

# Predictors of COVID-19 preventive behaviours in a sample of the Turkish population

Cemile Savci PhD, Assistant Professor<sup>1</sup>  | Ayse Cil Akinci PhD, Professor<sup>1,2</sup>

<sup>1</sup>Department of Nursing, Faculty of Health Sciences, Istanbul Medeniyet University, Istanbul, Turkey

<sup>2</sup>School of Nursing, Loma Linda University, Loma Linda, California, USA

## Correspondence

Cemile Savci, Department of Nursing, Faculty of Health Sciences, Istanbul Medeniyet University, Atalar Mah., Sehit Hakan Kurban Cad., 34862 Istanbul, Turkey.  
Email: cemile.savci@medeniyet.edu.tr; cemilesavci@gmail.com

## Abstract

**Aim:** This research aimed to determine predictors of COVID-19 preventive behaviours in a sample of the Turkish population.

**Methods:** The study was conducted with 575 individuals. COVID-19 preventive behaviours were evaluated with a 19-item scale scored from 19 to 95. Knowledge on COVID-19 was evaluated with a 22-item scale scored from 0 to 22. General health literacy was evaluated with the Turkey Health Literacy Scale (THLS), which was scored from 0 to 50.

**Results:** The average COVID-19 preventive behaviours score was moderately high in this sample of the Turkish population. Being female, having a higher level of education, better economic status, being a non-smoker, having a higher level of COVID-19 knowledge and better general health literacy score were significant predictors of COVID-19 preventive behaviours ( $P < 0.05$ ).

**Conclusion:** Sociodemographic characteristics, knowledge of COVID-19 and general health literacy are crucial in preventing COVID-19 infections in a sample of the Turkish population.

## KEYWORDS

COVID-19, knowledge, preventive behaviours, health literacy, pandemic

## Summary statement

What is already known about the topic?

- To reduce the risk of transmission and prevent the spread of the COVID-19, it is necessary to comply with COVID-19 preventive behaviours.
- Sociodemographic characteristics, knowledge of COVID-19 and general health literacy are crucial in preventing the COVID-19 disease.

What does this paper add?

- COVID-19 preventive behaviours scored moderately high among a sample of the Turkish population.
- Being female, having higher level of education, better economic status, being a non-smoker, having higher level of knowledge about COVID-19 and better general health literacy are significant predictors of COVID-19 preventive behaviours in a sample of the Turkish population, accounting for 22.4% of the variance in COVID-19 preventive behaviours.

The implications of this paper:

- Attempts should be made to increase the COVID-19 knowledge and health literacy to increase COVID-19 preventive behaviours among the Turkish population.
- In particular, attempts should be made to increase the COVID-19 preventive behaviours for men, individuals with low education and poor economic conditions, and smokers.

## 1 | INTRODUCTION

After the Coronavirus Disease 2019 (COVID-19) was accepted as a pandemic by the World Health Organization (WHO, 2020) on 11 March 2020, both a pandemic and an infodemic were experienced worldwide. Information on COVID-19 has increased rapidly on various platforms. Although some of this information was accurate, some of it was comprised of complex and contradictory information and individuals experienced problems in accessing reliable information (Huang et al., 2020; Paakkari & Okan, 2020). Having enough knowledge about a disease can affect people's attitudes and practices positively (Ceyhan & Uzuntarla, 2020). The knowledge levels of populations were evaluated after the pandemic and different findings were obtained (Ceyhan & Uzuntarla, 2020; Nicholas et al., 2020; Serwaa et al., 2020; Yildirim & Guler, 2020). In the systematic review of 52 studies which is the most comprehensive study on this subject, the knowledge of physicians, health-care professionals, and the general population regarding COVID-19 was evaluated, and the knowledge component was reported as good, fair, and poor in 59%, 34%, and 7%, respectively (Saadatjoo et al., 2020).

Health literacy has been considered crucial for the prevention of non-communicable diseases (Nutbeam, 2017) as well as infectious diseases (Castro-Sánchez et al., 2016). Therefore, whether individuals and communities are prepared for any pandemic should be determined, and health literacy should be regularly assessed to strengthen public health policies (Abdel-Latif, 2020; Abel & McQueen, 2020; Tehrani et al., 2018), and initiatives for enhancing health literacy regarding COVID-19 are needed (Abel & McQueen, 2020; Paasche-Orlow et al., 2005; Wong et al., 2020). It has been reported that individuals with inadequate health literacy demonstrate inadequate understanding of COVID-19 symptoms and infection preventive behaviours and that they have difficulty in accessing the information on COVID-19 and understanding government messages compared with individuals with adequate health literacy. Similarly, it has been reported that individuals with low health literacy have rated the severity of the threat posed by COVID-19 significantly lower, have higher anxiety and are more likely to think that they will not get sick from COVID-19 compared with individuals with adequate health literacy (McCaffery et al., 2020).

Due to a lack of definitive treatment, preventive behaviours are currently the best way to overcome the COVID-19 disease (Kim et al., 2020; Lin et al., 2020). To reduce the risk of transmission

of the COVID-19 disease and to prevent the spread of the disease, health authorities and organizations issue warnings and recommendations about COVID-19 at the national and international levels. In addition, governments are trying to implement protective measures at different levels through policies and legal restrictions. In general, it is stated that the public's compliance with the measures has not reached a satisfactory level (Abdel-Latif, 2020). In the systematic review of 43 studies, which is the most comprehensive study on this subject, the preventive practices of physicians, health-care workers and the general population for protection from COVID-19 was evaluated, 52% reported good practice, 44% fair practice and 4% poor practice (Saadatjoo et al., 2020). Determining the factors that affect COVID-19 preventive behaviours is the major step in taking control of COVID-19. In a study conducted in Turkey, it was reported that participants were largely engaged in all preventive behaviours; the most frequently practiced ones were wearing a mask, avoiding public transportation and avoiding public gathering, whereas the least practiced preventive behaviours were observed to be avoiding eating at restaurants and food centres, and exercising regularly (Yildirim & Guler, 2020). In another study conducted in Turkey, it was stated that impulsivity negatively correlated with COVID-19 preventive behaviours (Alper et al., 2020). In a study conducted on health-care workers in Turkey, it was found that the participants demonstrated a high level of COVID-19 preventive behaviours and that being female correlated positively while age and level of education did not (Arslanca et al., 2021). When the studies predicting COVID-19 preventive behaviours in other countries are examined, it was reported that, in China, the frequency of social media use, the level of knowledge about COVID-19 and eHealth literacy positively predicted uptake of COVID-19 preventive behaviours (Li & Liu, 2020). In another study conducted on individuals with mental illness in Taiwan, trust in COVID-19 information sources positively predicted COVID-19 preventive behaviours, whereas fear of COVID-19 negatively predicted COVID-19 preventive behaviours (Chang, Strong, et al., 2020). Fear of COVID-19 positively predicted COVID-19 preventive behaviours in both pregnant women and their spouses (Ahorsu, Imani, et al., 2020), whereas in older adults, health status indirectly predicted COVID-19 preventive behaviours through fear of COVID-19 (Ahorsu, Lin, & Pakpour, 2020). The most important factor predicting wearing a mask, which is one of the COVID-19 preventive behaviours, was concerns about the current situation, whereas other important factors were dislike of wearing masks, self-protection, protecting others and being

afraid of others' judgement (Rieger, 2020). Psychosocial models such as the integrated social cognition model have been used to predict COVID-19 preventive behaviours (Lin et al., 2020). However, when the literature was reviewed, no research that evaluated the impact of sociodemographic characteristics, knowledge of COVID-19, and general health literacy on COVID-19 preventive behaviours in Turkey was found. This research therefore aims to determine predictors of COVID-19 preventive behaviours in a sample of the Turkish population.

## 2 | METHODS

### 2.1 | Research design

This was descriptive-correlational and predictive research.

### 2.2 | Participants

The population of the study was comprised of individuals who resided in Turkey between September and November 2020. As a pandemic measure, the distance education process was started in Turkey on 23 March 2020. In order to collect data for this research, the survey link/Google Form was shared as an e-mail with students of a Health Sciences Faculty living in different regions of Turkey during the distance education process, and they were asked to share it with their acquaintances over the age of 18 years. The sample consisted of 575 individuals who met the inclusion criteria, selected with the convenience sampling method. Volunteers who were 18 years of age or older, who were able to read and comprehend Turkish were included within the scope of the research.

### 2.3 | Data collection tools

The research data were collected using the 'participant information form' and 'Turkey Health Literacy Scale (THLS)'.

#### 2.3.1 | Participant information form

In the first part of the participant information form, which consisted of three parts, 11 questions evaluated the sociodemographic and descriptive characteristics of the participants such as age, gender, marital status and educational status.

The second part, which evaluated the knowledge of COVID-19, included 22 items, each of which had response options of 'yes', 'no' or 'I have no idea'. While creating these items, the information on the pages of institutions such as the Ministry of Health and the WHO was used. In this section, information about the cause of COVID-19, incubation period, transmission routes, symptoms, prevention measures, isolation, quarantine and emergency aid was included. After the

information form was created, the content of the questions was evaluated by five experts who were academics and/or health professionals. Each expert was asked to evaluate the 22 items on the form as to how appropriate they were in measuring COVID-19 knowledge using a three-point Likert-type scale (the item is appropriate = 1, the item should be revised = 2 and the item is not appropriate = 3). Necessary corrections were made on the form in line with the suggestions. Then, a pilot study was conducted with 15 people to evaluate each item in terms of readability and clarity of meaning. The form was reviewed in line with the group's recommendations, and the necessary revisions were made. Of the items containing information, 13 were correct and should be responded to with 'yes' by the participants. Each 'yes' response was scored '1'; 'no' and 'I have no idea' responses were scored '0'. The remaining nine items were incorrect and should be responded to with 'no' responses. Scores ranged from 0 to 22. The Cronbach's alpha coefficient in this study was 0.827.

When it was investigated whether there was a valid and reliable scale evaluating COVID-19 preventive behaviours, a scale consisting of five questions was found in a study conducted with individuals with mental illness (Chang, Hou, et al., 2020). When this study's sample and scale items were examined, it was decided that the scale was limited in evaluating the COVID-19 preventive behaviours of the Turkish population. However, the items of scale developed by Chang, Hou, et al. (2020) were used while developing the third part. For this part, a form consisting of 19 items was created, which included maintaining physical distance, using masks, hand hygiene, nutrition, sleep and exercise, referring to information on the pages of institutions such as the Ministry of Health and WHO (Alicilar et al., 2020; Chang, Hou, et al., 2020; Li & Liu, 2020; Olapegba et al., 2020; Wong et al., 2020; Yildirim & Guler, 2020). Items were rated on a 5-point Likert-type scale ranging from 1 (*never*) to 5 (*always*). Of the items, 4 (2nd, 6th, 13th and 14th) represented negative behaviour and were reverse-scored. After the form was created, the content of the questions was evaluated by five experts who were academics and/or health professionals. Each expert was asked to evaluate the 19 items on the form as to how appropriate they were in measuring COVID-19 preventive behaviour using a 3-point Likert-type scale (the item is appropriate = 1, the item should be revised = 2 and the item is not appropriate = 3). Necessary corrections were made on the form in line with the suggestions. Then, a pilot study was conducted with 15 people to evaluate each item in terms of readability and clarity of meaning. The form was reviewed in line with the group's recommendations, and the necessary revisions were made. The score that can be obtained from this part, which evaluates the level of compliance with preventive behaviours, ranges between 19 and 95 points. The Cronbach's alpha coefficient in this study was 0.926.

#### 2.3.2 | Turkey Health Literacy Scale

The scale, developed by Okyay et al. (2016), consists of 32 structural items based on the HLS-EU Conceptual Framework. Items are rated on a 5-point Likert-type scale ranging from 1 (*very easy*) to

5 (*I have no idea*). Scale scores ranged from 0 to 50 points, calculated with a formula. Zero indicates the lowest health literacy, whereas 50 indicates the highest health literacy. According to the value obtained, the level of health literacy is categorized as follows: 0–25 points indicate inadequate health literacy, >25–33 points indicate problematic/limited health literacy, >33–42 points indicate sufficient health literacy and >42–50 points indicate excellent health literacy. The Cronbach's alpha coefficient used to evaluate the overall internal consistency of the scale was reported to be 0.927 (Okuy et al., 2016) and was found to be 0.967 in this study.

## 2.4 | Data collection

Study data were collected online using Google Forms. The survey link/Google Form was shared with the participants residing in different places (big city, province, district and village) via email. Data collection and recording via Google Form were managed by the researcher and limited to only one response per participant. In order to prevent the same participant from completing the survey twice or more, the e-mail addresses of those who filled the form were collected, and those who filled in the form before were asked not to do it again.

In addition, to ensure the accuracy of the data, a question was added to each of the sections where knowledge of COVID-19, COVID-19 preventive behaviours and general health literacy were evaluated. In these additional questions in the related sections, the participants were asked to tick the specified options. For example, an additional item was added to the section including questions about knowledge of COVID-19, instructing respondents to 'mark "no" in this question'. Participants who marked 'yes' or 'I have no idea' in this statement were excluded from the study. Thus, a total of 72 participants who gave different answers to any of these three questions related to the knowledge of COVID-19, the COVID-19 preventive behaviours and health literacy were excluded from the study.

## 2.5 | Ethical considerations

This research was conducted in accordance with the principles stated in the Declaration of Helsinki. Ethics committee approval (11 September 2020) was obtained for the implementation of the research from the Social and Humanities Ethics Committee of Istanbul Medeniyet University (Approval date: 11.09.2020). In the e-mail, participants were informed about the purpose of the study, and those that marked the 'I agree with participating in the survey' expression at the top of the Google Form were requested to fill out the form.

## 2.6 | Data analysis

Statistical analysis was performed using SPSS version 22.0 software (IBM Corp., Armonk, NY, USA). Number, percentage, mean [standard deviation (SD)] or median (min–max) were calculated in descriptive

statistics for categorical and continuous variables. The normality assumption was checked using the 'Kolmogorov–Smirnov' test value. As the distribution was normal, an independent samples t test, one-way analysis of variance (ANOVA) and Bonferroni corrections for post hoc analysis were used to compare total and subscale scores. Pearson's correlation coefficient was used to examine the relationship between two normally distributed quantitative variables. Multiple hierarchical regression analysis was performed to predict COVID-19 preventive behaviours. The significance level was accepted as  $P < 0.05$ .

## 3 | RESULTS

Of the 575 participants, whose mean age was 24.1 years (range: 18–66), 79.5% were women, 81.4% were single, 75.7% had bachelor's degrees and 77.4% had a moderate economic status. The mean COVID-19 knowledge score was 19.5 (range: 1–22); COVID-19 preventive behaviours were 76.7 (range: 31–95), whereas their health literacy scale score was 37.3 (range: 0–50). Of the participants, 33.6% had sufficient health literacy, and 33.9% excellent health literacy (Table 1).

Frequently demonstrated COVID-19 preventive behaviours were as follows:

1. 'I wear a mask when I am out of the house' (92.7%),
2. 'I cover my mouth and nose with a disposable tissue when coughing or sneezing, if there is no tissue I cough or sneeze into the bend of my elbow' (90.2%),
3. 'as my hands get dirty, I wash them with soap and water for at least 20 seconds' (89.7%),
4. 'I wash my hands after touching communal surfaces' (89.1%) (Table 2).

The mean score of COVID-19 preventive behaviours was higher in women compared with men, in singles compared with married people, in high school graduates and those with bachelor or higher degrees compared with primary school graduates and less. The mean score of COVID-19 preventive behaviours was higher in those with good and moderate economic conditions compared with those in poor economic condition; in those who do not live with individuals aged under 18 compared with those who do; in non-smokers compared with smokers; and in those who follow health-related developments compared with those who do not ( $P < 0.05$ ) (Table 3).

There was a positive weakly significant correlation between COVID-19 preventive behaviours score and COVID-19 knowledge scores and health literacy scale score ( $P < 0.05$ ) (Table 4).

To determine the factors that predict preventive behaviours in the COVID-19 pandemic among participants, three different models were set up sequentially. In the third model, being female ( $\beta$ : 0.149), having higher levels of education ( $\beta$ : 0.096), better economic status ( $\beta$ : 0.123), being a non-smoker ( $\beta$ : 0.121), having higher levels of COVID-19 knowledge ( $\beta$ : 0.262) and better general health literacy ( $\beta$ : 0.181) were

**TABLE 1** Characteristics of the participants (*N* = 575)

Variables	Mean (SD)		Min-max
Age (year)	24.1 (9.0)		(18–66)
		<i>n</i>	%
Gender	Male	118	20.5
	Female	457	79.5
Marital status	Married	107	18.6
	Single	468	81.4
Educational level	Primary school and less	23	4.0
	Secondary school	8	1.4
	High school	88	15.3
	Bachelor degree	435	75.7
	Master degree	21	3.7
Economic status	High	82	14.3
	Moderate	445	77.4
	Low	48	8.3
Presence of individuals under 18 years of age at home	Yes	162	28.2
	No	413	71.8
General perception of health	Very good	89	15.5
	Good	291	50.6
	Normal	195	33.9
Smoking status	Never used	442	76.9
	Started to use after the pandemic	3	0.5
	Not used after the pandemic	21	3.7
	Used before and after the pandemic	109	19.0
Having any chronic disease(s)	No	505	87.8
	Yes	70	12.2
Following health-related developments	Yes	509	88.5
	No	66	11.5
Having health workers in the immediate circle	Yes	324	56.3
	No	251	43.7
Health literacy level (THLS)	Inadequate (0–25 points)	43	7.5
	Problematic/limited (>25–33 points)	144	25.0
	Adequate (>33–42 points)	193	33.6
	Excellent (>42–50 points)	195	33.9
COVID-19 knowledge score		19.50 (2.8)	(1–22)
COVID-19 preventive behaviours score		76.7 (12.1)	(31–95)
THLS score		37.3 (9.1)	(0–50)

significant predictors of COVID-19 preventive behaviours ( $F$ : 27.296,  $P < 0.001$ ). These six variables accounted for 22.4% of the variance in COVID-19 preventive behaviours ( $R^2$ : 0.224,  $P < 0.05$ ) (Table 5).

## 4 | DISCUSSION

In this study, participants' knowledge scores were high 19.50 (range: 1–22). In research conducted on the public's knowledge of

COVID-19, using different questionnaires in different countries at different times, knowledge scores were found to be 4.12 (range: 0–5) (Peng et al., 2020), 4.15 (range: 0–5) (Olapegba et al., 2020), 10.8 out of 12 (range: 0–12) (Zhong et al., 2020), 8.1 (range: 0–10) (Alzoubi et al., 2020) and 7.09 (range: 0–10) (Barry et al., 2020). In a systematic review of 21 studies evaluating the general population and health-care workers' knowledge of COVID-19, it was reported that information about COVID-19 was scored at rates ranging from 40% to 99.5% (Bekele et al., 2020). The high level of knowledge reported in this and

TABLE 2 COVID-19 preventive behaviours (N = 575)

COVID-19 preventive behaviours	Never		Rarely		Sometimes		Often		Always	
	n	%	n	%	n	%	n	%	n	%
1. I stay at home as much as possible and stay away from crowded places.	18	3.1	31	5.4	22	3.9	196	34.1	308	53.6
2. I often wash my nose with salt water.	101	17.6	144	25.0	146	25.4	144	25.0	40	7.0
3. I wear a mask when I am out of the house	15	2.6	25	4.3	2	0.3	116	20.2	417	72.5
4. I do not touch the mask with my hand when I wear a mask.	14	2.4	42	7.3	66	11.5	199	34.6	254	44.2
5. I change my surgical mask as it gets moist.	23	4.0	36	6.3	41	7.1	197	34.3	278	48.3
6. I reuse the mask I used before.	294	51.1	136	23.7	71	12.3	53	9.2	21	3.7
7. I cover my mouth and nose with a disposable tissue when coughing or sneezing, if there is no tissue I cough or sneeze into the bend of my elbow.	19	3.3	26	4.5	11	1.9	137	23.8	382	66.4
8. I do not touch my mouth, nose and eyes without washing my hands.	19	3.3	38	6.6	49	8.5	166	28.9	303	52.7
9. I stay 1.5 metres away from people.	17	3.0	34	5.9	51	8.9	194	33.7	279	48.5
10. As my hands get dirty, I wash them with soap and water for at least 20 seconds.	16	2.8	29	5.0	14	2.4	157	27.3	359	62.4
11. When there is no soap and water, I use alcohol-containing hand sanitizer or cologne to clean my hands.	20	3.5	28	4.9	18	3.1	155	27.0	354	61.6
12. I wash my hands after touching communal surfaces.	19	3.3	26	4.5	18	3.1	139	24.2	373	64.9
13. I often use gloves in daily life to prevent disease transmission.	105	18.3	154	26.8	128	22.3	103	17.9	85	14.8
14. I do not wash my hands after removing my mask.	18	3.1	28	4.9	40	7.0	125	21.7	364	63.3
15. I wash food before I consume it.	18	3.1	30	5.2	36	6.3	142	24.7	349	60.7
16. I eat a balanced and healthy diet.	22	3.8	39	6.8	90	15.7	221	38.4	203	35.3
17. I get enough sleep.	32	5.6	36	6.3	92	16.0	202	35.1	213	37.0
18. I exercise.	64	11.1	106	18.4	161	28.0	141	24.5	103	17.9
19. I do relaxation exercises such as deep breathing to avoid stress.	72	12.5	96	16.7	152	26.4	152	26.4	103	17.9

other studies may be due to the easy and quick accessibility of knowledge sources about COVID-19. This finding was also considered to be related to easy access to various guidelines prepared by the WHO, the Ministry of Health and local governments during pandemic times, particularly when data were collected during the second wave period, and considering the high education level of the majority of participants.

In this study, the participants' scores of the THLS were moderately high at mean 37.3 (range: 0–50). Of this sample, 33.6% had sufficient health literacy, whereas 33.9% had excellent health literacy. In other studies, health literacy scale scores were reported at 38.35 (range: 0–56) (Wong et al., 2020), 11.09 (range: 3–15) (Barry et al., 2020) and 12.38 (range: 0–17) (Kilinc et al., 2020). In a study conducted in Australia, 87% of the sample was reported to have adequate health literacy (McCaffery et al., 2020). The moderately high level of health literacy in this study may be due to the high education level of the majority of the participants.

In this study, the participants' score of COVID-19 preventive behaviours was moderately high 76.7 (range: 31–95). In other

studies, COVID-19 preventive behaviour scores were reported at 8.91 (range: 0–10) (Peng et al., 2020), 11.04 (range: 0–18) (Salman et al., 2020) and 20.30 (range: 0–27) (Wong et al., 2020). In this and other studies, it was thought that the high scores for COVID-19 preventive behaviours were due to the collection of data in the second wave period and the high education level of the majority of the participants.

The most common COVID-19 preventive behaviours were mask-wearing (92.7%), taking the necessary precautions while coughing and sneezing (90.2%) and washing hands (89.7%). In the research, although COVID-19 preventive behaviours of the public differ, among the common COVID-19 preventive behaviours were mask-wearing (Ferdous et al., 2020; Reuben et al., 2020; Wong et al., 2020; Zhong et al., 2020), physical distancing/social isolation/limiting the number of social contacts (Khasawneh et al., 2020; Reuben et al., 2020; Riiser et al., 2020), regular hand washing (Ferdous et al., 2020; Khasawneh et al., 2020; Riiser et al., 2020; Wong et al., 2020) and enhanced personal hygiene measures (Khasawneh et al., 2020; Reuben et al., 2020). It could be said that

**TABLE 3** Comparison of the mean score of COVID-19 preventive behaviours according to characteristics of the participants ( $N = 575$ )

Variables	COVID-19 preventive behaviours score	
	Mean (SD)	t/F
Gender		
Male <sup>a</sup>	71.2 (16.4)	t: -5.648
Female <sup>b</sup>	78.1 (10.2)	$P < 0.001^{***}$
		b > a
Marital status		
Married <sup>a</sup>	73.9 (15.4)	t: -2.905
Single <sup>b</sup>	77.3 (11.1)	$P < 0.01^{**}$
		a < b
Educational level		
Primary school and less <sup>a</sup>	68.5 (17.4)	F: 9.579
Secondary/high school <sup>b</sup>	74.9 (13.0)	$P < 0.001^{***}$
Bachelor's/master's degree <sup>c</sup>	77.6 (11.2)	b > a, c > a
Economic status		
High <sup>a</sup>	80.0 (10.0)	F: 10.218
Moderate <sup>b</sup>	76.7 (11.5)	$P < 0.001^{***}$
Low <sup>c</sup>	70.3 (16.3)	a > c, b > c
Having any chronic disease(s)		
Yes <sup>a</sup>	76.8 (11.8)	t: 0.897
No <sup>b</sup>	75.4 (14.3)	P: 0.370
Presence of individuals under 18 years of age at home		
Yes <sup>a</sup>	74.8 (14.1)	t: -2.307
No <sup>b</sup>	77.8 (11.1)	$P < 0.05^*$
General perception of health		
Very good <sup>a</sup>	75.5 (15.0)	F: 1.180
Good <sup>b</sup>	77.4 (11.5)	P: 0.308
Normal <sup>c</sup>	76.1 (11.4)	
Smoking status		
Yes <sup>a</sup>	77.6 (10.8)	t: 4.051
No <sup>b</sup>	72.6 (15.8)	$P < 0.001^{***}$
		a > b
Following health-related developments		
Yes <sup>a</sup>	77.2 (11.9)	t: 3.214
No <sup>b</sup>	72.2 (12.4)	$P < 0.01^{**}$

Note: t = independent samples t test, F = one-way analysis of variance (ANOVA), post hoc test (Bonferroni).

\* $P < 0.05$ . \*\* $P < 0.01$ . \*\*\* $P < 0.001$ .

the data obtained in this study are similar to those of the aforementioned studies.

In this study, the mean score of COVID-19 preventive behaviours was higher in women, single people, high school and university graduates, in those who were in good/moderate economic condition, in non-smokers and those who followed health-related developments. Studies have reported that COVID-19 preventive behaviours are

**TABLE 4** The relationship between COVID-19 preventive behaviours and age, COVID-19 knowledge and general health literacy

	COVID-19 preventive behaviours score	General health literacy score
Age (year)	r: -0.066; P: 0.112 <sup>***</sup>	r: -0.113; P: 0.007 <sup>*</sup>
COVID-19 knowledge score	r: 0.339; P < 0.001 <sup>**</sup>	r: 0.121; P: 0.004 <sup>*</sup>
COVID-19 preventive behaviours score	—	r: 0.231; P < 0.001 <sup>**</sup>

Note: Pearson correlation.

\* $P < 0.01$ . \*\* $P < 0.001$ . \*\*\* $P > 0.05$ .

more frequently performed by women (Ceyhan & Uzuntarla, 2020; Ferdous et al., 2020; Zhong et al., 2020), by those with good socio-economic status (Ferdous et al., 2020; Zhong et al., 2020) and those with higher education (Ferdous et al., 2020). Although these findings are similar to those of our research, it has also been reported that COVID-19 preventive behaviours are better demonstrated by young people (Peng et al., 2020) and individuals aged 30 and above (Ferdous et al., 2020) and that demonstration of these preventive behaviours do not differ according to gender (Peng et al., 2020), contrary to our findings. It could be argued that this result could be linked with both socio-cultural differences among countries and with the population of this study.

This study showed a weak positive significant correlation between COVID-19 preventive behaviours scores and COVID-19 knowledge scores and general health literacy scale scores. Similar to our research findings, a positive correlation was reported between COVID-19 preventive behaviours and knowledge of COVID-19 (Ceyhan & Uzuntarla, 2020; Peng et al., 2020). In other studies, it has also been reported that health literacy correlates with both handwashing knowledge and handwashing behaviour (Riiser et al., 2020). However, contrary to our research findings, it is also reported that information on COVID-19 is not related to preventive behaviour (Yildirim & Guler, 2020). Although it is an expected result that as the knowledge regarding COVID-19 and health literacy increases, the COVID-19 preventive behaviours also increase, this may not always present a linear relationship because the level of knowledge and health literacy alone are not sufficient determinants regarding compliance with behaviours. Factors affecting individuals' health behaviours such as perceived seriousness and susceptibility to COVID-19, perceived barriers, perceived benefits, motivating factors and self-efficacy regarding compliance with COVID-19 preventive behaviours may also have an effect. In a study conducted of university students in Iran, it was reported that the level of COVID-19-related knowledge was not associated with COVID-19 preventive behaviours, whereas it was found to be associated with perceived susceptibility, perceived severity and health information seeking behaviours (Rayani et al., 2021).

Therefore, we recommend that various psychosocial approaches, such as the Health Belief Model, the Theory of

**TABLE 5** Multiple hierarchical regression for COVID-19 preventive behaviours (N = 575)

	COVID-19 preventive behaviours			
	R <sup>2</sup>	ΔR <sup>2</sup>	β	F P
Model 1				
Being female	0.103	0.098	0.210	21.882
Educational level			0.154	<0.001*
Economic status			0.158	
Model 2				
Being female			0.175	19.024
Educational level	0.118	0.112	0.158	<0.001*
Economic status			0.164	
Being a non-smoker			0.126	
Model 3				
Being female			0.149	27.296
Educational level			0.096	<0.001*
Economic status	0.224	0.216	0.123	
Being a non-smoker			0.121	
COVID-19 knowledge score			0.262	
General health literacy score			0.181	

\*P &lt; 0.001.

Reasoned Action, the Social Cognitive Model, the Protection Motivation Theory and the Stages of Change Model (Tang & Wong, 2004) be examined for their utility in predicting individuals' COVID-19 preventive behaviours. It is not always possible to talk about a linear relationship between the level of knowledge and general health literacy. Although knowledge is related to accessing and understanding information that is within the scope of the health literacy concept, it may not be directly related to evaluating and applying the obtained information.

In this study, being female, higher levels of education, better economic status, being a non-smoker, having greater COVID-19 knowledge and better general health literacy were positive significant predictors of COVID-19 preventive behaviours. Similar to our research findings, other studies reported that being female (Alper et al., 2020; Arslanca et al., 2021; Li et al., 2020; Li & Liu, 2020; Raude et al., 2020), of better economic status (Li et al., 2020; Li & Liu, 2020) with higher levels of education (Gautam et al., 2021), greater disease knowledge and better eHealth literacy (Li & Liu, 2020) were positive significant predictors of COVID-19 preventive behaviours. In addition, it was reported that age and marital status did not predict COVID-19 preventive behaviours (Li & Liu, 2020). Contrary to our research findings, gender (Gautam et al., 2021) and educational level (Alper et al., 2020; Li & Liu, 2020) were not found to predict COVID-19 preventive behaviours; age (Li et al., 2020; Li & Liu, 2020; Raude et al., 2020) and educational level (Li et al., 2020) were significant negative predictors, whereas being married was a positive significant predictor of COVID-19 preventive behaviours (Li et al., 2020).

#### 4.1 | Limitations of the study

The research was conducted in Turkey during the second wave of COVID-19 when many governments and public health campaigns were launched on social media and access to information was easy. This may have contributed to the overall positive results. Furthermore, data were collected via Google Form without the risk of COVID-19 transmission in the pandemic.

The sample group represented in the research did not allow generalization of the obtained findings to the whole society because the majority of participants were women, single and had bachelor degrees. In future studies on this subject, it is recommended to take measures to ensure the homogeneity and representative nature of the sample group.

Evaluation of all variables using only self-report is another limitation. It is recommended that future research be planned to measure actual behaviour rather than behavioural self-reports.

## 5 | CONCLUSION

For the future, to increase COVID-19 preventive behaviours, we recommend that attempts be made to increase COVID-19 knowledge and health literacy. We also recommend conducting research with different populations (children, adolescents, students, immigrants, patients, etc.) to predict individuals' COVID-19 preventive behaviours. Further, in this study, the authors provided no incentive to increase participation in the research. In future studies, it is recommended to



provide incentives to increase the number of individuals participating in the study.

## ACKNOWLEDGEMENTS

The authors would like to thank all participating in this study. The authors declared that this study has received no financial support.

## CONFLICT OF INTEREST

The authors have no conflict of interest to disclose.

## AUTHORSHIP STATEMENT

This study was designed and conceptualized by CS and ACA. Analysis of research data was done by ACA. CS and ACA contributed in data gathering and interpretation, agreeing on the design and scrutinizing the technical content and write ups of the full manuscript. CS and ACA after final review of the revised version of the manuscript agreed and approved to be submitted for publication.

## DATA AVAILABILITY STATEMENT

Research data are not shared.

## ORCID

Cemile Savci  <https://orcid.org/0000-0002-5612-9335>

## REFERENCES

- Abdel-Latif, M. M. (2020). The enigma of health literacy and COVID-19 pandemic. *Public Health*, 185, 95–96. <https://doi.org/10.1016/j.puhe.2020.06.030>
- Abel, T., & McQueen, D. (2020). Critical health literacy and the COVID-19 crisis. *Health Promotion International*, 35, 1612–1613. <https://doi.org/10.1093/heapro/daaa040>
- Ahorsu, D. K., Imani, V., Lin, C. Y., Timpka, T., Broström, A., Updegraff, J. A., Årestedt, K., Griffiths, M. D., & Pakpour, A. H. (2020). Associations between fear of COVID-19, mental health, and preventive behaviours across pregnant women and husbands: An actor-partner interdependence modelling. *International Journal of Mental Health and Addiction*, 20, 1–15. <https://doi.org/10.1007/s11469-020-00340-x>
- Ahorsu, D. K., Lin, C. Y., & Pakpour, A. H. (2020). The association between health status and insomnia, mental health, and preventive behaviours: The mediating role of fear of COVID-19. *Gerontology and Geriatric Medicine*, 6, 1–9. <https://doi.org/10.1177/2333721420966081>
- Alicilar, H. E., Gunes, G., & Col, M. (2020). Toplumda COVID-19 pandemisiyle ilgili farkındalık, tutum ve davranışların değerlendirilmesi (Evaluation of awareness, attitudes and behaviors related to COVID-19 pandemic in society). *ESTÜDAM Halk Sağlığı Dergisi*, 5, 1–16. <https://doi.org/10.35232/estudamhsd.763461>
- Alper, S., Bayrak, F., & Yılmaz, O. (2020). Psychological correlates of COVID-19 conspiracy beliefs and preventive measures: Evidence from Turkey. *Current Psychology*, 40(11), 5708–5717. <https://doi.org/10.1007/s12144-020-00903-0>
- Alzoubi, H., Alnawaiseh, N., Al-Mnayyis, A., Lubad, M. A., Aqel, A., & Al-Shagahin, H. (2020). COVID-19-knowledge, attitude and practice among medical and non-medical university students in Jordan. *Journal of Pure and Applied Microbiology*, 14(1), 17–24. <https://doi.org/10.22207/JPAM.14.1.04>
- Arslanca, T., Fidan, C., Dagez, M., & Dursun, P. (2021). Knowledge, preventive behaviors and risk perception of the COVID-19 pandemic: A cross-sectional study in Turkish health care workers. *PLoS ONE*, 16(4), e0250017. <https://doi.org/10.1371/journal.pone.0250017>
- Barry, C., Green, S., Payne, B., Holmes, J., & Xu, K. T. (2020). Knowledge of COVID-19 and health literacy among patients seeking care in an emergency department. *BMC Emergency Medicine*. <https://doi.org/10.21203/rs.3.rs-92195/v1>
- Bekele, F., Sheleme, T., Fekadu, G., & Bekele, K. (2020). Patterns and associated factors of COVID-19 knowledge, attitude, and practice among general population and health care workers: A systematic review. *SAGE Open Medicine*, 8, 2050312120970721. <https://doi.org/10.1177/2050312120970721>
- Castro-Sánchez, E., Chang, P. W. S., Vila-Candel, R., Escobedo, A. A., & Holmes, A. H. (2016). Health literacy and infectious diseases: Why does it matter? *International Journal of Infectious Diseases*, 43, 103–110. <https://doi.org/10.1016/j.ijid.2015.12.019>
- Ceyhan, S., & Uzuntarla, Y. (2020). Determination of knowledge, attitudes and behaviors of academic staff towards COVID-19. *Electronic Turkish Studies*, 15(6), 259–275.
- Chang, K. C., Hou, W. L., Pakpour, A. H., Lin, C. Y., & Griffiths, M. D. (2020). Psychometric testing of three COVID-19-related scales among people with mental illness. *International Journal of Mental Health and Addiction*, 20, 1–13. <https://doi.org/10.1007/s11469-020-00361-6>
- Chang, K. C., Strong, C., Pakpour, A. H., Griffiths, M. D., & Lin, C. Y. (2020). Factors related to preventive COVID-19 infection behaviors among people with mental illness. *Journal of the Formosan Medical Association*, 119(12), 1772–1780. <https://doi.org/10.1016/j.jfma.2020.07.032>
- Ferdous, M. Z., Islam, M. S., Sikder, M. T., Mosaddek, A. S. M., Zegarar-Valdivia, J. A., & Gozal, D. (2020). Knowledge, attitude, and practice regarding COVID-19 outbreak in Bangladesh: An online-based cross-sectional study. *PLoS ONE*, 15(10), e0239254. <https://doi.org/10.1371/journal.pone.0239254>
- Gautam, V., Dileepan, S., Rustagi, N., Mittal, A., Patel, M., Shafi, S., Thirunavukkarasu, P., & Raghav, P. (2021). Health literacy, preventive COVID 19 behaviour and adherence to chronic disease treatment during lockdown among patients registered at primary health facility in urban Jodhpur, Rajasthan. *Diabetes and Metabolic Syndrome: Clinical Research and Reviews*, 15(1), 205–211. <https://doi.org/10.1016/j.dsx.2020.12.023>
- Huang, C., Wang, Y., Li, X., Ren, L., Zhao, J., Hu, Y., Zhang, L., Fan, G., Xu, J., Gu, X., Cheng, Z., Yu, T., Xia, J., Wei, Y., Wu, W., Xie, X., Yin, W., Li, H., Liu, M., ... Cao, B. (2020). Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *The Lancet*, 395(10223), 497–506. [https://doi.org/10.1016/S0140-6736\(20\)30183-5](https://doi.org/10.1016/S0140-6736(20)30183-5)
- Khasawneh, A. I., Humeidan, A. A., Alsulaiman, J. W., Bloukh, S., Ramadan, M., Al-Shatanawi, T. N., Awad, H. H., Hijazi, W. Y., Al-Kammash, K. R., Obeidat, N., Saleh, T., & Kheirallah, K. A. (2020). Medical students and COVID-19: Knowledge, attitudes, and precautionary measures. A descriptive study from Jordan. *Frontiers in Public Health*, 8, 253. <https://doi.org/10.3389/fpubh.2020.00253>
- Kilinc, A., Cam, C., Aydogan Gedik, S., Oktar, D., Tascioglu, U., Oznur Muz, F. N., Önsüz, M. F., & Metintas, S. (2020). Evaluation of public health literacy in adults who applied for primary health care in Turkey. *European Journal of Public Health*, 30(Supplement\_5), ckaa165–586. <https://doi.org/10.1093/eurpub/ckaa165.586>
- Kim, S., Kim, Y. J., Peck, K. R., & Jung, E. (2020). School opening delay effect on transmission dynamics of coronavirus disease 2019 in Korea: Based on mathematical modeling and simulation study. *Journal of Korean Medical Science*, 35(13), e143. <https://doi.org/10.3346/jkms.2020.35.e143>
- Li, S., Feng, B., Liao, W., & Pan, W. (2020). Internet use, risk awareness, and demographic characteristics associated with engagement in preventive behaviors and testing: Cross-sectional survey on COVID-19 in the United States. *Journal of Medical Internet Research*, 22(6), e19782. <https://doi.org/10.2196/19782>
- Li, X., & Liu, Q. (2020). Social media use, eHealth literacy, disease knowledge, and preventive behaviors in the COVID-19 pandemic:

- Cross-sectional study on Chinese netizens. *Journal of Medical Internet Research*, 22(10), e19684. <https://doi.org/10.2196/19684>
- Lin, C. Y., Imani, V., Majd, N. R., Ghasemi, Z., Griffiths, M. D., Hamilton, K., Hagger, M. S., & Pakpour, A. H. (2020). Using an integrated social cognition model to predict COVID-19 preventive behaviours. *British Journal of Health Psychology*, 25(4), 981–1005. <https://doi.org/10.1111/bjhp.12465>
- McCaffery, K. J., Dodd, R. H., Cvejic, E., Ayre, J., Batcup, C., Isautier, J. M. J., Copp, T., Bonner, C., Pickles, K., Nickel, B., Dakin, T., Cornell, S., & Wolf, M. S. (2020). Health literacy and disparities in COVID-19 related knowledge, attitudes, beliefs and behaviours in Australia. *Public Health Res Pract*, 30(4), e30342012. <https://doi.org/10.17061/phrp30342012>
- Nicholas, T., Mandaah, F. V., Esemu, S. N., Vanessa, A. B. T., Gilchrist, K. T. D., Vanessa, L. F., & Shey, N. D. (2020). COVID-19 knowledge, attitudes and practices in a conflict affected area of the South West Region of Cameroon. *The Pan African Medical Journal*, 35(34), 1–8. <https://doi.org/10.11604/pamj.suppl.2020.35.2.22963>
- Nutbeam, D. (2017). Discussion paper on promoting, measuring and implementing health literacy-implications for policy and practice in non-communicable disease prevention and control. *World Health Organ*, 1–29.
- Okuyay, P., Abacigil, F., & Harlak, H. (2016). *Türkiye Sağlık Okuryazarlığı Ölçeği-32 (TSOY-32)*. In P. Okuyay & F. Abacigil (Eds.), *Türkiye Sağlık Okuryazarlığı Ölçekleri Güvenilirlik ve Geçerlilik Çalışması* (Vol. 1) (pp. 43–62). Sağlık Bakanlığı.
- Olapegba, P. O., Iorfa, S. K., Kolawole, S. O., Oguntayo, R., Gandi, J. C., Ottu, I. F., & Ayandele, O. (2020). Survey data of COVID-19-related knowledge, risk perceptions and precautionary behavior among Nigerians. *Data in Brief*, 30, 105685. <https://doi.org/10.1016/j.dib.2020.105685>
- Paakkari, L., & Okan, O. (2020). COVID-19: Health literacy is an underestimated problem. *The Lancet Public Health*, 5(5), e249–e250. [https://doi.org/10.1016/S2468-2667\(20\)30086-4](https://doi.org/10.1016/S2468-2667(20)30086-4)
- Paasche-Orlow, M. K., Parker, R. M., Gazmararian, J. A., NielsenBohman, L. T., & Rudd, R. R. (2005). The prevalence of limited health literacy. *Journal of General Internal Medicine*, 20(2), 175–184. <https://doi.org/10.1111/j.1525-1497.2005.40245.x>
- Peng, Y., Pei, C., Zheng, Y., Wang, J., Zhang, K., Zheng, Z., & Zhu, P. (2020). A cross-sectional survey of knowledge, attitude and practice associated with COVID-19 among undergraduate students in China. *BMC Public Health*, 20(1), 1–8. <https://doi.org/10.1186/s12889-020-09392-z>
- Raude, J., Lecrique, J. M., Lasbeur, L., Leon, C., Guignard, R., Roscoät, E. D., & Arwidson, P. (2020). Determinants of preventive behaviors in response to the COVID-19 pandemic in France: Comparing the sociocultural, psychosocial and social cognitive explanations. *Frontiers in Psychology*, 11, 3345. <https://doi.org/10.3389/fpsyg.2020.584500>
- Rayani, M., Rayani, S., & Najafi-Sharjabad, F. (2021). COVID-19-related knowledge, risk perception, information seeking, and adherence to preventive behaviors among undergraduate students, southern Iran. *Environmental Science and Pollution Research*, 28(42), 59953–59962. <https://doi.org/10.1007/s11356-021-14934-y>
- Reuben, R. C., Danladi, M. M., Saleh, D. A., & Ejembi, P. E. (2020). Knowledge, attitudes and practices towards COVID-19: An epidemiological survey in North-Central Nigeria. *Journal of Community Health*, 46, 457–470. <https://doi.org/10.1007/s10900-020-00881-1>
- Rieger, M. O. (2020). To wear or not to wear? Factors influencing wearing face masks in Germany during the COVID-19 pandemic. *Soc Health Behav*, 3(2), 50–54. [https://doi.org/10.4103/SHB.SHB\\_23\\_20](https://doi.org/10.4103/SHB.SHB_23_20)
- Riiser, K., Helseth, S., Haraldstad, K., Torbjørnsen, A., & Richardsen, K. R. (2020). Adolescents' health literacy, health protective measures, and health-related quality of life during the Covid-19 pandemic. *PLoS ONE*, 15(8), e0238161. <https://doi.org/10.1371/journal.pone.0238161>
- Saadatjoo, S., Miri, M., Hassanipour, S., Ameri, H., & Arab-Zozani, M. (2020). A systematic review of the knowledge, attitudes, and practices of physicians, health workers, and the general population about coronavirus disease 2019 (COVID-19). *medRxiv*. <https://doi.org/10.1101/2020.10.04.20206094>
- Salman, M., Mustafa, Z. U., Asif, N., Zaidi, H. A., Hussain, K., Shehzadi, N., Khan, T. M., & Saleem, Z. (2020). Knowledge, attitude and preventive practices related to COVID-19: A cross-sectional study in two Pakistani university populations. *Drugs & Therapy Perspectives*, 36, 319–325. <https://doi.org/10.1007/s40267-020-00737-7>
- Serwaa, D., Lamptey, E., Appiah, A. B., Senkyire, E. K., & Ameyaw, J. K. (2020). Knowledge, risk perception and preparedness towards coronavirus disease-2019 (COVID-19) outbreak among Ghanaians: A quick online cross-sectional survey. *The Pan African Medical Journal*, 35(44), 1–7. <https://doi.org/10.11604/pamj.suppl.2020.35.2.22630>
- Tang, C. S. K., & Wong, C. Y. (2004). Factors influencing the wearing of facemasks to prevent the severe acute respiratory syndrome among adult Chinese in Hong Kong. *Preventive Medicine*, 39(6), 1187–1193. <https://doi.org/10.1016/j.ypmed.2004.04.032>
- Tehrani, H., Rahmani, M., & Jafari, A. (2018). Health literacy and its relationship with general health of women referring to health care centers. *Journal of Health Literacy*, 3(3), 191–198. <https://doi.org/10.22038/JHL.2018.36901.1021>
- Wong, J. Y. H., Wai, A. K. C., Zhao, S., Yip, F., Lee, J. J., Wong, C. K. H., Wang, M. P., & Lam, T. H. (2020). Association of individual health literacy with preventive behaviours and family well-being during COVID-19 pandemic: Mediating role of family information sharing. *International Journal of Environmental Research and Public Health*, 17(23), 8838. <https://doi.org/10.3390/ijerph17238838>
- World Health Organization. (2020). Novel coronavirus (2019-nCoV)-situation report 13. Available online: <https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200202-sitrep-13-ncov-v3.pdf> (accessed on 26 December 2020).
- Yildirim, M., & Guler, A. (2020). COVID-19 severity, self-efficacy, knowledge, preventive behaviors, and mental health in Turkey. *Death Studies*, 1–8. <https://doi.org/10.1080/07481187.2020.1793434>
- Zhong, B. L., Luo, W., Li, H. M., Zhang, Q. Q., Liu, X. G., Li, W. T., & Li, Y. (2020). Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: A quick online cross-sectional survey. *International Journal of Biological Sciences*, 16(10), 1745–1752. <https://doi.org/10.7150/ijbs.45221>

**How to cite this article:** Savci, C., & Cil Akinci, A. (2022). Predictors of COVID-19 preventive behaviours in a sample of the Turkish population. *International Journal of Nursing Practice*, 28(2), e13048. <https://doi.org/10.1111/ijn.13048>