw the paper napkin/handkerchief directly into the trash after using. 91.6% of the students stated that they wash their hands more than usual. Although other preventive behaviors related COVID-19 are mostly high, prevalence of mask usage among medical students were only 38.7%.

Risk perception scores and preventive behavior scores of students were calculated (Table 6). The mean risk perception score of students was 22.70±4.68 out of 44 which is indicative of moderate risk perception. The mean preventive behavior score of students was 32.20±4.70 out of 40 which is indicative of high preventive behavior. There was a significantly positive correlation between risk perception and preventive behavior scores ($r=0.198$, $p<0.001$).

Table 7 describes the scores of risk perception and preventive behavior regarding COVID-19 with respect to medical students' socio-demographic and health-related characteristics. Both the risk perception scores and preventive behavior scores of the female were higher than that of males ($p<0.001$). Clinical period students have lower risk perception scores and higher preventive behavior scores, but these differences were not significant ($p>0.05$). Married students' preventive behavior scores were higher than single students ($p=0.032$). Also, risk perception scores of married students were higher, although the difference was not significant ($p=0.174$). Students with lower income have higher risk perception scores than students with higher income ($p=0.002$).

The risk perception scores of the students whose mother's education level were less than high school were lower ($p=0.020$). With respect to the history of chronic diseases, preventive behaviors scores of students with chronic illness were higher ($p=0.022$). Risk perception scores of students who think their health status is very poor/poor/fair were higher ($p=0.019$). On the contrary, students with very good/good health status have higher preventive behaviors scores ($p=0.003$).

Table 1. Population and sample of the study

	Population			Sample		
Year of Study	Female N(%)	Male N(%)	Total** N(%)	Female n(%)	Male n(%)	Total** n(%)
1st Year*	127 (49.03)	132 (50.97)	259 (18.99)	66 (63.46)	38 (36.54)	104 (16.10)
2nd Year*	131 (55.04)	107 (44.96)	238 (17.45)	82 (68.91)	37 (31.09)	119 (18.42)
3rd Year*	121 (59.02)	84 (40.98)	205 (15.03)	83 (69.75)	36 (30.25)	119 (18.42)
4th Year*	108 (50.94)	104 (49.06)	212 (15.54)	58 (61.05)	37 (38.95)	95 (14.71)
5th Year*	158 (56.03)	124 (43.97)	282 (20.67)	79 (63.20)	46 (36.80)	125 (19.35)
6th Year*	104 (51.19)	82 (48.81)	186 (12.32)	45 (53.57)	39 (46.43)	84 (13.00)
Total	731 (53.59)	633 (46.41)	1364 (100)	413 (63.93)	233 (36.07)	646 (100)

*Row Percentage , **Column Percentage

Table 2. Socio-demographic and health-related characteristics of the students

Variables	n(%)
Age (year) (mean±SD)	21.77±2.28
Year of Study	
1st year	104 (16.1)
2nd year	119 (18.4)
3rd year	119 (18.4)
4th year	95 (14.7)
5th year	125 (19.3)
6th year	84 (13.0)
Gender	
Male	233 (36.1)
Female	413 (63.9)
Marital Status	
Single	638 (98.8)
Married/widowed/separated/divorced	8 (1.2)
Income Status of Parents	
Not enough and have debt	46 (7.1)
Not enough and no debt	39 (6.0)
Enough and no savings	277 (42.9)
Enough and have savings	284 (44.0)
Educational Status of Mother	
Illiterate	15 (2.3)
Literate (non-formal education)	7 (1.1)
Primary Education	156 (24.1)
Secondary Education	49 (7.6)
High School	157 (24.3)
Graduate/Postgraduate	262 (40.6)
Educational Status of Father	
Illiterate	2 (0.3)
Literate (non-formal education)	5 (0.8)
Primary Education	90 (13.9)
Secondary Education	48 (7.4)
High School	126 (19.5)
Graduate/Postgraduate	375 (58.0)
Living Place During Education	
At Home Alone	268 (41.5)
At Home with Family or Relatives	190 (29.4)
University Dormitory	101 (15.6)
Home Share with Peers	87 (13.5)
Smoking History	
Current smoker	118 (18.3)
Ex-smoker	45 (7.0)
Never	483 (74.8)
History of Chronic Diseases	87 (13.5)
Self-Evaluation Health Status	
Very good	202 (31.3)
Good	383 (59.3)
Fair	51 (7.9)
Poor	9 (1.4)
Very poor	1 (0.2)
Receiving Influenza Vaccination in the Last Season	
Yes	17 (2.6)
No	629 (97.4)

*SD=standard deviation

Table 3. Answers provided by Turkish medical students regarding the COVID-19

Item	n (%)
Self-evaluation in rating their knowledge about COVID-19	
Very good	37 (5.7)
Good	362 (56.0)
Average	188 (29.1)
Poor	55 (8.5)
Very Poor	4 (0.6)
Attending an informational meeting on COVID-19	
Yes	229 (35.4)
No	417 (64.6)
Following news and updates about COVID-19	
Always	337 (52.2)
Often	283 (43.8)
Sometimes	24 (3.7)
Rarely	1 (0.2)
Never	2 (0.3)
Source of knowledge about COVID-19	
Ministry of Health website/social media account	508 (78.6)
TV news	438 (67.8)
Group-based communication via WhatsApp/Telegram groups	303 (46.9)
Physicians' personal social media accounts (Facebook, twitter, website)	276 (42.7)
WHO website/social media account	259 (40.1)
TV health programs	247 (38.2)
Professional medical association website/social media account	233 (36.1)
Articles/medical journal/books	144 (22.3)
Meeting/seminar/webinar	88 (13.6)
Measures taken regarding COVID-19 infection	
Avoiding going crowded places such as malls, markets	607 (94.0)
Practicing social distancing	581 (89.9)
Avoiding using public transport	580 (89.8)
Self-isolation	577 (89.3)
Avoiding close contact	480 (74.3)
Buying cologne as a disinfectant	404 (62.5)
Buying masks	281 (43.5)
Online shopping	264 (40.9)
Buying hand sanitizer/disinfectant	238 (36.8)
Buying paper napkin/wet tissue/alcohol wipe	219 (33.9)
Buying glove	212 (32.8)
Informing their family/relatives who are not healthcare professionals, about protection from COVID-19 infection	
Always	425 (65.8)
Often	157 (24.3)
Sometimes	51 (7.9)
Rarely	7 (1.1)
Never	6 (0.9)

Table 4. Perceived risk of COVID-19 infection among Turkish medical students

Items	Absolutely Agree n (%)	Agree n (%)	Neither disagree, nor agree n (%)	Disagree n (%)	Absolutely Disagree n (%)
COVID-19 is a preventable disease.*	218 (33.7)	334 (51.7)	67 (10.4)	24 (3.7)	3 (0.5)
I am sure that I will be protected from this virus if I wash my hands as necessary and when necessary.*	82 (12.7)	210 (32.5)	235 (36.4)	94 (14.6)	25 (3.9)
Health education has no effect on preventing COVID-19 infection.	18 (2.8)	24 (3.7)	28 (4.3)	202 (31.3)	374 (57.9)
I am concerned that I can get infected with COVID-19.	165 (25.5)	317 (49.1)	74 (11.5)	67 (10.4)	23 (3.6)
I am concerned that one of my family members can get infected with COVID-19.	459 (71.1)	164 (25.4)	10 (1.5)	7 (1.1)	6 (0.9)
If the vaccine for COVID-19 is developed, I will be vaccinated immediately.	171 (26.5)	214 (33.1)	223 (34.5)	31 (4.8)	7 (1.1)
If the vaccine for COVID-19 is developed, I will have my family members vaccinated.	253 (39.2)	188 (29.1)	182 (28.2)	18 (2.8)	5 (0.8)
If COVID-19 cases started to be reported in my city, I will move to another city.	10 (1.5)	17 (2.6)	42 (6.5)	212 (32.8)	365 (56.5)
I think everyone should use a mask.	83 (12.8)	83 (12.8)	173 (26.8)	199 (30.8)	108 (16.7)
I think a curfew should be declared after the first COVID-19 case is declared in Turkey.	186 (28.8)	173 (26.8)	158 (24.5)	101 (15.6)	28 (4.3)
I think everyone should be tested, whether he/she is suspected/possible case or not.	158 (24.5)	161 (24.9)	130 (20.1)	141 (21.8)	56 (8.7)

*****These items were reverse-coded.

Table 5. Preventive behaviors of Turkish medical students regarding COVID-19 infection

Items	Always n (%)	Often n (%)	Sometimes n (%)	Rarely n (%)	Never n (%)
I avoid close contact with people who sneeze or cough.	426 (65.9)	194 (30.0)	24 (3.7)	2 (0.3)	1 (0.3)
I generally avoid touching my eyes, nose, and mouth with my hands.	198 (30.7)	287 (44.4)	120 (18.6)	29 (4.5)	12 (1.9)
When I cough or sneeze, I cover my nose and mouth with a handkerchief/napkin.	282 (43.7)	233 (36.1)	84 (13.0)	35 (5.4)	12 (1.9)
I throw the paper napkin/handkerchief that I use directly into the trash.	351 (54.3)	203 (31.4)	60 (9.3)	17 (2.6)	15 (2.3)

I clean commonly touched surfaces with alcohol or a disinfectant.	147 (22.8)	184 (28.5)	169 (26.2)	77 (11.9)	69 (10.7)
I use a mask in crowded places to cover my nose and mouth.	134 (20.7)	116 (18.0)	115 (17.8)	106 (16.4)	175 (27.1)
Due to COVID-19, I avoid using public transport such as buses or subways.	526 (81.4)	101 (15.6)	11 (1.7)	5 (0.8)	3 (0.5)
Due to COVID-19, I avoid going to crowded places, markets, shopping malls.	454 (70.3)	166 (25.7)	18 (2.8)	5 (0.8)	3 (0.5)
Due to COVID-19, I wash my hands more often than usual.	436 (67.5)	156 (24.1)	43 (6.7)	5 (0.8)	6 (0.9)
I do not go to health institutions except emergency medical conditions.	565 (87.5)	75 (11.6)	6 (0.9)	0 (0)	0 (0)

Table 6. Correlation between risk perception score and preventive behavior score

	Mean±SD	Median (IQR)	Correlation*
Risk Perception Score (Range 0-44)	22.70±4.68	23.00 (6.00)	r=0.198
Preventive Behavior Score (Range 0-40)	32.20±4.70	33.00 (7.00)	p<0.001

*Spearman rank correlation, SD=standard deviation, IQR=interquartile range.

Table 7. Factors associated with COVID-19-related perceived risk and preventive behavior

Variable	Risk Perception Score	p value	Preventive Behavior Score	p value
Year of Study				
Pre-clinical (1-3 year)	23.00±4.66	0.104	32.02±4.86	0.307a
Clinical (4-6 year)	22.36±4.68		32.40±4.51	
Gender				
Male	21.60±5.34	<0.001	31.19±4.84	<0.001a
Female	23.32±4.15		32.76±4.52	
Marital Status				
Single	22.67±4.68	0.174	32.16±4.69	0.032a
Married/widowed/separated/divorced	24.87±4.48		35.37±4.53	
Income Status of Parents				
Not enough (have debt or no debt)	24.12±4.25	0.002	32.00±4.64	0.587a
Enough (have savings or no savings)	22.48±4.71		32.23±4.71	
Educational Status of Mother				
Less than high school	22.07±4.88	0.020	31.85±4.73	0.123a
High school and higher	23.04±4.54		32.38±4.67	
Educational Status of Father				
Less than high school	22.61±4.52	0.836	31.97±4.81	0.529a
High school and higher	22.73±4.73		32.26±4.66	
Living Place During Education				
At Home Alone	22.86±4.63		32.57±4.35	
At Home with Family or Relatives	22.60±4.66	0.805	32.58±4.49	0.063b
Home Share with Peers	22.37±4.81		31.39±4.97	
University Dormitory	22.75±4.78		31.17±5.49	
Smoking History				
Current smoker	22.67±5.07	0.991	32.14±4.90	0.897b
Ex-smoker	22.73±5.63		32.62±4.68	
Never	22.70±4.49		32.17±4.65	
History of Chronic Diseases				
Yes	23.31±4.58	0.162	33.32±4.18	0.022a

No	22.61±4.69		32.02±4.75	
Self-Evaluation Health Statusa				
Very good+Good	22.56±4.61	0.019	30.78±4.30	0.003a
Fair+Poor+Very poor	24.06±5.15		32.34±4.71	
Receiving Influenza Vaccination in the Last				
Season				
Yes	22.41±3.39	0.705	32.76±4.78	0.669a
No	22.71±4.71		32.18±4.70	
Self-evaluation in Rating Their Knowledge about COVID-19				
Very good+Good	22.36±4.59	0.030	32.48±4.50	0.103a
Average+Poor+Very poor	23.25±4.78		31.73±4.97	
Attending an Informational Meeting on COVID-19				
Yes	22.19±4.44	0.058	32.25±4.38	0.913a
No	22.98±4.79		32.17±4.87	

[a]Mann-Whitney U test, [b]Kruskal-Wallis test

It is found that students who thought that their knowledge about COVID-19 was insufficient have higher risk perception scores (p=0.030). Although the difference was not significant (p=0.103), students who thought that their knowledge about COVID-19 was sufficient have higher preventive behavior scores. With respect to the other variables such as educational status of father, living place during education, smoking history, receiving influenza vaccination, and attending an informational meeting on COVID-19, students' risk perception scores and preventive behavior scores were not found to be statistically different (p>0.05).

DISCUSSION

COVID-19 pandemic has led to anxiety and fear in all people in the world, since there is little known about biological, clinical, and epidemiological features of COVID-19 in the early period of the epidemic[13]. People's protective behaviors were influenced by their risk perception[14]. According to their own risk perceptions, people more or less took some measures vrecommended by health professionals to prevent themselves from coronavirus. In terms of making proper future planning in the later period of the current COVID-19 pandemic and in possible new epidemics in the future; it is important to assess the risk perception levels of people, the extent to which they take the recommended protective measures and related factors. In this study, we aimed to evaluate the risk perception and preventive behaviors of the medical students of XXXX University regarding COVID-19. And to the best of our knowledge, this is the first study conducted on Turkish medical students in the early period of the COVID-19 pandemic in Turkey (conducted two weeks after the first diagnosis of the disease in Turkey). This study highlights that students have moderate risk perception and high preventive behaviors about COVID-19 infection. Also, there was a positive correlation between risk perception and preventive behavior scores. It is important to identify perceived risk because as researches conducted during previous outbreaks such as SARS, MERS and H1N1 indicated that risk perception of pandemics has a key role in adherence to the preventive measures and our findings were consistent with results from these studies[15–20]. Dohle et al. also showed that there was a very small but significant correlation between the perceived risk of COVID-19 infection and adoption of measures[21]. In contrast, a recent study of Iranian medical students reported negative correlation between risk perception and self-reported preventive behaviors about COVID-19[22]. This could be due to insufficient assessment of risk perception with only two questions. In our study, we tried to measure students' perceived risks with 11 questions.

With regards to factors associated with COVID-19-related perceived risk and preventive behavior, female students got higher risk and behavior than male students. This finding is consistent with the results of prior COVID-19 studies[9,23–28]. It is shown that women's greater perceived likelihood of negative outcomes mediated their lower propensity toward risky choices such as health domains[29]. So, females were more risk averse and this affect their behavioral responses, consequently females were more likely to

accept and adopt protective measures.

Concerning marital status, single students have lower precautionary COVID-19 practices. Baig et al. found similar results in their participants[30]. The possible explanation may be that married people are more cautious and take more serious about these matters. Karasneh et al. found that having children were associated with an increased perception of COVID-19 risk[31]. People who have children might fear that they can transmit the infection to their families. It is likely that married people are more afraid to get sick because they do not want to infect other household members, especially their children.

Students with lower socioeconomic status (SES) have higher risk perception scores. But Dohle et al. found no indication that SES was related to COVID-19 risk perception[21]. People of low SES are more likely to live in overcrowded accommodation and overcrowding reduces compliances with social distancing and they are more presumably infected with COVID-19[32]. Association between low SES and high-risk perception of COVID-19 may be explained by this.

Students whose mothers' educational status were higher than high school have higher risk perception scores. This could be explained by the fact that persons with higher levels of education had higher knowledge about COVID-19, therefore they are more aware of the seriousness of its threat[33]. Consequently, mother's awareness probably affects student's risk perception.

Students who evaluate their health status as poor have higher risk scores and preventive behaviors scores of students with chronic illness were higher. These results were expected, as people who have chronic medical condition are at increased risk for severe disease with COVID-19, this affect their risk perception and they tend to be more careful to avoid infection.

Students who thought that their knowledge about COVID-19 was insufficient have higher risk perception scores. Zhong et. al found that a significant negative relationship between knowledge of COVID-19 and the perceived risk of infection[34]. People with insufficient knowledge of COVID-19 might have feeling that they are more threatened by it. In this study, students reported that various sources of knowledge about COVID-19. Website/social media account of Ministry of Health, TV news and WhatsApp/Telegram groups were the most common sources of knowledge about COVID-19. Reliable knowledge sources such as articles, medical journal/books about COVID-19 were found to be the least common sources. And only 35.4% of students attended an informational meeting on COVID-19. These results were in accordance with previous studies about COVID-19 conducted among university students[26,35–41]. All students' sources of information on COVID-19 were similar and mostly social media. These were very important results for both medical education and public awareness about COVID-19 pandemic. Medical students have an important effect on spreading out their knowledge and risk perception to the people around them. In this study, vast majority of students indicated that they were informing their non-healthcare professional family members/relatives about COVID-19 infection. WHO warned that there is a global epidemic of misinformation (infodemic) and that makes it difficult for people to find reliable sources[42]. Additionally, the use of social media as a source of information about COVID-19 was related with conspiracy theories and with less-protective behaviors[43]. So, health professionals should be aware and immediately fill these gaps in knowledge. COVID-19 training courses were needed for medical students, as they were highly using social media for information about COVID-19. Medical training should be seen as an opportunity for community education. Also, it is very important that health professionals should be active on social media so that they can spread the scientifically validated information to the masses[44].

There are some limitations regarding this research. First, since medical faculty switched over to online education web-based survey was used. This may be resulted to relatively low response rates in this study. But we were able to collect data more reliably due to the anonymity of web-survey. Besides, unlike traditional survey method, this web-survey method gave us chance to collect data from medical students quickly who live in different provinces during pandemic which might enhance this research to be more objective. Also, when compared to the population of the study, participation of female students to the study was higher than male students. So, estimates may be biased due to possible selection bias. In addition, students' precautionary activities were collected with self-reported questions, so there may be social-desirability bias and reporting bias. Also, correlational associations regarding risk perception and protective behaviors should be

considered carefully, because of the cross-sectional nature of the study design, causal inferences cannot be made.

In conclusion, there was a positive correlation between COVID-19 infection related risk perception and preventive behavior. Medical students in Turkey had a moderate risk perception and high preventive behaviors. Accurate information about COVID-19 infection from trusted sources should be provided to medical students. Authorities and educators should be more involved in the process of medical education about the pandemic in order to improve the risk perception, because medical students could lead people around to change their behaviors during the COVID-19 pandemic.

Yazar Katkıları: Çalışma konsepti/Tasarımı: SUU; Veri toplama: NAÇ; Veri analizi ve yorumlama: SUU, NAÇ, AE; Yazı taslağı: SUU, NAÇ, AE; İçeriğin eleştirel incelenmesi: SUU, AE; Son onay ve sorumluluk: SUU, NAÇ, AE; Teknik ve malzeme desteği: -; Süpervizyon: AE; Fon sağlama (mevcut ise): yok.
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