

## Knowledge, behaviours and anxiety of eastern part of Turkey residents about the current COVID-19 outbreak

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**Abstract** *Aim:* The aim of this study was to assess the knowledge and behaviors of Eastern part of Turkey residents about the COVID-19 and the relationship between the pandemic and the anxiety levels. *Methods:* Cross-sectional study was carried out between 07-21 April 2020 through online questionnaires. The study included 897 people who filled out the form and met the study criteria. The data was collected through a self-administered questionnaire of the socio-demographic characteristics, generalized anxiety disorder scale, opinions about the epidemic, knowledge and behaviours of individuals regarding COVID-19. *Results:* A total of 897 participants had a mean score of knowledge and behaviors of  $5.11 \pm 1.63$  and  $46.81 \pm 5.65$ , respectively. Knowledge and behaviors score were higher in males ( $p < 0.001$ ) and participants with high education level ( $p = 0.003$ ). Anxiety level was negatively correlated with knowledge ( $r = -0.156$ ,  $p < 0.001$ ) and behaviors scores ( $r = -0.288$ ,  $p < 0.001$ ). There was a positive significant correlation between knowledge level and positive behaviors score ( $r = 0.194$ ,  $p < 0.001$ ). *Conclusion:* Gender and education levels had a statistical effect on individuals' COVID-19 knowledge and positive behaviors scores. COVID-19 outbreak was associated with high anxiety levels in individuals and it was determined that the anxiety caused by the epidemic negatively affected the knowledge and positive behaviours of the individuals.

**Keywords:** COVID-19, novel coronavirus, SARS-CoV-2, behaviours, knowledge, anxiety

### Introduction

Coronavirus disease 2019 (COVID-19) is caused by one type of novel coronavirus which is called as a SARS-CoV-2. The virus was first detected in the December 2019 and spread to the whole world in a short time (1). The new type of coronavirus (SARS-CoV-2) has low pathogenicity and high infectious properties, so it is difficult to prevent the spread of infection. For this reason, the infection spread all over the world in a very short time and World Health Organization (WHO) announced the International Concern of

Public Health Emergency on 30 January 2020 (2). To date, over 2.2 million new cases and 39,000 deaths of COVID-19 have been reported across all six WHO regions (3).

The outbreak briefing studies provide basic information to change society's misunderstandings about the outbreak and determine the type of response that may be needed. It has been reported that prevention is the best way to struggle against the epidemic due to the lack of effective treatment and vaccines against COVID-19 (4). In this context, some preventive procedures were applied in Turkey after first cases. The

measurement proposed by the WHO to reduce the spread of COVID-19 was recommended to all citizens by the Turkish Ministry of Health, as a rule of in Turkey (5). Personal hygiene and social isolation have been reported to be the most important recommendations that slow the spread of the virus. To success against the COVID-19, individuals' adherence to these control measures are essential, which is largely affected by their knowledge, attitudes, and practices towards pandemic (6). In the studies conducted after the SARS outbreak in 2003, it was reported that individuals' knowledge, attitudes and panic levels in the population against infectious diseases made it difficult to prevent the spread of the disease (7, 8). The continuous spread of the epidemic and strict isolation measures across the country is expected to influence the mental health of the population. In three different studies about the COVID-19 outbreak, it was reported that the COVID-19 outbreak caused negative psychological effects on people (9, 10). Among the lessons learned from the SARS outbreak is that knowledge and attitudes are associated with levels of panic and emotion which could further complicate measures to contain the spread of the disease (11).

According to the literature data, it was reported that the knowledge, attitudes, and behaviors of individuals are important in the struggle of the epidemic. The psychological impact of the epidemic on the population should not be ignored as it makes it difficult to fight the epidemic. Therefore, the current study was aimed to investigate the knowledge and behaviors of individuals about the COVID-19 outbreak and the effect of the epidemic on the mental health of the society.

## Material and Methods

### *Study design and participants*

The current cross sectional study was conducted for the period of 2 weeks between 07-21 April 2020, in family medicine centers of Elazig city in eastern part region of Turkey. Minitab 19.0 software was used to determine the sample size. The sample size was calculated based on an expected prevalence of 6.3% (Y. Wang et al. 2020), Type 1 error of 5% and study power of 95% based on a similar previous study (12). The

smallest acceptable target sample size was calculated 815. Questionnaire forms were sent to 1100 people who meet the study criteria in order to reach the targeted sample size. A total of 897 questionnaires were answered (response rate 81.5%). Elazig city consists of 4 large neighborhoods. A family health center in the most populated area of each neighborhood was included in the study. Data collection questionnaire was developed by google forms and sent to the participants via "what is up" application (WhatsApp). The data collection tools of the study were sent to the participants online by family physicians in the 4 family health center and the participants were asked to fill. The first question of the questionnaire was asked whether the participants volunteered to participate in the study. For those who did not volunteer to participate in the study, the questionnaire was terminated and the volunteer participants were directed to complete the questionnaire. The study inclusion criteria were as follows: (i) being over 18 years old, (ii) being registered to the family health center where the study is carried out, (iii) being contact information registered in the family medicine system and (iv) volunteering to participate in the study. Those who did not live in the region where the study was conducted, who were not registered in the family medicine information system, and who were healthcare workers were excluded from the study.

### *Ethical approval, informed consent and permissions*

Ethical approval was obtained from the Firat University Non-Interventional Ethics Committee for the study (2020/07-03). The first question of the questionnaire was asked whether the participants volunteered to participate in the study. For those who did not volunteer to participate in the study, the questionnaire was terminated and the volunteer participants were directed to complete the questionnaire.

### *Data collection tools*

The data was obtained by the semi-structured questionnaire. The questionnaire consisted of four main themes: 1) demographics, which surveyed participants' sociodemographic information, including gender, age, education level, occupation, and source of COVID-19 information; 2) knowledge about COVID-19; 3) behaviours toward COVID-19; and 4) anxiety status.

To measure knowledge about COVID-19, 7 questions that were adapted from Zhong et al. to measure knowledge about COVID-19, including clinical characteristics, transmission, treatment, symptoms of the disease and the risky conditions for the disease (13). The knowledge questionnaire was evaluated as 1 point for the correct response of the participants and 0 points for the wrong answer. The knowledge questionnaire was evaluated within a range of 0-7 points. Respondents who answered the questions correctly below the average value were grouped as insufficient level of knowledge, and participants who answered correctly above the average value were grouped as sufficient level of knowledge.

In the third part of the questionnaire, the behaviors of the participants during the COVID-19 pandemic were questioned with 11 questions. The questions were prepared by considering the 14 rules that should be followed during the COVID-19 pandemic of the Ministry of Health of Turkey to question the behaviour characteristics of the participants (14). The behaviour questionnaire has been prepared in a 5-point Likert style. Participants were asked to mark the questions most suitable for them at all, rarely, sometimes, often and always. Participants from each question from the questionnaire scored between 1 and 5 points (none = 1 point, always = 5 points). The lowest score to be taken from the survey was 11 and the highest score was 55 points. The behaviour questionnaire cronbach alpha score was 0.829. The high score from the behaviour questions were interpreted as the participants' high positive behaviour towards COVID-19. Participants with an behaviour score below the average score of the behaviour questionnaire were classified as insufficient behaviour level (negative behaviour), and participants with an behaviourscore above the average score were classified as a sufficient behaviour level (positive behaviour).

The anxiety levels of the participants were measured with the 7-item Generalized Anxiety Disorder Scale (GAD-7). The self-administered questionnaire form is composed of three parts. The first part included demographic data and opinions of the participants about COVID-19 pandemic. The second part of the questionnaire included 7 multiple choice questions prepared to measure the level of knowledge of the

participants about COVID-19. Information questions were asked about the cause of the disease, the course of the disease, the routes of transmission, treatment options, symptoms of the disease and the risky conditions for the disease. Generalized Anxiety Disorder Scale -7 (GAD-7) was developed by Spitzer according to DSM-IV-TR criteria. GAD-7 is a seven-question four-point Likert self-report scale (0 = none, 1 = many days, 2 = more than half the days, 3 = almost every day) is a type scale that evaluates the experiences asked in the scale items in the last 2 weeks. The range of points to be obtained from the scale varies between 0-21. Total scores from the scale are cut-off points for mild, moderate and severe anxiety, respectively 5, 10, and 15, respectively. Konkan et al. (2013) was adapted to Turkish, Cronbach's alpha value was found to be 0,852, and its validity and reliability were demonstrated (15).

#### *Statistical analysis*

Statistical analysis of the data was performed by IBM SPSS 22 statistics package program. Kolmogorov-Smirnov test was used to determine whether the data showed normal distribution. Descriptive statistics of the data were expressed as mean  $\pm$  standard deviation for variables with normal distribution in continuous data and frequency for categorical variables as percentage (n (%)). In comparison of two independent groups, Student t test was used for normal distributed continuous data. In comparison of more than two independent groups, One-Way ANOVA and LSD test for post-Hoc test were used for normal distributed continuous data. Pearson's correlation coefficient was used to evaluate the association between anxiety score and knowledge, behaviourscores. Significance level was  $p < 0.05$ . Statistically significant significance values are indicated in bold in the tables.

#### **Results**

A total of 897 participants included study. The average age of the participants was  $38.77 \pm 11.59$  years, 64.8% (n = 581) female and 35.2% (n = 316) male. The participants mostly had access to niformation about COVID-19 from TV programs. Participants' knowledge questionare mean score was  $5.11 \pm 1.63$ , behaviour

questionnaire mean score was  $46.81 \pm 5.65$  and anxiety inventory mean score was  $6.89 \pm 5.59$  (Table 1).

The most common sources of COVID-19 information are Media (TV programs) 58.53% and 24.30% social media, with the least amount of article (2.23%) use reported (Figure 1).

A total of 78.8% of the participants had sufficient knowledge about COVID-19. The participants gave the most correct answer to the question we asked the most risky age group for COVID-19 (Table 2).

According to the behaviour questionnaire, where we questioned the rules that should be applied against COVID-19, the majority of the participants showed

adequate positive behaviours. The participants showed the most positive behaviour towards hand washing and avoiding close contact rules. (Table 3)

Male participants had higher knowledge ( $p < 0.001$ ) and behaviour ( $p = 0.003$ ) scores than females. Knowledge and behaviour scores were higher in participants with high education levels ( $p < 0.001$ ). Knowledge ( $p = 0.003$ ) and positive behaviour scores ( $p < 0.001$ ) were decreasing in participants with high anxiety level. (Table 4)

Anxiety level was negatively correlated with knowledge ( $r = -0.156$ ,  $p < 0.001$ ) and behaviour scores ( $r = -0.288$ ,  $p < 0.001$ ). There was a positive significant correlation between knowledge level and behaviour score ( $r = 0.194$ ,  $p < 0.001$ ) (Table 5).

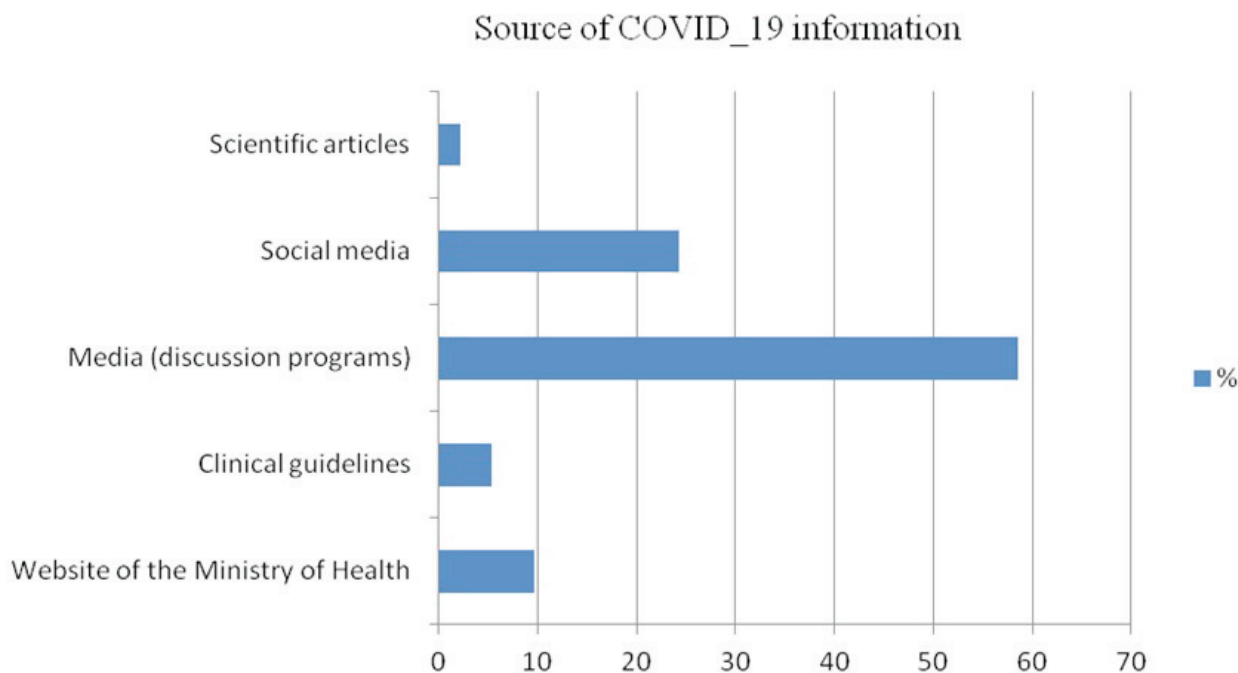
**Table 1.** Sociodemographic characteristics of the participants

Variables (n=897)	n	%
<b>Gender</b>		
Female	581	64.8
Male	316	35.2
<b>Education level</b>		
Primary school	94	10.5
Middle school	90	10.0
High school	134	14.9
University	579	64.6
<b>Occupation</b>		
Officer	571	63.7
Housewife	126	14.1
Student	57	6.3
Retired	72	8.0
Self-employment	71	7.9
<b>Do you have any chronic illness?</b>		
Yes	118	13.2
No	779	86.8
<b>Anxiety states</b>		
Normal	426	47.5
Anxiety level mild	192	21.4
Moderate anxiety	182	20.3
Severe anxiety	97	10.8
	<b>mean±SD</b>	<b>Median (min-max)</b>
<b>Age (year)</b>	38.77±11.59	39.00 (18-82)
<b>Anxiety score</b>	6.89±5.59	6.00 (0-21)
<b>Knowledge questionnaire score</b>	5.11±1.63	5.00 (1-7)
<b>Behaviour questionnaire score</b>	46.81±5.65	48.00 (30-55)

## Discussion

Studies conducted after previous pandemics reported that the awareness and knowledge levels of individuals are important in order to prevent pandemic outbreaks (16). To the best of our knowledge, this is the first study in Turkey investigating the knowledge and behaviours towards COVID-19 among Turkish population. 78.8% of the study population has sufficient knowledge about COVID-19. In two separate studies conducted in Arabia and Mumbai, it was reported that participants had sufficient knowledge and awareness levels against COVID-19 (17, 18). In the study conducted by Modi et al. reported that the knowledge questionnaire correct answers rates were 53.6% and 74.1% in Mumbai among health workers and students, (18). According to the literature data, it was thought that our participants' level of knowledge about the COVID-19 outbreak was sufficient.

It was determined that the participants reached the information about COVID-19 mostly from media (TV program) and social media. In their study, Nooh et al reported that the source of information about individuals about COVID-19 is the ministry of health and social media (17). Al-hazmi et al. reported that TV programs and social media were the most common source of information about the Mers Cov epidemic of the public (19). The data we obtained were similar to the literature data. It is important that the information



**Figure 1.** Source of COVID-19 information

**Table 2.** Knowledge of participants about COVID-19

Knowledge questions	Correct n (%)	Wrong n (%)
What is the cause of COVID-19 ?	877 (97.8)	20 (2.2)
What is the most common transmission route of COVID-19?	361 (40.2)	536 (59.8)
How long is the incubation period of COVID-19 ?	824 (91.9)	73 (8.1)
What is the most common symptom of COVID-19 ?	547 (61.0)	350 (39.0)
Is there a suitable vaccine to protect COVID-19 ?	768 (85.6)	129 (14.4)
What is the most effective method of preventing COVID-19 ?	615 (68.6)	282 (31.4)
Which age groups are riskier toward COVID-19 ?	888 (99.0)	9 (1.0)
<b>Knowledge questionnaire score</b>		
Score (correct answer average) [mean±sd]	5.11±1.63	
Insufficient level of knowledge [n (%)]	190 (21.2)	
Sufficient level of knowledge [n (%)]	707 (78.8)	

*Knowledge questions correct answer average 5.11±1.27.*

*insufficient level of knowledge <5 correct answer; sufficient level of knowledge ≥5 correct answer*

about the epidemic in TV programs and social media is true and publicly understandable.

In current study, the behaviour questionnaire scores of the participants and the rate of participants with sufficient positive behaviour levels were high.

The behaviour questionnaire was prepared according to the rules proposed by the Ministry of Health within the scope of combating COVID-19. In this context, the participants were considered to comply with the rules. Zhong et al. reported that the partici-



**Table 3.** Behaviour of participants toward COVID-19

Features	1	2	3	4	5
	n (%)	n (%)	n (%)	n (%)	n (%)
I wash my hands with water and soap for at least 20 seconds	0 (0.0)	4 (0.4)	26(2.9)	509(56.7)	358(39.9)
I leave at least 3-4 steps away from people	1(0.1)	8(0.9)	168(18.7)	212(23.6)	508(56.6)
I use disposable wipes during coughing and sneezing	4(0.4)	3(0.3)	86(9.6)	253(28.2)	551(61.4)
I avoid touching my eyes, my mouth and my nose with my hands	19(2.1)	44(4.9)	238(26.5)	328(36.6)	268(29.9)
I often ventilate my environment	0(0.0)	3(0.3)	90(10.0)	306(34.1)	498(55.5)
I wash my clothes at 60-90 °C	11(1.2)	12(1.3)	222(24.7)	255(28.4)	397(44.3)
I clean door handles and luminaires every day	12(1.3)	38(4.2)	247(27.5)	337(37.6)	263(29.3)
I avoid contact with elder and people with chronic disease. I do not go out without a mask	9(0.9)	14(1.6)	119(13.3)	253(28.2)	502(26.0)
I do not share personal items such as towels	33(3.7)	95(10.6)	75(8.4)	179(20.0)	515(57.4)
I drink plenty of fluids. I take care of my sleep patterns	8(0.9)	27(3.0)	165(18.4)	350(39.0)	347(38.7)
I avoid close contact such as handshaking, hugging	2(0.2)	13(1.4)	18(2.0)	274(30.5)	590(65.8)
<b>Behaviourquestionare (mean±sd) and n(%)</b>					
Behaviour questionnaire score [mean±sd]	46.81±5.66				
Insufficient level of behavior [n (%)]	367 (40.9)				
Sufficient level of behaviour [n (%)]	530 (59.1)				
1: none. 2: rarely. 3: sometimes. 4:frequently. 5: always					

**Table 4.** The relation between sociodemographic data and anxiety level with knowledge and behaviour scores

Variables	Knowledge score	p' value	Behaviour score	p' value	p'' value
<b>Gender</b>					
Female ( n= 581)	4.92±1.71	t=4.69	46.39±5.94	t=3.02	
Male (n=316)	5.45±1.43	<i>p</i> <0.001	47.57±5.01	<i>p</i> = 0.003	
<b>Education level</b>					
Primary school (n=94)	3.97±1.35 <sup>1</sup>	F=24.45	1-2:0.019	39.78±4.98 <sup>1</sup>	F=133.56 1-2:0.021
Middle school (n=90)	4.64±1.36 <sup>2</sup>	<i>p</i> <0.001	1-3<0.001	41.80±4.67 <sup>2</sup>	<i>p</i> <0.001 1-3<0.001
High school (n=134)	5.09±1.52 <sup>3</sup>		1-4<0.001	49.59±4.83 <sup>3</sup>	<i>p</i> <0.001 1-4<0.001
University (n=579)	5.37±1.64 <sup>4</sup>		2-4<0.001	48.09±4.63 <sup>4</sup>	<i>p</i> <0.001 2-4<0.001
<b>Do you have a chronic illness?</b>					
Yes (n=118)	5.26±1.82	t=1.93	47.75±4.54	t=1.93	
No (n=779)	5.09±1.60	<i>p</i> = 0.274	46.66±5.79	<i>p</i> = 0.054	
<b>Anxiety status</b>					
Normal (426)	5.12±1.89 <sup>1</sup>		48.47±4.43		1-3<0.001
Anxiety level mild (192)	5.35±1.59 <sup>2</sup>	F=4.32	47.47±4.94	F=51.03	1-4<0.001
Moderate anxiety (182)	4.76±1.28 <sup>3</sup>	<i>p</i> =0.005	2-3:0.003	44.73±7.11	<i>p</i> <0.001 2-3<0.001
Severe anxiety (97)	5.20±0.75 <sup>4</sup>		42.09±4.91		2-4<0.001
					3-4<0.001

t: Student t test . F: Anova test. \* multiple comparison p value. \*\* binary comparison p value

**Table 5.** Correlation analysis between continuous variables

Variables	Anxiety score	Variables	Behaviourscore
Behaviour score	r= -0.288 <i>p</i> <0.001	Knowledge score	r= -0.194 <i>p</i> <0.001
Knowledge score	r= -0.156 <i>p</i> <0.001		

pants showed a sufficient positive behaviour towards COVID-19 in their study among Chinese residents (13). Another study conducted among Indian population, it was reported that the awareness and positive behaviour levels of the participants were high towards COVID-19 (20). The data we obtained and the literature data suggested that individuals' awareness against COVID-19 is sufficient. From the first day of the epidemic, stressing the importance of following the behaviors and rules set by the Turkish Ministry of Health in all communication channels may be the reason for the high public awareness.

In this study, the knowledge level was significantly higher in males and participants with high education levels. It may be an expected result that the level of knowledge will increase as the education level of the participants' increases. In two different studies on COVID-19, were obtained similar results with our data (20, 21). Nooh et al reported that there was no significant relationship between individuals' COVID-19 knowledge levels and education levels (17). They suggested that the most important source of information about COVID-19 was social media and TV programs, and that everyone had equal access to information. Despite contradictory findings in the literature, it has been thought that the education levels of individuals can be effective in reaching correct and reliable information and thus may affect individuals' COVID-19 knowledge levels. Khan et al reported that healthcare professionals dealing with the MERS epidemic in Saudi Arabia, it was reported that the level of knowledge increased as the year spent in the profession increased (8). The data obtained by Khan et al. support our findings and we believe that the level of education may be related to the level of knowledge about COVID-19. The relationship between gender and knowledge level is contradictory in the literature. Zhong et al reported that knowledge level about COVID-19 is higher in female (13). In two different studies conducted by Giao et al. and Nooh et al. were reported that there was no relationship between gender and knowledge level about COVID-19 (17, 21). Khan et al reported that knowledge level about a pandemic is higher in male participants (8). Literature data and the data we obtained could not explain the effect of gender on pandemic knowledge level. We believe that

more extensive researches are needed to explain this relationship.

In this study, it was found that males and participants with high education levels were showed more positive behaviours toward the COVID-19 epidemic. In addition, there was a positive and significant correlation between the knowledge score and the behaviour score. In the literature, most of the studies on epidemics reported a positive relationship between knowledge level and positive behaviour level (17, 18, 22-24). The data we obtained were similar to the literature data. It is an expected result that the positive behaviour increases as the level of knowledge of individuals about the risks brought by the epidemic, the precautions to be taken, their effects on health and social life increases. The high level of behaviour in males with high knowledge and the positive relationship between knowledge level and behaviour level supports our opinion.

Outbreaks and pandemics have negative effects on the psychological health of society. Outbreaks can increase the level of fear and anxiety in society, and increased fear and anxiety can affect individuals' behavior. In this study, it was found that anxiety level caused negative behaviour and there was a negative correlation between anxiety score and behaviour score. It has been reported that epidemic increases the level of fear and anxiety of individuals as expected in almost all of the literature data. (10, 12, 22, 24-27). The data we obtained were supported by literature data. The moderate anxiety rate in the study population was 20.3%, and the severe anxiety rate was 10.8%. Roy et al. reported that COVID-19 outbreak caused sleep difficulties in 28% of the participants (20). In the same study, it was reported that two-thirds of the participants experienced anxiety and fear due to the outbreak (20). Baneerje reported that fear and turmoil created by the outbreak may increase the negative effects of the virus, so early psychological intervention may reduce the spread of the outbreak (27). In current study, as the anxiety score increased, the decrease in knowledge and behaviour score supported Benjeer's hypothesis. In this context, practices to reduce anxiety and fears of individuals can be suggested in the struggle the epidemic. In the study of Roy et al 46% of the participants reported that the discussion programs on TV caused fear (20). Considering that the most important source

of information about the epidemic was media and TV programs, it was thought that the media had an impact on the psychological health of the society. In this context, it may be recommended to pay attention to the content of the epidemic news shared on TV programs and social media and to avoid news that may cause panic and fear in the public.

### Limitations

Firstly, conducting the study online may have caused us to reach only a certain population and therefore not to reflect the general public. Therefore, future studies with larger and representative samples might yield different results. The online questionnaire application may have made it difficult to reach individuals with low education level, illiteracy or limited use of a smartphone. The participants filled in the questionnaire online and we were not able to assist the participants in unclear points. As the behaviour characteristics against the epidemic are evaluated according to the participants' own statements, it may have caused a difference between individuals.

### Conclusion

This current study showed that COVID-19 knowledge and positive behaviour levels about COVID-19 were sufficient in study population. Gender and education level had a statistically significant effect on individuals' COVID-19 knowledge and behaviour scores. COVID-19 knowledge and behaviour scores were higher in males and participants with higher education levels. COVID-19 outbreak was associated with high anxiety levels in individuals and it was determined that the anxiety caused by the epidemic negatively affected the knowledge and attitudes of the individuals. In addition to developing knowledge and positive behaviour in the fight against the epidemic, it may be recommended to develop practices that can reduce anxiety and fear in individuals.

**Conflicts of interest:** Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article.

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