

1 **Evaluation of variables affecting health-seeking behaviors in the COVID-19**  
2 **pandemic with structural equation modeling in İstanbul, Türkiye**

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3    **Abstract**

4 Background/aim: The relation between demographic characteristics of individuals and  
5 their health-seeking behaviors was presented, the effects of health cognitions, healthy  
6 lifestyle behaviors, and coronavirus fear levels on health-seeking behaviors were aimed  
7 to examine in COVID-19 pandemic.

8 Materials and methods: This descriptive, survey study was conducted in the Tuzla,  
9 district of İstanbul, Türkiye between March-June, 2021.

10 Results: From analysis of 391 participants, 60.0% were females, 27.1% aged between  
11 31-40 years, 47.0% were healthcare professionals, and 50.9% perceived socioeconomic  
12 status was above average. According to the results, women have more health-seeking  
13 behavior than men ( $p < 0.05$ ). While young participants showed more online health-  
14 seeking behavior ( $p < 0.05$ ), older individuals have more health responsibility ( $p <$   
15  $0.05$ ). The participants have high education showed traditional health-seeking behavior  
16 ( $p < 0.05$ ) more than others, and the level of below-low socioeconomic status increased  
17 the COVID-19 fear level 1.94 times (95.0% CI: 1.08-3.48). HSBS was related to HCQ  
18 ( $p < 0.0001$ ) and HLBS-II ( $p = 0.002$ ; Table 3). While HSBS was positively associated  
19 with an increase in HCQ score and HLBS-II score ( $p < 0.05$ ), HSBS was not statistically  
20 related to FCV-19S ( $p > 0.05$ ).

21 Conclusion: While the fear of COVID-19 was not statistically effective, health  
22 cognitions and healthy lifestyle behaviors were main factors that led to health-seeking  
23 behavior in COVID-19 pandemic.

24 **Key words:** COVID-19, pandemic, health-seeking behavior, structural equation  
25 modeling

## 1 **1. Introduction**

2 Health-seeking behavior can be defined as actions taken to solve current and potential  
3 health problems by professional means. Humanity throughout its existence was  
4 experiencing a constant change caused by events in its natural environment. One of the  
5 natural events that humanity has encountered many times until today has been  
6 pandemics. Throughout history pandemics that affect states, societies, and individuals.  
7 It is known that there is a relation between how individuals perceive a disease, and their  
8 response to it, and adaptation to the disease [1]. For this reason, the health-seeking  
9 behavior of individuals' response to a threat is important to minimize speed of spread of  
10 the epidemic to reduce its geographical prevalence and possible loss of life. In addition,  
11 knowledge of individuals' response to a threat is essential for authorities to handle to  
12 epidemics and plan accordingly [2].

13 It should be seen as the responsibility of public health professionals to understand that  
14 how society relates to measures because of present extraordinary conditions and  
15 changing daily life during the Corona virus disease 2019 (COVID-19). For this purpose,  
16 recent studies have shown important results for the variables that shape health behaviors  
17 regarding compliance with the measures taken. One of these studies, How Democracies  
18 Cope with COVID-19: A Data Driven Approach, 2020-2021 (The HOPE Project) was a  
19 scale study published by a group of Danish academics. This study aimed to reveal and  
20 compare how citizens in Western countries approach the measures taken regarding the  
21 epidemic. The study has a mission to transparently explain how the COVID-19  
22 restrictions were implemented in Danish citizens to maintain trust to their government.  
23 So, Danish Health Authority (DHA) had an opportunity to collect all individuals' posts,  
24 comments, and responses to comments, the data that collected used for scientific

1 purposes only. It was hoped to be seen, as a general social example communication of  
2 information during a health crisis. The science of health communication has highlighted  
3 the need to forward science informatics over the last decade by building trust through  
4 transparency [3]. The HOPE Project contributed to Denmark's relatively successful  
5 management of the epidemic's early stages, about first results of the survey conducted  
6 among 26,508 people showed that threat perception and fear were the determining  
7 factors, even across cultures, in line with the measures taken [4]. Another significant  
8 result from the HOPE Project reveals that believing in the effectiveness of measures  
9 was a strong factor that positively affects health-seeking behaviors [4]. Moreover, it has  
10 been observed the effects of this belief were powerful on individuals with weak threat  
11 perception that this suggests that health belief model that was not based on health  
12 anxiety or fear [4].

13 Research on this subject in Turkey was carried out relatively at the beginning of the  
14 epidemic. Long-term, repeated field studies are needed to reveal the factors that shape  
15 the healthy behavior of the public. The question 'needing for field studies produced in  
16 the field of health-seeking behavior' can be answered within the framework of  
17 'effectiveness'.

### 18 **1.1. Study content**

19 In our research, in addition to examining the relation between individuals' demographic  
20 data and health-seeking behavior, performed structural equation modeling to examine  
21 the effect level of health cognitions, fear of COVID-19, and healthy lifestyle behaviors  
22 on health-seeking behavior. If individuals who do not have health concerns do not show  
23 health-seeking behavior, this situation can cause serious health problems in the future.  
24 On the other hand, while individuals with high health concerns those caused to use

1 health services unnecessarily, caused preventing that really need people. When the  
2 individuals have high levels of health-seeking behaviors and healthy lifestyle behaviors,  
3 they do not worry excessively, can maintain the balance. One thing was obvious that the  
4 COVID-19 pandemic caused a widespread effect on the mental well-being of people  
5 across the globe [5].

## 6 **1.2. Multivariate model analyses**

7 Multivariate model analyses showed the level of effect of a change in each independent  
8 variable on the outcome and determine to explain the level of its effect. SEM was a  
9 second-generation method of data analysis, addressing a research question by modeling  
10 the connections among multiple independent and dependent variables [6]. One of the  
11 recent SEM studies results searched the relation between fear and anxiety related to  
12 COVID-19 among pregnant women showed that, COVID-19-induced anxiety have  
13 indirect effects to the mental well-being of pregnant women [7]. It has been seen that  
14 modeling studies facilitate the complex analysis created with dynamic latent variables in  
15 health research. In the literature, similar modeling studies in the field of health  
16 conducted abroad mostly examine the effects of health behaviors, quality of life,  
17 anxiety, and risk factors in individuals with chronic diseases. For example, a study was  
18 conducted to evaluate the mediating impact of the Mediterranean diet in moderating the  
19 negative impact of depression and anxiety on the likelihood of developing  
20 cardiovascular disease with a structural equation modeling approach [8]. Generalized,  
21 behavioral examples are the basis of modeling studies, especially in health. However,  
22 modeling studies in Turkiye were limited, our research aimed to provide access to more  
23 useful scientific data to understand the variables' affect, and their effectiveness levels on  
24 health-seeking behaviors for health policies carried out in this field.

## 1 **2. Materials and methods**

2 This descriptive and survey study was conducted in Tuzla district of İstanbul, Türkiye.  
3 The research population consisted of adults over aged eighteen living in Tuzla, was a  
4 total number of 85,446.

### 5 **2.1. Study design**

6 Although our study was descriptive research, the relation of individuals' demographic  
7 characteristics with health-seeking behavior and the effect of health cognition, healthy  
8 lifestyle behaviors and coronavirus fear level on health-seeking behavior are in a cross-  
9 sectional analytical design. Since those volunteered to participate in the study were  
10 included in the sample using the convenient sampling method (not a probability  
11 sampling method), so we could not generalize the results to all the adult population of  
12 Tuzla that hindered the cross-sectional analytical design of our study. Since  
13 confirmatory factor analysis and correlations between scales were investigated, our  
14 study also had a methodological design section.

### 15 **2.2. Sample size**

16 During the data collection period of March-June, 2021 the individuals reached when  
17 filiation studies of COVID-19 and vaccination studies in the research area, were invited  
18 to our survey. A total of 391 people volunteered in our study. Since, there were missing  
19 questions (unanswered), the sample number (n) was not given as 391 on all scales.

### 20 **2.3. Data collection**

21 The data were collected via questionnaires, printed and online, in a way that all  
22 participants could understand much easier by taking care to answer in a period  
23 appropriate to the research topic. This study utilized previously validated scales and  
24 ensured their comprehension and acceptability among all participants. Due to the

1 pandemic, an online survey was sent to those who wanted to participate in the research  
2 among those who visited during the filiation studies. The questionnaire was applied to  
3 the elderly group during the vaccination studies at home. Printed questionnaires were  
4 given at health institutions and public situations who wanted to participate in the study.  
5 The questionnaire consisted of five parts, a total of 108 questions. The initial section of  
6 the data collection form included items regarding the demographic characteristics of the  
7 participants. The Health Seeking Behavior Scale, the Health Cognitions Questionnaire,  
8 the Healthy Lifestyle Behaviors Scale-II, and the Fear of COVID-19 Scale were applied  
9 in the second part of the data collection form.

### 10 **2.3.1. Health Seeking Behavior Scale**

11 The scale developed by Kırac and Öztürk in 2021 consists of twelve items and three  
12 sub-dimensions [9]. The online health-seeking behavior contains six items, while the  
13 traditional and professional sub-dimensions each have three items. Cronbach's alpha  
14 coefficient was 0.755 for the HSBS. The scale items rated on 5-point Likert type and  
15 ranging from "strongly disagree = 1" to "strongly agree = 5". The total scores from the  
16 scale vary between 12-60. High scores reflect the high level of health-seeking behaviors  
17 [9].

### 18 **2.3.2. Health Cognitions Questionnaire**

19 The scale developed by Hadjistavropoulos et al. in 2012 evaluates dysfunctional health-  
20 related beliefs associated with the severity of health anxiety experienced by individuals  
21 [10]. The scale consists of 20 items prepared with the Likert method and ranging from  
22 "strongly disagree = 1" to "strongly agree = 5". The total score obtained from the scale  
23 varies between 20-100. The scale consists of four sub-dimensions: possibility of  
24 disease, severity of the disease, difficulty in coping with the disease, and inadequacy of

1 medical services. High scores on the scale reflect high dysfunctional beliefs about  
2 health [11, 12]. The Cronbach's alpha coefficient was calculated as 0.821 [12].

### 3 **2.3.3. Healthy Lifestyle Behaviors Scale-II**

4 The HLBS was developed in 1987 and revised as HLBS-II by Walker in 1996 [13]. The  
5 Turkish version of the scale was developed by Bahar et al. in 2008 [14]. The HLBS-II is  
6 a 4-point Likert-type scale (“never = 1” to “regularly = 4”) and consists of 52 items and  
7 six sub-dimensions. The sub-dimensions include physical activity, nutrition, spiritual  
8 growth, interpersonal support, health responsibility, and stress management. The  
9 Cronbach's alpha coefficient of the HLBS-II was 0.92 [14]. The total scores vary from  
10 52 to 208. Higher scores show the more common practice of healthy behaviors [14].

### 11 **2.3.4. The Fear of COVID-19 Scale**

12 The scale developed by Ahorsu et al. consists of seven items and is unidimensional [5].  
13 The Turkish validity and reliability study of the FCV-19S was conducted by Bakioğlu et  
14 al. [15]. Cronbach's alpha coefficient of the FCV-19S was 0.82. The items were  
15 answered on a 5-point Likert scale ("strongly disagree = 1" to "strongly agree = 5"). The  
16 scores from the scale vary between 7 and 35. Better scores show experiencing high level  
17 of fear towards the coronavirus [15].

## 18 **2.4. Statistical analysis**

19 Statistical Package for the Social Sciences (SPSS) for Windows version 21.0 program  
20 (IBM Corp, Armonk, NY: USA, Released 2012) was used to analyze the data obtained  
21 for our study. The Health Cognitions Questionnaire (HCQ), the Healthy Lifestyle  
22 Behaviors Scale-II (HLBS-II) and the Fear of COVID-19 Scale (FCV-19S) scores'  
23 predicted effects on the Health-Seeking Behavior Scale (HSBS) as the dependent



1 variable, were examined by structural equation modeling (SEM) with Statistical  
2 software for data science version 17 program (STATA 17).

3 Although our study was a descriptive study with a cross-sectional analytical design, we  
4 wanted to test our data-collecting tools by adding a methodological design. The HCQ,  
5 HSBS, FCV-19S, and HLBS-II scores were independent variables of the study, in the  
6 structural equation model only health-seeking behavior was the dependent variable. The  
7 independent variables of the study were demographic characteristics: age group, gender,  
8 educational level, occupation, marital status, employment status, the region where lived  
9 longest in the last five years, family type, the region where lived until the age of twelve,  
10 perceived socioeconomic status, educational level of parents, presence of ever positive  
11 COVID-19 polymerase chain reaction (PCR) test result, chronic disease, medication  
12 use, health insurance, and the status of the first health institution applied when  
13 necessary. Descriptive statistics were presented with percentages, and median and range  
14 (minimum – maximum) values. Continuous variables were tested by histogram graphics  
15 and the Kolmogorov-Smirnov test for normal distribution. The Mann-Whitney U and  
16 the Kruskal-Wallis tests compared the differences of the scale and the subscales scores  
17 in the individual characteristics. In addition, independent variables and scale scores  
18 relation was evaluated with logistic regression analysis. Scale scores were dichotomized  
19 according to the median values of the study group and considered the dependent  
20 variable in logistic regression analyses.

21 Also, categories of the region of the residence until the age of twelve, educational level,  
22 and socioeconomic level variables, were reduced for further evaluation in the logistic  
23 regression analysis. Living in villages and towns were considered small settlements,  
24 living in city and district centers were considered large settlement centers, and others

1 were considered abroad. The educational level variable was categorized as lower than  
2 high school (illiterate, literate, primary school, secondary school), high school and  
3 higher education (high school, associate degree, and graduate degree). The socio-  
4 economic status was reduced into three categories for logistic regression analysis that  
5 below low-level and above-low level were categorized as low socio-economic status,  
6 below average and above average were categorized as middle socio-economic status.  
7 High and top level socio-economic status were categorized as high socio-economic  
8 status.

### 9 **2.5. Ethical issues**

10 Research permissions were obtained from the Ministry of Health of the Republic of  
11 Türkiye COVID-19 Platform of the Directorate General. The study was approved in line  
12 in Helsinki Declaration by the Clinical Trials Ethics Committee of Marmara University  
13 School of Medicine (06.11.2020/09.2020.1212).

### 14 **3. Results**

15 A total of 236 (60.4%) participants were females, and most of the participants were aged  
16 between 31-40 years (n = 106, 27.1%) and 41-50 years (n = 105, 24.3%). A total of  
17 participants had at least one positive COVID-19 PCR test were 62 (15.9%). A total of  
18 243 (62.3%) had higher education, and 274 (70.1%) were working. Most of the  
19 occupational groups in this study are healthcare professionals (n = 136, 47.0%) and  
20 educators (n = 49, 17.1%). Participants were mainly nuclear families (n = 316, 80.8%).  
21 Half of the participants' perceived socioeconomic status was above average (n = 199,  
22 50.9%). Approximately one-quarter of the participants had a chronic disease (n = 101,  
23 25.8%) and used medications continuously (n = 109, 28%). Half of the participants  
24 preferred the family medicine unit as their first choice for healthcare (n = 204, 52.3%),

1 28.5% (n = 111) were the state hospital. The median scores of the participants obtained  
2 from each scale were presented in (Table 1). Since there was missing data on some scale  
3 items, n was not given as 391 in all scales.

4 The median online health-seeking behavior sub-dimension scores of the HSBS were  
5 found 19.0 (6-30) higher in females and the participants within 26-30 ages (22.0, range  
6 11-30). The median traditional health-seeking behavior score was found 10 (3-15)  
7 higher in the participants those have high school graduation and have higher education.  
8 The median professional health-seeking behavior score was found 12 (5-15) higher in  
9 the participants who had secondary school education and in the participants who had  
10 elementary school education (13, range 5-15). Growing up in a town until the age of  
11 twelve (OR: 2.46, 95.0% CI [1.01-5.99],  $p < 0.05$ ) and in the district center (OR: 1.87,  
12 95.0% CI [1.10-3.50],  $p < 0.05$ ) were associated with a higher HSBS total score. Mother  
13 participants in this study that have elementary school education (OR: 2.20, 95.0% CI  
14 [1.22-3.97],  $p < 0.05$ ) and father participants in this study that have secondary school  
15 education (OR: 4.14, 95.0% CI [1.33-12.8],  $p < 0.05$ ) had higher HSBS total scores. It  
16 was found that the other individual characteristics did not affect the HSBS score as  
17 statistically significant in the logistic regression analysis (Table 2).

18 The sub-dimension of severity of the disease higher was found (13, range 4-20) in  
19 females and the participants aged 21-25 was 15 (10-20) high as well. The median the  
20 difficulty in coping with the disease sub-dimension was higher in the participants over  
21 age 70 was 24 (16-32). Also, the participants with below low-level socioeconomic status  
22 had a higher level of difficulty in coping with the disease (25, range 16-33). According  
23 to the results, living in a town and in the district center until the age of twelve was  
24 associated with a higher HCQ total score (OR: 3.08, 95.0% CI [1.25-7.57],  $p < 0.05$ ),

1 (OR: 2.66, 95.0% [CI = 1.41-5.03],  $p < 0.05$ ). The other independent variables were not  
2 found statistically significant in the logistic regression analysis according to the HCQ  
3 score (Table 2).

4 The status first preference health institution that participants applied to the family  
5 medicine unit (139, range 82-205) and the state hospital (135.5, range 82-199) showed  
6 statistically significant higher scores than the participants have applied to any other  
7 health institution (132.5, range 70-204) on the total score of the HLBS-II. The median  
8 health responsibility sub-dimension score was found 24 (13-36) higher in females.  
9 Moreover, the nutrition (22, range 12-35) and the interpersonal support (27, range 13-  
10 36) sub-dimension scores were higher in females than males. The median health  
11 responsibility sub-dimension score was found 27 (16-34) higher in participants aged 61-  
12 70 years. The health responsibility of the participants lived in a village until the age of  
13 twelve (25, range 14-36) and participants lived in a town until the age of twelve (25.5,  
14 range 14-33) had statistically significantly found higher than the other participants.  
15 Between the age groups of 31-40 (OR: 2.21, 95.0% CI [1.10-4.42],  $p < 0.05$ ) and  
16 between the age groups of 61-70 (OR: 6.75, 95.0% CI [1.31-35.01],  $p < 0.05$ ) were  
17 found higher HLBS-II total scores. In addition, having a perceived socioeconomic status  
18 above average increased the HLBS-II total score as in (OR: 6.00, 95.0% CI [1.29-  
19 28.40],  $p < 0.05$ ). The other individual characteristics were not found to be statistically  
20 significant in the logistic regression analysis on the HLBS-II score (Table 2).

21 The FCV-19S scores was found higher in participants who were females (17, range 7-  
22 35), working in non-health professions (17, range 7-35) and had below low-level  
23 socioeconomic status (18.5, range 9-27). Being female (OR: 1.45, 95.0% CI [1.12-1.89],  
24  $p < 0.05$ ), not working in the healthcare field (OR: 1.78, 95.0% CI [1.11-2.87],  $p < 0.05$ )

1 and having below-low socioeconomic status (OR: 1.94, 95.0% CI [1.08-3.48],  $p < 0.05$ )  
2 were found associated with higher FCV-19S total scores. The other individual  
3 characteristics were not found to be statistically significant in the logistic regression  
4 analysis on the FCV-19S score (Table 2).

5 It was found that SRMR Standardized Root Mean Squared Residual (SRMR) and  
6 Coefficient of Determination (CD) compliance criteria of all scales showed acceptable  
7 values (Table 4). The data we provided determined that the model used for our research  
8 fit well according to SRMR and CD criteria (Figure). On Structural Equation Modeling,  
9 HSBS was found to be related to HCQ ( $p < 0.0001$ ) and HLBS-II ( $p = 0.002$ , Table 3).  
10 That is, an increase in HSBS was positively associated with an increase in HCQ score  
11 and HLBS-II score, whereas HSBS was not statistically related to FCV-19S ( $p > 0.05$ ).

#### 12 **4. Discussion**

13 The high participation of females in our study can be explained as females engage in  
14 more health-seeking behavior than males. A previous study on personal health  
15 responsibility determined that females acted more responsibly for their health [16]. The  
16 results of our study indicated females' online health-seeking behavior, disease severity,  
17 health responsibility, nutrition, and interpersonal support levels higher than males.  
18 Generally, women have longer life expectancy than men, get sick more frequently, and  
19 benefit from health services at a higher level [17]. According to the logistic regression  
20 analysis of our study, the COVID-19 fear level of women adults was 1.45 times higher  
21 than men. Research has revealed that women tend to experience more fear towards  
22 COVID-19 compared to men, potentially due to gender-based variations in sensitivity  
23 and susceptibility to stress. Furthermore, women may face an increased likelihood of  
24 developing mental health issues following stressful life events [18].

1 According to our study, while online health-seeking behavior was more prevalent aged  
2 26-30, those aged 61-70 had a higher tendency to engage in their health responsibility. It  
3 can be explained as online computer and/or mobile device usage can be more accessible  
4 for the young participants. In contrast, with increasing age, individuals might become  
5 more sensitive about their health and fulfill their health responsibilities better [18]. The  
6 study that examining the impact of COVID-19 threat perception and new media literacy  
7 on e-health literacy using path analysis, found e-health to be a large part of health  
8 literacy [19]. The fact that most of the participants were young people (37% were  
9 twenty-five and below and 47% were 26-40) as our study, they mainly obtain health-  
10 related information through digital media. Another finding obtained in this research was  
11 that the COVID-19 threat perception did not significantly affect e-health literacy [19].  
12 Our study found no statistically significant relation between having positive COVID-19  
13 PCR test result and health cognition, health-seeking behavior, fear of COVID-19, and  
14 healthy lifestyle behaviors. As in similar study indicated no significant difference in any  
15 aspect of health-seeking behaviors, health perception, certainty, the importance of  
16 health, and self-awareness levels with suffering COVID-19 disease or not [20]. Other  
17 model research show when eliminating uncertainty from the fear of COVID-19, will  
18 contribute to reducing depression, anxiety and stress, and increasing positivity. [15].  
19 However, according to another previous study, the most influential factors in  
20 determining positive health perception were marriage, education, and income [21]. In  
21 the structural equation model on factors affecting health-seeking behaviors, significant  
22 relation was detected between the participants' educational level with health literacy and  
23 online health-seeking behavior. In our research, the online health-seeking behavior level  
24 of illiterate and primary school education was lower than those with a high school,

1 associate, graduate, and higher graduate. In a previous study, the professional health-  
2 seeking behavior participants with high school graduate was found lower than that of  
3 higher education [4]. Our study revealed that participants with a high school graduate  
4 and higher education degree were more likely to engage in traditional methods of  
5 seeking healthcare. However, in our study that the participants have not high school  
6 education and more, were more likely to engage professional health-seeking behavior.  
7 Individuals those have limited education and they do not have no alternative to benefit  
8 from other than government health services and might not be able to find a source to  
9 ask/learn or trust other than the professional health provider, therefore, they could have  
10 higher professional method than.

11 The concept of family, which is a social unit, shapes the members of that society with its  
12 structure, function, and needs. World Health Organization (WHO) puts the family at the  
13 center of improving the health of individuals. Our study did not observe a relation  
14 between family structure and health-seeking behaviors. Based on the findings of a  
15 comparable study, there was no notable distinction between family composition and the  
16 use of online, professional, and traditional methods for seeking healthcare [22].  
17 According to the cognitive-behavioral approach, maladaptive basic beliefs developed in  
18 childhood are thought based on health anxiety [23]. These maladaptive beliefs are  
19 thought to arise from the individual's past experiences, the teachings that he or she has  
20 experienced in the close family, or the disease processes of the sick parent [24].

21 Growing up in urban spaces brings with it many difficulties [25]. In a study conducted  
22 to determine whether some variables like gender, number of siblings, age of the mother,  
23 relationship with siblings, participation in social activities, and the situation reading  
24 books in the social skills of children living in the village, there was found statistically

1 significant difference [25]. Another study revealed that age, grade level, birth order,  
2 father's age, parental education level, family type, perceived parental attitude, active  
3 participation in classes, and receiving support when faced with a problem, did not make  
4 a significant difference was found [26]. The study also showed no significant difference  
5 in any of the variables listed in the social skills of children living in the city [26]. The  
6 findings from our study indicate that individuals who spent their formative years in  
7 urban environments had more dysfunctional health beliefs, whereas those raised in  
8 villages and towns demonstrated a stronger sense of health responsibility. More  
9 significant results can be achieved when the effects of rural and urban life on health  
10 anxiety are examined together with the other components of the sociocultural structure,  
11 such as family structure, parental education level, and socioeconomic level. Studies in  
12 Turkiye showed that parents' attitudes towards children differ according to their  
13 socioeconomic and educational levels. The data showed that an increase in parental  
14 education led to a rise in democratic attitudes towards their children, while  
15 overprotective and strict disciplinary attitudes decreased [27]. Another accepted point is  
16 that poverty was the most determining risk factor for health [28]. Despite the efficient  
17 public health response to the pandemic, COVID-19 disease was not equally distributed  
18 among all segments of the general population. Based on our findings, individuals with a  
19 low socioeconomic status face greater challenges in dealing with the disease and have a  
20 fear of COVID-19 that is twice as high. Among the psychosocial and cultural reasons  
21 that affect the utilization of health services, achieved too many factors, such as  
22 knowledge, attitudes, behaviors, beliefs, traditions, and customs [29].  
23 Another result of our research was that having chronic diseases increased the afraid of  
24 the COVID-19 disease. In addition, there was found they were more affected by the



1 possibility of getting sick and negative health beliefs. Chronic diseases have created a  
2 basis that intensifies the effect of the COVID-19 pandemic. Research has indicated that  
3 those with underlying comorbidities are more prone to experiencing severe courses of  
4 the COVID-19 disease [30]. The studies examining the effect of patient activity on self-  
5 care in chronic disease management show that the most significant role belongs to the  
6 patient. The health-seeking behavior of individuals is shaped by their health beliefs,  
7 knowledge, life skills, and motivation, all of which play a crucial role in designing  
8 effective health initiatives. The researchers define patient activity as the total of an  
9 individual's knowledge, skill, belief/trust, and behavior [31]. Our study revealed that  
10 there was no significant association between the status of the first health institution  
11 applied when necessary and the fear of COVID-19. On the other hand, health-seeking  
12 behavior and healthy lifestyle behaviors were higher in those who preferred the first  
13 health institution as a family medicine unit. Our results showed again the importance of  
14 the family medicine unit, which is the easiest to reach in the dimension of professional  
15 health-seeking behavior.

16 Similar modeling studies conducted abroad mostly examined the effects of health  
17 behaviors of individuals with chronic diseases. Behavioral models are the basis of  
18 modeling studies, especially in health. Another model study searches the relation  
19 between perceived leadership behaviors among doctors, nurses and administrative staff  
20 and their levels of organizational commitment, the influence of organizational culture;  
21 found positive correlation between doctors, nurses, and administrative staff's perception  
22 of interactional and transformational leadership behaviors within the healthcare group  
23 [32]. A similar study, the structural equation model revealed a positive and meaningful  
24 impact on hope, optimism, self-efficacy, psychological resilience, service innovation

1 behavior, and new service development to evaluate the impact of innovations to solve  
2 the desired needs of healthcare sector employees [33]. From this aspect, modeling  
3 research in the health field will provide access to more effective and valuable scientific  
4 data in taking steps toward developing health services. Our research provide access to  
5 more effective scientific data to understand the variables affecting health-seeking  
6 behaviors and their effectiveness levels for health policies in this field.

## 7 **5. Conclusion**

8 Our study concluded that the participants' health-seeking behaviors were influenced by  
9 their health perceptions and healthy lifestyle choices, but not by their level of fear  
10 towards COVID-19. From this result, health cognitions and health behaviors that have  
11 become a lifestyle were among the main factors that led to the health-seeking behavior  
12 during the COVID-19 pandemic. In the event of future public health issues caused by  
13 pandemics, this research can provide valuable insights for further research.

## 14 **6. Limitations**

15 Firstly, since participation in this study was voluntary, participants that have more  
16 information than expected about the research subject; for example, most of the  
17 participants were healthcare workers, which might have a limitation due to their being  
18 more knowledgeable. In the daytime, the survey study was limited as the people who  
19 were at home were mostly homemakers, elderly, and sick people. Also, the varying  
20 effects of COVID-19 on individuals may have resulted in varying levels of anxiety at  
21 different stages of the illness.

22 In this study, fit criteria of the HSBS model other than SRMR and CD, did not show  
23 sufficient fit. Schermelleh-Engel et al. argued that when the model was not adequately  
24 defined, it could not meet all the fit criteria [34, 35]. This might be because the scales

1 included in the model do not meet the fit criteria or the sample size was insufficient to  
2 implement the model.

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## 1 **References**

- 2 1. Hekler EB, Lambert J, Leventhal E, Leventhal H, Jahn E. Commonsense illness  
3 beliefs, adherence behaviors, and hypertension control among African Americans.  
4 *Journal of Behavioral Medicine* 2008; 31 (5): 391-400. [https://doi.org/310.1007/s10865-](https://doi.org/310.1007/s10865-10008-19165-10864)  
5 10008-19165-10864
- 6 2. Çırakoğlu OC. Examining perceptions related to the swine flu (H1N1) epidemic in  
7 the context of anxiety and avoidance level variables. *Turkish Journal of Psychology*  
8 2011; 26 (67): 49-64 (in Turkish).
- 9 3. Petersen MB, Bor A, Jørgensen F, Lindholt MF. Transparent communication about  
10 negative features of COVID-19 vaccines decreases acceptance but increases trust.  
11 *Proceedings of the National Academy of Sciences* 2021; 118 (29): e2024597118.  
12 <https://doi.org/2024597110.2024591073/pnas.2024597118>
- 13 4. Kalem S. On the factors that determine compliance/non-compliance with the  
14 restrictions imposed by the COVID-19 period. *Legal Theory* 2020; 7 (1-2): 77-89  
15 (in Turkish).
- 16 5. Ahorsu DK, Lin CY, Imani V, Saffari M, Griffiths MD. The Fear of COVID-19 Scale:  
17 Development and initial validation. *International Journal of Mental Health and*  
18 *Addiction* 2022; 20 (3): 1537-1545. [https://doi.org/1510.1007/s11469-11020-00270-](https://doi.org/1510.1007/s11469-11020-00270-11468)  
19 11468
- 20 6. Anderson JC, Gerbing DW. Structural equation modeling in practice: A review and  
21 recommended two-step approach. *Psychological Bulletin* 1988; 103 (3): 411-423.  
22 <http://dx.doi.org/410.1037/0033-2909.1103.1033.1411>
- 23 7. Salehi L, Rahimzadeh M, Molaei E, Zaheri H, Esmaelzadeh-Saeieh S. The  
24 relationship among fear and anxiety of COVID-19, pregnancy experience, and mental

- 1 health disorder in pregnant women: A structural equation model. *Brain and Behavior*  
2 2020; 10 (11): e01835. <https://doi.org/01810.01002/brb01833.01835>
- 3 8. Antonogeorgos G, Panagiotakos DB, Pitsavos C, Papageorgiou C, Chrysohoou C.  
4 Understanding the role of depression and anxiety on cardiovascular disease risk, using  
5 structural equation modeling; the mediating effect of the Mediterranean diet and  
6 physical activity: the ATTICA study. *Annals of Epidemiology* 2012; 22 (9): 630-637.  
7 <https://doi.org/610.1016/j.annepidem.2012.1006.1103>
- 8 9. Kır a  R,  zt rk YE. Health seeking behavior: scale development study. *S leyman*  
9 *Demirel  niversitesi Vizyoner Dergisi* 2021; 12 (29): 224-234.  
10 <https://doi.org/210.21076/vizyoner.754526>
- 11 10. Hadjistavropoulos HD, Janzen JA, Kehler MD, Leclerc JA, Sharpe D et al. Core  
12 cognitions related to health anxiety in self-reported medical and non-medical samples.  
13 *Journal of Behavioral Medicine* 2012; 35 (2): 167-178. [https://doi.org/110.1007/s10865-](https://doi.org/110.1007/s10865-10011-19339-10863)  
14 [10011-19339-10863](https://doi.org/110.1007/s10865-10011-19339-10863)
- 15 11. Altay D, Y ksel M. Saėlık bilişleri  l eėinin ge erlilik g venilirlik  alıřması. In: IV.  
16 Uluslararası TURKCESS Eėitim ve Sosyal Bilimler Kongresi Tam Metin Kitabı. 1st ed.  
17 İstanbul, Turkiye: Vizetek Yayıncılık; 2023. pp 286-295.
- 18 12. Keskin Yıldırım A, Molu B. The relationship among nursing students' health  
19 cognitions for Covid-19 pandemia and depression anxiety stress levels. *Manisa Celal*  
20 *Bayar University Journal of Institute of Health Science* 2021; 8 (2): 241-249.  
21 <https://doi.org/10.34087/cbushed.796470>
- 22 13. Walker SN, Sechrist KR, Pender NJ. The Health-Promoting Lifestyle Profile:  
23 development and psychometric characteristics. *Nursing Research* 1987; 36 (2): 76-81.

- 1 14. Bahar Z, Beşer A, Gördes N, Ersin F, Kıssal A. Validity and reliability study of the  
2 healthy lifestyle behaviors scale II. Cumhuriyet University School of Nursing Journal  
3 2008; 12 (1): 1-13 (in Turkish).
- 4 15. Bakioğlu F, Korkmaz O, Ercan H. Fear of COVID-19 and positivity: Mediating role  
5 of intolerance of uncertainty, depression, anxiety, and stress. International Journal of  
6 Mental Health and Addiction 2021; 19 (6): 2369-2382.  
7 <https://doi.org/2310.1007/s11469-11020-00331-y>
- 8 16. Demir Avcı Y. Kişisel sağlık sorumluluğu. TAF Preventive Medicine Bulletin 2016;  
9 15 (3): 259-266 <https://doi.org/210.5455/pmb.5451-1445494881> (in Turkish)
- 10 17. Cirhinlioğlu Z. Sağlık sosyolojisi. 1st ed. Ankara, Türkiye: Nobel Akademik  
11 Yayıncılık; 2021.
- 12 18. Tzur Bitan D, Grossman-Giron A, Bloch Y, Mayer Y, Shiffman N. Fear of COVID-  
13 19 scale: Psychometric characteristics, reliability and validity in the Israeli population.  
14 Psychiatry Research 2020; 289: 113100.  
15 <https://doi.org/113110.111016/j.psychres.112020.113100>
- 16 19. Özdemir A, Öztürk M. Examining the effect of perception of threat from COVID-19  
17 and new media literacy on the e-Health literacy level using path analysis. Gümüşhane  
18 Üniversitesi Sağlık Bilimleri Dergisi 2022; 11 (1): 22-33.  
19 <https://doi.org/10.37989/gumussagbil.788000>
- 20 20. Özdemir D, Arpacıoğlu S. Effect of social media use, health perception and health  
21 search behavior on the Coronavirus fear. Current Approaches in Psychiatry 2020; 12  
22 (1): 364-381 <https://doi.org/310.18863/pgy.803145> (in Turkish)

- 1 21. Aydın K. Living conditions and perceptions of health and illness. *Journal of*  
2 *Sociological Research* 2019; 22(1):32-68 <https://doi.org/10.18490/sosars.559087> (in  
3 Turkish)
- 4 22. Kıracı R. Factors affecting the health seeking behavior: a study based on structural  
5 equation modeling. PhD, Selcuk University, Konya, Turkiye, 2019.
- 6 23. Fergus TA. Health-related dysfunctional beliefs and health anxiety: further evidence  
7 of cognitive specificity. *Journal of Clinical Psychology* 2014; 70 (3): 248-259.  
8 <https://doi.org/210.1002/jclp.22012>
- 9 24. Alberts NM, Hadjistavropoulos HD, Sherry SB, Stewart SH. Linking illness in  
10 parents to health anxiety in offspring: Do beliefs about health play a role? *Behavioural*  
11 *and Cognitive Psychotherapy* 2016; 44 (1): 18-29.  
12 <https://doi.org/10.1017/s1352465814000319>
- 13 25. Tandogan O. More livable urban space for children: Practices around the world.  
14 *Megaron* 2014; 9 (1): 19-33 <https://doi.org/10.5505/megaron.2014.43534> (in Turkish)
- 15 26. Basun B, Erden Ş. Analysis of social problem solving skills of preschool children  
16 living in urban and rural areas. *Milli Eğitim Dergisi* 2020; 49 (227): 271-288 (in  
17 Turkish)
- 18 27. Tezel Şahin F, Özyürek A. Examining the effect of demographic characteristics of  
19 parents with 5-6 year old children on their child-rearing attitudes. *Turkish Journal of*  
20 *Educational Sciences* 2008; 6 (3): 395-414 (in Turkish)
- 21 28. Wagstaff A. Poverty and health sector inequalities. *Bulletin of the World Health*  
22 *Organization* 2002; 80 (2): 97-105.
- 23 29. Akman M. Health seeking behavior. *Turkish Journal of Family Medicine* 2015; 19  
24 (2): 53-54 <https://doi.org/10.15511/tahd.15515.02053> (in Turkish)

- 1 30. Sandalcı B, Uyarođlu OA, Güven GS. The role, importance and recommendations  
2 of chronic diseases in COVID-19. *Flora* 2020; 25(5):1-7  
3 <https://doi.org/10.5578/flora.69700> (in Turkish)
- 4 31. Hibbard JH, Stockard J, Mahoney ER, Tusler M. Development of the Patient  
5 Activation Measure (PAM): conceptualizing and measuring activation in patients and  
6 consumers. *Health Services Research* 2004; 39 (4 Pt 1): 1005-1026.  
7 <https://doi.org/10.1111/j.1475-6773.2004.00269.x>
- 8 32. Gökçe Parseyhan B. The role of organizational culture in the relationship between  
9 transactional and transformational leadership behaviors and organizational commitment:  
10 An application in a healthcare institution. PhD, İstanbul Aydın University, Social  
11 Sciences Institute, Department of Business Administration, Aydın, Türkiye, 2014.
- 12 33. Turgut E, Beğenirbaş M. The role of social capital and innovative climate on the  
13 innovative behavior of employees: A research in the health sector. *Military Academy  
14 Science Journal* 2013; 23 (2): 101-124 (in Turkish).
- 15 34. Hair JF, Ringle CM, Sarstedt M. PLS-SEM: Indeed a silver bullet. *Journal of  
16 Marketing theory and Practice* 2011; 19 (2): 139-152.  
17 <https://doi.org/110.2753/MTP1069-6679190202>
- 18 35. Schermelleh-Engel K, Moosbrugger H, Müller H. Evaluating the fit of structural  
19 equation models: Tests of significance and descriptive goodness-of-fit measures.  
20 *Methods of psychological research online* 2003; 8 (2): 23-74.  
21 <https://doi.org/10.23668/psycharchives.12784>

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1 **Tables**

2 Table 1. HCQ, HSBS, FCV-19S, and HLBS-II median values of score points

| Scales  | n   | Median (range) |
|---------|-----|----------------|
| HCQ     | 386 | 58 (25-87)     |
| HSBS    | 386 | 39 (12-60)     |
| FCV-19S | 389 | 16 (7-35)      |
| HLBS-II | 375 | 137 (70-205)   |

HSBS: Health Seeking Behavior Scale, HCQ: Health Cognitions Questionnaire, HLBS-II: Healthy Lifestyle Behaviors Scale-II, FCV-19S: The Fear of COVID-19 Scale.

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- 1 Table 2. Associations between scale scores and individual characteristics, univariate
- 2 logistic regression analysis<sup>a</sup>

|  |                             |
|--|-----------------------------|
| Health Seeking Behavior Scale (HSBS) (score > 39)  |                             |
| Living place until the age of twelve <sup>b</sup>  | Town                        |
|  | District center             |
| Educational level of mother <sup>c</sup>   | Elementary school graduates |
| Educational level of father <sup>c</sup>   | Secondary school graduates  |
| Health Cognitions Questionnaire (HCQ) (score > 58)   |                             |
| Living place until the age of twelve <sup>b</sup>  | Town                        |
|  | District center             |
| Healthy Lifestyle Behaviors Scale-II (HLBS-II) (score > 137)   |                             |
| Age <sup>d</sup>   | 31-40 years                 |
|  | 61-70 years                 |
| Perceived socioeconomic status <sup>e</sup>  | Above the average           |
| Fear of COVID-19 Scale (FCV-19S) (score > 16)  |                             |
| Females  |                             |
| Non-healthcare professionals   |                             |
| Perceived socioeconomic status <sup>e</sup>  | Below low-level             |
| <sup>a</sup> Socio-demographic and medical characteristics of the participants were included in the analysis. Scale scores were dichotomized according to the median values of the study group and considered the dependent variable in the analyses. Statistically significant results were shown in the table.<br><sup>b</sup> Living in a village was the reference category<br><sup>c</sup> Illiterate was the reference category<br><sup>d</sup> <20 years was the reference category<br><sup>e</sup> Average socio-economic status was the reference category<br>OR; Odds ratio, CI; Confidence interval |                             |

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1 Table 3. Structural equation model findings of factors affecting health seeking behavior

|                     |            |                   |
|---------------------|------------|-------------------|
| Compliance criteria | Model HSBS | Acceptable values |
|---------------------|------------|-------------------|

| Model HSBS | Coefficient | Standard error | p-value | %95.0 CI     |
|------------|-------------|----------------|---------|--------------|
| HCQ        | 2.30        | 0.55           | <0.0001 | 1.23 – 3.37  |
| HLBS-II    | 0.25        | 0.08           | 0.002   | 0.09 – 0.41  |
| FCV19S     | -1.05       | 0.57           | 0.066   | -2.16 – 0.07 |

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|--|----------|---------------------------|
| Chi-square   | 883.23   |                           |
| Df   | 164      |                           |
| Chi-square/df  | 5.39     | $2 \leq \chi^2/df \leq 3$ |
| p>chi-square   | < 0.0001 | $\geq 0.01$               |
| RMSEA  | 0.11     | $\leq 0.08$               |
| CFI  | 0.80     | $\geq 0.95$               |
| TLI  | 0.76     | $\geq 0.95$               |
| SRMR   | 0.09     | $\leq 0.10$               |
| CD   | 0.99     | $\geq 0.75$               |
| <p>HSBS: Health Seeking Behavior Scale, HCQ: Health Cognitions Questionnaire, HLBS-II: Healthy Lifestyle Behaviors Scale-II, FCV-19S: The Fear of COVID-19 Scale, RMSEA: Root mean squared error of approximation, CFI: Comparative Fit index, TLI: Tucker–Lewis index, SRMR: Standardized root mean squared residual, CD: Coefficient of determination.</p> |          |                           |

1 Table 4. Compliance criteria and acceptable values of Model HSBS

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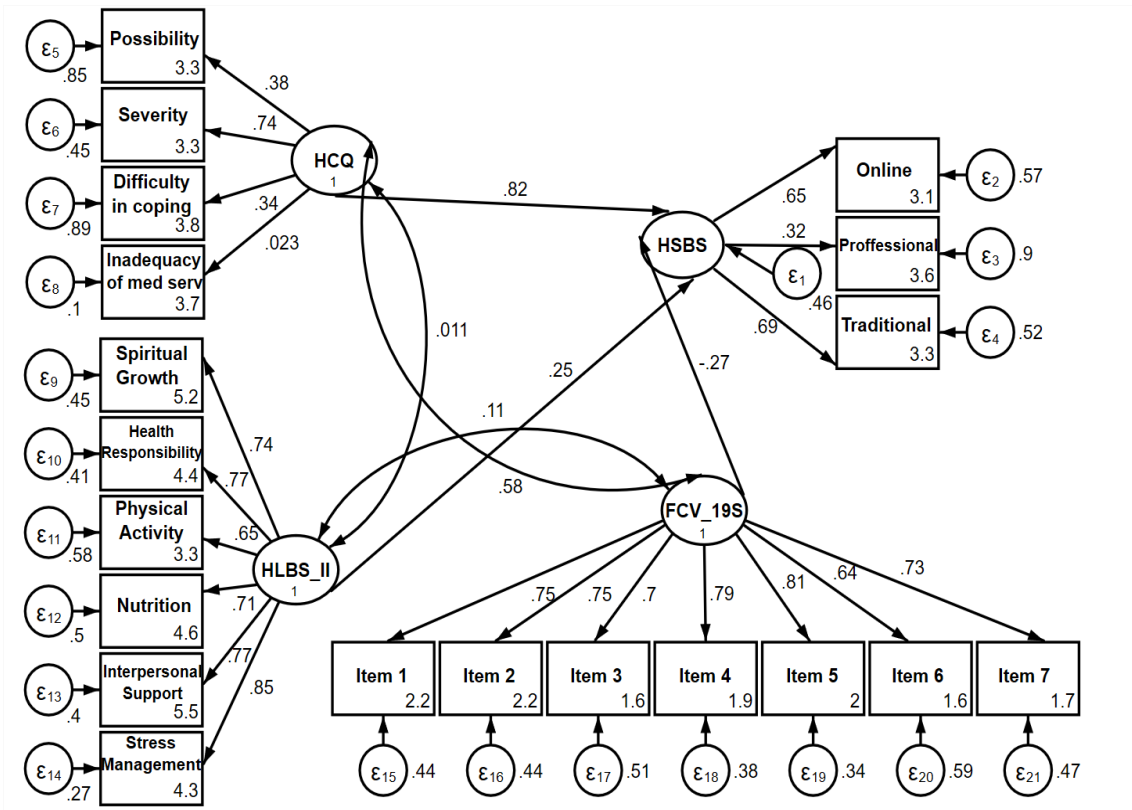
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11 **Figure**

12 Figure. Structural equation model of health-seeking behavior



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2 HSBS: Health Seeking Behavior Scale, HCQ: Health Cognitions Questionnaire, HLBS-II: Healthy

3 Lifestyle Behaviors Scale-II, FCV-19S: The Fear of COVID-19 Scale

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