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### Evaluation of Knowledge and Attitudes of Somali Citizens Living in Ankara Towards COVID-19

Ankara'da Yaşayan Somali Uyruklu Yabancıların COVID-19'a Yönelik Bilgi ve Tutumlarının Değerlendirilmesi

Meimona Adirahman FARAH<sup>1</sup> , Nazan TORUN<sup>2\*</sup> 

<sup>1</sup> Ankara Yıldırım Beyazıt University, Institute of Health Sciences, The Modadishu Embassy and Master's Student, Ankara, Türkiye 

<sup>2</sup> Ankara Yıldırım Beyazıt University, Faculty of Health Sciences, Department of Health Management, Ankara, Türkiye 

Article Information	ABSTRACT
<p><i>Received:</i> 18.08.2025</p> <p><i>Accepted:</i> 22.12.2025</p>	<p><b>Aim:</b> This study was conducted as descriptive research to assess the knowledge and attitudes of Somali citizens living in Ankara. <b>Subjects and Method</b> The study group consists of people who volunteered to participate in the study, using the non-probability sampling method. The questionnaires were completed in a face-to-face interview between October 2021 and April 2022 and the study was completed with 516 volunteers. <b>Results:</b> The findings showed that the majority of participants had sufficient knowledge about the transmission routes and clinical symptoms of COVID-19 and that they adhered to basic preventive measures such as mask use, hand hygiene, and social distancing. In addition, a significant portion of the participants indicated that vaccination is an effective method of protection against COVID-19 and reported having received the vaccine. Statistically relationships were found between knowledge and attitude levels and variables such as age, gender, marital status (<math>p \leq 0.05</math>). <b>Conclusion:</b> As a result of the research, it was found that the majority of Somali citizens living in Ankara who participated in the research are sufficiently informed about COVID-19 and have a positive attitude. It is thought that the information, warning, and training programs on COVID-19 to be carried out by the government and/or health authorities will help increase the knowledge of foreign citizens about COVID-19 and support the development of a positive attitude.</p> <p><b>Keywords:</b> Attitudes, COVID-19, epidemics, knowledge, pandemics, public health</p>
Makale Bilgisi	ÖZ
<p><i>Geliş Tarihi:</i> 18.08.2025</p> <p><i>Kabul Tarihi:</i> 22.12.2025</p>	<p><b>Amaç:</b> Bu çalışma, Ankara'da yaşayan Somali uyruklu kişilerin COVID-19 konusundaki bilgi ve tutumlarını değerlendirmek amacıyla tanımlayıcı bir araştırma olarak yürütülmüştür. <b>Örneklem ve Yöntem:</b> Çalışma grubu, olasılıksız örnekleme yöntemi kullanılarak araştırmaya gönüllü olarak katılan kişilerden oluşmaktadır. Anketler Ekim 2021 ile Nisan 2022 tarihleri arasında yüz yüze görüşme yoluyla doldurulmuş ve çalışma 516 gönüllü ile tamamlanmıştır. <b>Bulgular:</b> Araştırma sonuçları, katılımcıların çoğunun COVID-19'un bulaşma yolları ve klinik semptomları hakkında yeterli bilgiye sahip olduğunu ve maske kullanımı, el hijyeni ve sosyal mesafe gibi temel önleyici tedbirlere uyduklarını gösterdi. Ayrıca, katılımcıların önemli bir kısmı aşılamaya yönelik COVID-19'a karşı etkili bir koruma yöntemi olduğunu belirtti ve aşı olduklarını bildirdi. Bilgi ve tutum düzeyleri ile yaş, cinsiyet ve medeni durum gibi değişkenler arasında anlamlı ilişkiler bulundu (<math>p \leq 0.05</math>). <b>Sonuç:</b> Çalışma sonucunda, Ankara'da yaşayan ve araştırmaya katılan Somali uyruklu kişilerinin çoğunluğunun COVID-19 hakkında yeterli bilgiye sahip olduğu ve olumlu bir tutuma sahip olduğu bulunmuştur. Hükümet ve/veya sağlık otoriteleri tarafından COVID-19 hakkında yürütülecek bilgilendirme, uyarı ve eğitim programlarının yabancı uyruklu kişilerin COVID-19 hakkındaki bilgilerini artırmaya ve olumlu bir tutum geliştirmelerine yardımcı olacağı düşünülmektedir.</p> <p><b>Anahtar Kelimeler:</b> Tutumlar, COVID-19, salgın, bilgi, pandemic, toplum sağlığı</p>
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\*Corresponding author/Sorumlu yazar: Nazan Torun, [nazantorun@aybu.edu.tr](mailto:nazantorun@aybu.edu.tr)

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## Introduction

The first case of SARS-Cov-2 (COVID-19) was detected in Wuhan, China, in the last months of 2019; the COVID-19 outbreak unexpectedly caused a critical international public health crisis with a high mortality and morbidity rate (Team, 2020; Wong et al., 2020). COVID-19 has created various challenges in terms of economy, politics, education and society, especially in the field of health, and has caused problems worldwide with unexpected numbers of cases and deaths. Studies have reported that governments have taken various mandatory measures against COVID-19, including bans on public gatherings and travel, and isolation. But coercive measures can be counterproductive and make public safety and cooperation more difficult. For this reason, the quarantine or isolation process is of great importance in determining awareness and attitudes (Xu et al., 2021).

Previous research having basic knowledge of COVID-19 plays an important role in reducing the risk of illness and building positive attitudes towards COVID-19 by adapting to the response (Afzal et al., 2020; Al-Hanawi et al., 2020; Azlan et al., 2020; Huynh et al., 2020; Khasawneh et al., 2020; Wake, 2020; Al Ahdab, 2021; Qutob & Awartani, 2021). The level of knowledge, attitudes and practices of the public are very important in this context. Therefore, the consequences of the COVID-19 pandemic have been widely studied (Wake, 2020). In China, Palestine, Saudi Arabia and Vietnam, it was reported that the people were knowledgeable about taking preventive measures, exhibited positive attitudes and acted in accordance with the process (Al-Hanawi et al., 2020; Huynh et al., 2020; Khasawneh et al., 2020; Qutob & Awartani, 2021), whereas in low-income countries such as Syria, Pakistan, Bangladesh and the Philippines, the level of knowledge was lower and attitudes and practices were lower (Afzal et al., 2020; Azlan et al., 2020; Haque et al., 2020; Al Ahdab, 2021;). The coherent review was reported that general knowledge, attitudes and practice regarding COVID-19 were good in most countries, except for a few countries in the initial phase of the pandemic (Wake, 2020).

The Ministry of Health of Turkiye has officially announced the detection of the first COVID-19 case on March 11, 2020 (Ali et al., 2021). Based on the estimations, in July 2020, approximately 14 million people had contracted the virus, and more than half a million deaths had been reported. To prevent the risk of increasing the number of patients and to intervene, the government closed schools for a week as part of social distancing, and then education continued as distance education. Similarly, gatherings in public places were banned, and all travel, including business or tourism, was restricted (Civcir, 2020; Ali et al., 2021). Foreign citizens residing in Turkiye were also subjected to these restrictions and prohibitions in a coordinated manner with Turkish citizens (Özer, 2020).

The level of knowledge regarding infectious diseases and their effects varies across individuals depending on geographical and cultural characteristics as well as differences among societal groups (IOM, 2021). In many societies, certain groups have demonstrated heightened concern for developing awareness of COVID-19, viewing the disease as a personal health risk and seeking to improve their knowledge and adopt positive attitudes. Assessing individuals' knowledge levels and general attitudes towards COVID-19 contributes to the development of effective and targeted information strategies, facilitates communication with communities, and promotes positive health behaviours (Akın & Akar, 2021; Aloğlu & Sönmez, 2021). Previous research has shown that knowledge, attitudes, and behaviours related to a specific infectious disease significantly influence the severity, transmission rate, and mortality associated with that disease (Ceylan & Uzuntarla, 2020). Therefore, identifying levels of awareness and attitudes towards COVID-19 is essential for the effective prevention, control, and management of the pandemic.

National and international studies assessing knowledge and attitudes towards COVID-19 have largely focused on healthcare

workers, the general population, and students. Research examining the knowledge and attitudes of foreign nationals residing in host countries, however, remains limited. In Türkiye, only one study conducted by the Turkish Red Crescent with 160 migrants of Syrian, Afghan, Iraqi, and Iranian nationality has addressed this population. Aside from this study, the existing literature predominantly evaluates the knowledge and attitudes of Turkish citizens, including healthcare workers, university students, and academics (Bulut, 2020; Dikmen, 2021; Ertaş et al., 2021; Özşahin & Arıbaş, 2021; Şirin et al., 2021; Duman-Karakuş et al., 2022; Gökçay & Çevirme, 2022). No additional studies involving foreign nationals were identified in the literature. The COVID-19 pandemic has profoundly affected all societies worldwide, particularly foreign nationals, who have become increasingly vulnerable due to the combined effects of the virus's severity and adverse socioeconomic conditions. Consequently, governments have implemented proactive measures to support these vulnerable groups and manage the crisis effectively. Determining individuals' levels of knowledge and their attitudes towards COVID-19 is highly significant for designing effective interventions and fostering positive public health behaviours. Although numerous studies have been conducted since the onset of the pandemic, the scarcity of research focusing on foreign residents highlights an important gap in the literature.

This research was conducted to evaluate the knowledge and attitudes of Somali citizens living in Ankara towards COVID-19. In the fight against COVID-19, the attitudes of individuals towards the stated protective measures are as important as the protective measures taken by the government and health authorities. Taking the necessary precautions in the fight against COVID-19 is the responsibility of foreign citizens living in that country as well as its own citizens. When the literature was examined, only one study was found that evaluated the knowledge and attitudes of foreign citizens living in Türkiye towards COVID-19. The research is the first research to evaluate the knowledge and attitudes of Somali citizens living in Türkiye regarding COVID-19. Therefore, it is thought that the research will contribute to both the literature and the determination of more effective methods and practices in the fight against COVID-19. This research aims to contribute to the healthy behaviors of Somali citizens, especially other foreign citizens, against COVID-19.

## **Subjects and Method**

### **Method**

The study was designed in a descriptive pattern within the scope of quantitative research methods.

### **Study Group**

The study population consists of Somali citizens living in Ankara, Türkiye's second largest city. Currently, the relationship between Türkiye and Somalia is rapidly developing and acquiring various fields such as health, economy, social relations, military and education. Somali citizens particularly those residing in Türkiye with a student residence permit rank among the top ten foreign student groups in the country; however, the Ministry of Internal Affairs has not disclosed the exact figures (TC. Ministry of Internal Affairs, 2023). Moreover, the majority of Somalis are concentrated in the central and crowded places of Ankara, namely Kızılay, 15 July Square and Keçiören districts. Due to the density of Somali citizens in Ankara and the possibility of easy communication during the pandemic period, Somalis were preferred as the specific population in the study. Since it was not possible for researchers to determine where Somali foreigners living in Ankara were located, a convenience sampling method, which is a non-probability sampling method, was used in data collection. In addition, this method makes the data collection process easier, less costly and faster compared to other sampling techniques. Somali citizens who live in Ankara, speak English, and agree to participate in the study as volunteers were included in the study. The research was completed with a total of 516 individuals who voluntarily agreed to participate in the study.

## **Data Collection Tool and Data Collection**

Since there was no questionnaire evaluating the knowledge and attitudes of foreign citizens towards COVID-19 in the literature, the questionnaire form used to collect the data of the study was prepared by the researcher by reviewing the literature (Haque et al., 2020; Kasemy et al., 2020; Narayana et al., 2020; Oncul et al., 2020; Şirin et al., 2020; Wong et al., 2020; Zhong et al., 2020; Akin & Akar, 2021; Dermitzakis et al., 2021; Dikmen 2021; Ertaş et al., 2021; Muslih et al., 2021; Duman-Karakuş et al., 2022). The prepared survey questions were presented to experts for their opinion. According to expert feedback, revisions were made, and the final version of the survey was completed. The questionnaire used in the study consists of two parts, totalling 36 questions COVID-19. The Survey was initially prepared in Turkish and then translated into English to implement the interview with Somali citizens proficient in English. To assure the clarity of the questions, the survey was pilot-tested on 20 individuals. Only one participant did not understand the term “chronic diseases”. After the participants confirmed the comprehensibility of the other questions, the survey continued. The surveys were conducted by the researcher through face-to-face interviews between October 2021 and April 2022 in locations where the participants were present, namely in the districts of Kızılay, 15 July Square, and Keçiören (associations, cafés, and restaurants). COVID-19 precautions were followed during the administration of the surveys. While some participants agreed to participate in the research, others (n=24) declined to participate.

## **Analysis of Data**

Data was analyzed with IBM SPSS V23. Pearson’s chi-square test and Yates correction were used to compare the demographic characteristics of the participants with the answers they gave to the questions that determined their knowledge and attitudes towards COVID-19. Multiple comparisons of ratios were examined with the Bonferroni corrected Z test. Conformity to normal distribution was examined by Kolmogorov-Smirnov. The Mann-Whitney U test was used to compare variables that did not show normal distribution according to pairs. Kruskal-Wallis H test was used to compare the data of groups with three or more participants, and multiple comparisons were examined with the Dunn test. In the study, the results of the analysis of the age of the participants and the duration of their stay in Türkiye were presented as mean  $\pm$  standard deviation and median (minimum – maximum) for quantitative data. Other analysis results were presented as frequency (percentage). The significance level was taken as  $<0.05$ . In the comparison of categorical variables in cross-tabulations, the states of the relevant variables were not included in the comparison in cases where the number of expected values of the observed values in the cross-tabulations was less than 5 and the ratio was 25% or more.

## **Ethical Aspects of Research**

Ethical Approval from the Ankara Yıldırım Beyazıt University Ethics Committee (Date: 27/09/2021 no:394) was obtained to conduct the research. All procedures in the study were implemented in accordance with the principles of the World Medical Association Declaration of Helsinki. Participation in the study was voluntary, and participants provided informed consent prior to their participation in the study.

## **Results**

64% of the participants are male and 68% are single. 40% of the participants have a licence degree and 2% are primary school graduates. It was determined that the majority of the participants have an active working life at a rate of 31% and that 4% do not have any active working life. It was determined that 60% of the participants came to Türkiye for education and 5% for residence. It was determined that the majority of the participants, 36%, stayed with a roommate in Türkiye and at least 0.2% stayed in a guesthouse, 27% stayed with 1 person and 6% stayed with 2 people. It was determined that 7% of the participants had a chronic disease, 51% of the participants with chronic diseases mostly had diabetes, 3% had cancer

and 21% of the participants thought they were in the COVID-19 risk group. It was determined that 83% of the participants who thought they were in the COVID-19 risk group had had COVID-19 once. The average age of the participants was 27.71, the minimum age was 18, and the maximum age was 71. The average duration of stay of the participants in Turkiye was 2.15 years, the minimum duration of stay was 0.019 years, and the maximum duration of stay was 11 years (Table 1).

**Table 1.** Descriptive Findings of The Participants in The Study

	Frequency (n)	Percentage (%)		Frequency (n)	Percentage (%)
<b>Gender</b>			<b>Having a Chronic Illness</b>		
Male	331	64	Yes	35	7
Female	185	36	No	481	93
<b>Civil Situation</b>			<b>Chronic Illnesses</b>		
Single	351	68	Hypertension	6	17
Married	165	32	Diabetes	18	51
			Asthma	5	14
<b>Education Status</b>			Cancer	1	3
Primary school	12	2	Kidney disorder	5	15
Middle school	31	6			
High school	115	22	<b>COVID-19 Risk Group Status</b>		
Licence	205	40	Yes	75	14
postgraduate	153	30	No	407	79
			Partially	34	7
<b>Job</b>			<b>COVID-19 Infection Status</b>		
Student	289	56	Had COVID-19	107	21
Worker	161	31	Did not have COVID-19	409	79
Unemployed	20	4			
House Wife	46	9	<b>Number of COVID-19 Infections</b>		
			Once	90	83
<b>Coming Reason To Turkiye</b>			Twice	17	17
Education	305	59	<b>Course of COVID-19 Disease</b>		
Residence To take	25	5	No symptoms	35	33
Health Problem	32	6	Flu-like symptoms	55	51
Work	29	5	Severe course	17	16
Tourism	85	17	<b>COVID-19 Infection Status of Relatives</b>		
Holiday	40	8	Yes	170	33
			No	346	67
<b>Place to stay in Turkiye</b>			<b>Loss of Relatives Due to COVID-19</b>		
At home (Only Per )	130	25	Yes	70	14
At home together withmy friends	187	36	No	446	86
At home together with my family	152	30	<b>Total</b>	516	100
in dormitory	34	7			
At Hotel / Hostel	12	2	one person	138	28
<b>Total</b>	516	100	2 person	33	6
<b>Age</b>	27.71 ±	25 (18 - 71)	3 person	95	18
Duration of stay in Turkiye (Year)	8.731		4 person	88	17
<b>Duration of Stay in Turkiye ( Year )</b>	2.15 ± 1.976	1.83 (0.019 - 11th)	5 person	68	13
			6 person	94	18
			<b>Total</b>	<b>516</b>	<b>100</b>

It was determined that 78% of the participants answered yes to the question "Vaccination prevents the spread of COVID-19" and 70% had received the COVID-19 vaccine. It was determined that most of the participants wanted to get the COVID-19 vaccine and at least 12.1% were undecided. It was observed that most of the participants answered "What do you think COVID-19 is?" with 48% saying it is a severe and sometimes fatal viral disease and at least 3% saying "Other." It was determined that most of the participants answered "What is the mode of transmission of the COVID-19 virus?" with 22% saying it is through coughing, sneezing, talking, breathing, touching surfaces and at least 22% saying it is transmitted through blood and eating and drinking. It was determined that 72% of the participants answered yes to the question of whether wearing a mask prevents the transmission of COVID-19. 73% of the participants stated that they wore a mask indoors or outdoors during the COVID-19 pandemic. It was determined that 78% of the participants answered yes to the question of whether social distancing prevents the transmission of COVID-19. 79% of the participants answered that they complied with the curfew during the COVID-19 pandemic. It was determined that 82% of the participants complied with the social distancing rules during the COVID-19 pandemic. It was determined that 28% of the participants went to crowded places other than for mandatory reasons during the COVID-19 pandemic. 65% of the participants answered yes to the question of whether the rules implemented to prevent the spread of COVID-19 reduce the risk of disease. 80% of the participants answered yes to the question of whether hand washing and hygiene prevent the transmission of COVID-19. 65% of the participants stated that they washed their hands with soap and water to eliminate the risk of COVID-19. It was determined that most of the individuals who said they washed their hands with soap and water washed their hands in more than 20 seconds, 48% and at least 24% in less than 20 seconds. It was observed that 82% of the participants covered their mouth and nose with a tissue when sneezing or coughing. It was determined that 73% of the participants answered yes to the question of whether avoiding touching the eyes, nose and mouth is one of the ways to prevent COVID-19. 73% of the participants stated that they perform hand hygiene with disinfectant when hand washing is not possible. It was determined that most of the participants answered the question of what they would do if they were infected with the answer "I would go to a health institution" and at least 1% answered "I have no idea". It was observed that 62% of the participants lead an epidemic-focused lifestyle. 37% of the participants stated that they took vitamins to protect themselves from the virus. It was determined that most of the participants who took vitamins took vitamins daily, 70% and at least 12% weekly. 82% of the participants answered yes to the question "Keeping your home clean and ventilated reduces the risk of disease." It was determined that most of the participants answered "vaccine" to the question "Which of the following do you think are personal protection measures for COVID-19?" and at least 0.2% answered "I don't believe in the measures." (Table 2).

**Table 2.** Participants to COVID-19 Aimed at Information and to Their Attitudes Descriptive Findings Regarding

	Frequency (n)	Percentage (%)		Frequency (n)	Percentage (%)
<b>Vaccination prevents the spread of COVID-19</b>			<b>Did you comply with the curfew during the COVID-19 pandemic?</b>		
Yes	403	78	Yes	406	79
No	113	22	No	35	7
<b>Have you been vaccinated against COVID-19?</b>			Partly	75	14
Yes	363	70	<b>Did you comply with social distancing rules during the COVID-19 pandemic?</b>		
No	153	30	Yes	422	82
<b>Do you want to get vaccinated against COVID-19?</b>			No	36	7
Yes	99	60	Partly	58	11
No	46	28	<b>Did you go to crowded places other than for mandatory reasons during the COVID-19 pandemic?</b>		
Undecided	20	12	Yes	142	28
			No	265	51
			Partly	109	21

**Table 2 (continued).** Participants to COVID-19 Aimed at Information and to Their Attitudes Descriptive Findings Regarding

	Frequency (n)	Percentage (%)		Frequency (n)	Percentage (%)
<b>What do you think COVID-19 is?</b>			<b>Do the rules implemented to prevent the spread of COVID-19 reduce the risk of disease?</b>		
Influenza-like infectious disease	165	32	Yes	337	65
Severe viral disease that may sometimes cause death	250	48	No	98	19
I do not believe such a disease exists	45	9	Partly	81	16
Multiple answers	43	8			
Other (ordinary illness/disaster)	13	3			
<b>Handwashing and hygiene prevent the transmission of COVID-19.</b>			<b>Do you wash your hands with soap and water to eliminate the risk of COVID-19?</b>		
No	29	5	Yes	337	65
Partly	76	15	No	70	14
Yes	411	80	Sometimes	109	21
<b>What Is the Mode of Transmission of the COVID-19 Virus</b>			<b>How long do you wash your hands?</b>		
Through coughing, sneezing, speaking, breathing, and touching surfaces	41	22	Less than 20 seconds	82	24
Transmitted through food and beverages	41	22	20 seconds	94	28
No idea	51	27	More than 20 seconds	161	48
Multiple answers	57	30	<b>Do you cover your mouth and nose with a tissue when sneezing or coughing?</b>		
<b>Wearing a Mask Prevents the Transmission of COVID-19?</b>			Yes	422	82
Yes	373	72	No	45	9
No	56	11	Sometimes	49	9
Partly	87	17	<b>Do you use hand sanitizer for hand hygiene when handwashing is not possible?</b>		
<b>Did you wear a mask indoors or outdoors during the COVID-19 pandemic?</b>			Yes	377	73
Yes	379	74	No	61	12
No	48	9	Partly	78	15
Partly	89	17	<b>Total</b>		
<b>Total</b>	<b>516</b>	<b>100</b>		<b>516</b>	<b>100</b>
<b>Social distancing prevents the transmission of COVID-19.</b>			<b>Avoiding touching the eyes, nose, and mouth is one of the ways to prevent COVID-19.</b>		
Yes	403	78	Yes	376	73
No	33	6	No	61	12
Partly	80	16	Partly	79	15
<b>What would you do if you were infected?*</b>			<b>Does keeping your home clean and well ventilated reduce the risk of disease?</b>		
I would apply to a healthcare facility	337	39	Yes	423	82
I would use antibiotics or supportive treatment	52	6	No	35	7
I would stay in isolation for 14 days	306	26			
I would use herbal remedies	115	13	Partly	57	11
I would continue my normal life	40	5			
I have no idea	9	1			

**Table 2 (continued).** Participants to COVID-19 Aimed at Information and to Their Attitudes Descriptive Findings Regarding

	Frequency (n)	Percentage (%)		Frequency (n)	Percentage (%)
			<b>Which of the following do you think are personal protective measures against COVID-19?*</b>		
<b>Do you maintain a pandemic-oriented healthy lifestyle?</b>			Vaccination	360	30
Yes			Complying with social distancing	179	15
No			Ensuring personal hygiene and sanitation	159	13
Sometimes			Avoiding unnecessary travel	99	8
<b>Do you take vitamins to protect against the virus?</b>			Balanced nutrition	67	6
Yes			Wearing a mask	299	25
No			All	6	1
Sometimes			I do not believe in preventive measures	1	0.2
<b>How often do you take vitamins?</b>			Other	12	1
Daily					
Weekly					
Occasionally					
<b>Total</b>	<b>516</b>	<b>100</b>	<b>Total</b>	<b>516</b>	<b>100</b>

\*Multiple Responses.

According to the answers given to the question "What do you think is COVID-19 disease?", a statistically significant difference was found between the median ages of the participants ( $p=0.012$ ). This difference is due to the difference between the ages of those who responded that it is a severe and sometimes fatal viral disease and those who responded that it is a flu-like infectious disease, I do not believe there is such a disease, multiple options and other. The median age of those who responded that COVID-19 disease is a severe and sometimes fatal viral disease (26) is older than those who responded that it is a severe and sometimes fatal viral disease. According to the answers given to the question "What is the mode of transmission of the COVID-19 virus?", a statistically significant difference was found between the median ages ( $p=0.021$ ). This difference is due to the difference between the ages of those who responded that it is transmitted through blood and those who responded that it is transmitted by coughing-sneezing-talking-breathing-touching surfaces, eating and drinking, I have no idea and multiple options. The median age of the participants who have no idea about the transmission route of the COVID-19 virus (27) is older than those who responded that it is transmitted by other answers. According to the answers to the question "Do you wash your hands with soap and water to eliminate the risk of COVID-19?", a statistically significant difference was found between the median ages ( $p=0.033$ ). This difference is due to the difference between the ages of those who answered yes and those who answered no and sometimes. The median age of those who answered yes was 25, the median age of those who answered no was 23, and the median age of those who answered sometimes was 25. According to the answers to the question "Avoiding touching the eyes, nose, and mouth is one of the ways to prevent COVID-19" a statistically significant difference was found between the median ages ( $p=0.002$ ). This difference is due to the difference between the ages of those who answered yes and no and those who answered partially. The median age of those who answered yes was 25, the median age of those who answered no was 24, and the median age of those who answered partially was 27. According to the answers given to other questions, no statistically significant difference was found between the median age values and they were not included in the table ( $p>0.05$ ) (Table 3).

**Table 3.** Comparison of Questions Assessing Knowledge and Attitudes Towards COVID-19 According to The Age of The Participants

Age	Age Mean $\pm$ SD	Age Median (min - max)	Dunn / Kruskal Wallis H test and Mann Whitney U Test ist.	p	Age Mean $\pm$ SD	Age Median (min - max)	Dunn / Kruskal Wallis H test and Mann Whitney U Test ist.	p	
<b>What do you think is COVID-19 disease?</b>					<b>What is the mode of transmission of the COVID-19 virus?</b>				
A flu infectious disease	27.26 $\pm$ 8.65	24 (18 - 66) <sup>cu</sup>			Through coughing, sneezing, speaking, breathing, and touching surfaces	27.6 $\pm$ 8.23	25 (18 -71) <sup>ab</sup>		
A severe viral disease that sometimes causes death	28.83 $\pm$ 9.48	26 (18 - 71) <sup>b</sup>	12,931	<b>0.012**</b>	Transmitted through blood	25.73 $\pm$ 9.36	23 (18 - 66) <sup>b</sup>	11,541 <b>0.021**</b>	
I don't believe there is such a disease	25.62 $\pm$ 5.15	25 (18 - 40) <sup>a</sup>			Transmitted through food and beverages	26.27 $\pm$ 6.42	24 (19 - 44) <sup>a</sup>		
<b>Do you wash your hands with soap and water to eliminate the risk of COVID-19?</b>					<b>Avoiding touching the eyes, nose, and mouth is one of the ways to prevent COVID-19.</b>				
Yes	28.07 $\pm$ 9.01	25 (18 - 71) <sup>b</sup>			I have no idea	28.04 $\pm$ 7.66	27 (19 - 55) <sup>a</sup>		
No	25.51 $\pm$ 6.5	23 (18 - 45) <sup>a</sup>	6,807	<b>0.033**</b>	Multiple options	30.47 $\pm$ 12.32	26 (19 - 69) <sup>a</sup>		
Sometimes	28.01 $\pm$ 8.98	25 (18 - 60) <sup>cu</sup>			Yes	27.76 $\pm$ 9.29	25 (18 - 71) <sup>b</sup>	12,562 <b>0.002**</b>	
					No	25.8 $\pm$ 6.5	24 (18 - 49) <sup>b</sup>		
					Partially	28.94 $\pm$ 7.19	27 (19 - 66) <sup>a</sup>		

\*Mann Whitney U test, \*\* Kruskal Wallis H test, ab: There is no difference between groups with the same letter.

A statistically significant difference was found between the distributions of the answers given to the question " Did you go to crowded places other than for mandatory reasons during the COVID-19 pandemic" (p=0.043) and "Do you cover your mouth and nose with a tissue when sneezing or coughing" (p=0.034)? according to gender. It was determined that male participants went to crowded places out of necessity (30.8%) and covered their mouth and nose with a tissue when sneezing or coughing (10.9%) more than female participants during the COVID-19 pandemic. No statistically significant difference was found between the distributions of other questions according to gender and are not included in the table (p>0.05) (Table 4).

**Table 4.** Comparison of Questions Assessing Knowledge and Attitudes Towards COVID-19 According to Participants' Gender

	Female n(%)	Male n(%)	Pearson's chi-square test and Yates Test ist.	p **
<b>Did you go to crowded places other than for mandatory reasons during the COVID-19 pandemic?</b>				
Yes	40 (21.6)a	102 (30.8)b	6,295	<b>0.043</b>
No	98 (53)a	167 (50.5)a		
Partly	47 (25.4)a	62 (18.7)a		
<b>Do you cover your mouth and nose with a tissue when sneezing or coughing?</b>				
Yes	154 (83.2)a	268 (81)a	6,736	<b>0.034</b>
No	9 (4.9)a	36 (10.9)b		
Sometimes	22 (11.9)a	27 (8.2)a		

\*Multiple response, \*\*Pearson chi-square test, ab: There is no difference between groups with the same letter.

A statistically significant difference was found between the distributions of the answers given to the question "Have you been vaccinated against COVID-19?" according to the participants' educational status ( $p=0.003$ ). It was determined that the lowest rate of those who were vaccinated (50%) were primary school graduates, while the highest rate (78%) were undergraduate graduates. A statistically significant difference was found between the distributions of the answers given to the question "What is the mode of transmission of the COVID-19 virus?" according to the educational status ( $p<0.001$ ). This difference was observed in the "It is transmitted" answer and the multiple choice answer. While the rate of postgraduate graduates who responded that it is transmitted through blood was 2.6%, the rate of high school graduates who responded that it is transmitted through blood was 14.8%. A statistically significant difference was found between the distributions of the answers given to the question "Do you maintain a pandemic-oriented healthy lifestyle?" according to the educational status ( $p=0.025$ ). This difference was stated in the "yes" and "no" answers. The "yes" response rate for primary school graduates was 3%, and the "yes" response rate for high school graduates was 69.6%. There was a statistically significant difference between the distributions of answers to the question "Does keeping your home clean and well ventilated reduce the risk of disease?" according to education level ( $p=0.015$ ). This difference is due to the difference between primary school graduates who answered no and secondary school and postgraduate graduates. The rate of primary school graduates responding no was 25%, while the rate of postgraduate graduates responding no was 2.6%. There was no statistically significant difference between the distributions of other questions according to education level and they are not included in the table ( $p>0.05$ ) (Table 5).

**Table 5.** Comparison of Questions Assessing Knowledge and Attitudes Towards COVID-19 According to The Educational Status Of The Participants

	Primary school n(%)	Secondary school n(%)	High school n(%)	License n(%)	Postgraduate n(%)	Pearson's chi-square test and Yates Test ist.	p **
<b>Have you been vaccinated against COVID-19?</b>							
Yes	6 (50) abcd	16 (51,6) cd	73 (63,5) bd	160 (78) a	108 (70,6) abcd	16,032	<b>0,003</b>
No	6 (50)	15 (48,4)	42 (36,5)	45 (22)	45 (29,4)		
<b>What is the mode of transmission of the COVID-19 virus?</b>							
Through coughing, sneezing, speaking, breathing, and touc	4 (33.3) a	17 (54.8) a	65 (56.5)	132 (64.4) a	108 (70.6)	55,152	<b>&lt;0.001</b>
Transmitted through blood	0 (0) eu	1 (3,2) ab	17 (14.8)b	19 (9,3) ab	4 (2,6)a		

**Table 5 (continued).** Comparison of Questions Assessing Knowledge and Attitudes Towards COVID-19 According to The Educational Status Of The Participants

	Primary school n(%)	Secondary school n(%)	High school n(%)	License n(%)	Postgraduate n(%)	Pearson's chi-square test and Yates Test ist.	p **
Transmitted through food and beverages	0 (0)a	1 (3,2)a	10 (8.7)	16 (7.8)a	14 (9,2)a		
I have no idea	1 (8,3)a	5 (16.1) a	8 (7)a	21 (10,2)a	16 (10.5)		
Multiple Options	7 (58.3) a	7 (22.6) ab	15 (13)b	17 (8.3)b	11 (7.2)b		
<b>Do you maintain a pandemic-oriented healthy lifestyle?</b>							
Yes	3 (25)a	17 (54.8) eu	80 (69.6)b	127 (62) eu	93 (60.8) ab		
No	7 (58.3) a	5 (16.1) ab	17 (14.8)b	44 (21.5)b	31 (20.3)b	17,536	<b>0.025</b>
Sometimes	2 (16.7)a	9 (29)a	18 (15.7)a	34 (16.6)a	29 (19)a		
<b>Does keeping your home clean and well ventilated reduce the risk of disease?</b>							
Yes	9 (75)	29 (96.7)	94 (81.7)	163 (79.5)	128 (83.7)		
No	3 (25)a	0 (0)b	10 (8.7) ab	18 (8,8) ab	4 (2,6)b	18,924	<b>0.015</b>
Partially	0 (0)a	1 (3,3)a	11 (9.6) a	24 (11.7)a	21 (13.7)a		

\*Multiple response, \*\*Pearson chi-square test, name: There is no difference between groups with the same letter.

### Discussion

Participants described COVID-19 as a severe, sometimes fatal viral disease (48%) and believed that the virus spreads through coughing, sneezing, speaking, breathing, and touching surfaces (63.2%). In a study conducted in Egypt, it was found that over 48.5% of the population was aware of the severity of COVID-19 and its potential to result in death, along with the potential for widespread transmission and infection (Kasemy et al., 2020). These similarities may be explained by the widespread dissemination of global public health messages early in the pandemic, particularly through social media and WHO-led campaigns, which provided consistent information regardless of country. However, certain studies reported substantially higher awareness rates. Sulistyawati et al. (2021) reported that over 80% of respondents believed that the virus spreads from infected individuals through coughing, sneezing, droplets, physical contact, or handshaking, while some respondents believed it could also be transmitted directly from person to person, through mosquito bites (1.1%), fecal contamination, and airborne transmission (6.8%). This difference may be related to more intensive public education efforts in Southeast Asian countries following prior outbreaks such as SARS and MERS, which increased baseline public awareness about respiratory viruses. Moreover, cultural norms regarding hygiene and mask-wearing already common in many Asian societies may have contributed to greater understanding of transmission routes. A systematic review of thirteen studies conducted in the United States found that the general public primarily obtained information about COVID-19 through social media, and that various misunderstandings arose due to misinformation circulating online (Sarria-Guzmán et al., 2021). In a study conducted in Northern Thailand, 68% of participants considered COVID-19 to be dangerous, while 58% were unaware of the main symptoms of infection (Srichan et al. 2020). In a study conducted in India, over 90% of participants were found to be knowledgeable about the virus's name, source, incubation period, symptoms, risk groups, mode of transmission, prevention, and control, but only half of the participants were aware that COVID-19 cannot be transmitted through the air (Narayana et al. 2020). Another study conducted in Bangladesh found that 48.3% of participants had more accurate knowledge, 62.3% had more positive attitudes, and 55.1% were exposed to stricter preventive measures regarding COVID-19, with the majority (96.7%) perceiving COVID-19 as a dangerous disease (Zhong et al., 2020). In a study conducted in Greece, participants (86.4%) were found to have higher levels of knowledge about the transmission routes of COVID-19 (Dermitzakis et al., 2021). These differences could be related to stricter government measures, more aggressive awareness campaigns, and higher literacy rates in some regions. In a study conducted in Turkiye during the early

months of the pandemic, it was found that over 90% of participants were knowledgeable about the transmission route, symptoms, risk groups, isolation, and treatment of the disease. Identifying potential risk factors associated with the disease is important to establish a successful control program. Therefore, the use of risk assessment tools is recommended to develop effective public health strategies against pandemics (Şirin et al., 2020).

In our study, participants believed that wearing masks (72%), maintaining social distance (78%), adhering to rules (65%), handwashing and hygiene (80%), avoiding touching eyes, nose, and mouth (73%), keeping the house clean and ventilated (82%) are ways to prevent the transmission of COVID-19. Similarly, the same participants reported wearing masks indoors and outdoors (73%) during the COVID-19 pandemic and adhering to curfews (82%), washing hands (65%), covering their mouths and noses with tissue when coughing or sneezing (82%), and using hand sanitizer for hand hygiene when handwashing was not possible (73%). These findings align with many international studies but differ from others depending on cultural norms, public health messaging, and the strictness of national pandemic measures. In a study conducted by Masoud et al., (2021) it was found that 82% of participants generally wore masks in crowded places, with only 52% wearing masks outdoors. Public health officials worldwide recommend wearing masks not only in crowded places but also in outdoor and indoor settings. Differences may also stem from climatic and cultural factors such as discomfort in outdoor mask usage in hot climates or varying perceptions of risk in open spaces. In a study conducted by Sulistyawati et al., (2021) most participants recommended avoiding contact with patients with acute or unhealthy respiratory diseases (82.2%), frequently washing hands with soap or hand sanitizer (97.0%), boosting immunity (95.0%), and avoiding touching the face before washing hands (93.1%), as well as avoiding unprotected contact with farm and wild animals (45.4%). In a study evaluating the knowledge, attitudes, and practices of assistant physicians regarding COVID-19 conducted by Oguz Oncul and colleagues (2020) it was found that the most commonly adopted measures by assistant physicians individually were "frequent handwashing," "avoiding physical contact," "avoiding crowded areas," and "changing clothes immediately after entering the house". In a study conducted in Northern Thailand, 28% of participants reported never wearing masks, while 54.8% reported using soap every time they washed their hands (Huang et al., 2022). These differences may be attributed to limited access to health information, rural living conditions, or lower perceived risk in regions with earlier or fewer COVID-19 cases. Socioeconomic factors and education levels also play a crucial role in shaping health behaviors. In another study, participants were reported to adhere to correct practices such as staying at home (97.9%), coughing into elbows (98.0%), maintaining physical distance (96.9%), hand hygiene (98.2%), wearing masks (97.1%), avoiding travel (90.4%), disinfecting surrounding areas (90.0%), avoiding shaking hands (90.4%), and avoiding touching eyes, nose, and mouth (69.9%) due to COVID-19 (Zhong et al., 2020). In a study by Azlan et al., (2020) participants were found to take preventive measures such as avoiding crowds (83.4%) and practicing proper hand hygiene (87.8%), while the rate of mask wearing was lower (51.2%). Overall, similarities across studies likely stem from globally shared pandemic experiences and WHO-driven communication strategies, while differences appear to be influenced by cultural norms, previous outbreak exposure, socioeconomic factors, government policies, education levels, and the timing of data collection. These contextual elements must be considered when interpreting cross-country differences in COVID-19 preventive behaviors.

In our study, the majority of participants indicated the importance of vaccination for personal protection (70%), believed that vaccination prevents the spread of COVID-19 (78%), and reported being vaccinated against COVID-19 (70%). Participants also stated that they would seek medical help if infected with COVID-19 (65%) and maintain a pandemic-focused lifestyle (62%). Additionally, participants reported taking daily vitamins for protection against the virus (36%) and avoiding touching their eyes, nose, and mouth (72%). In a study conducted in Greece, 63.3% of participants agreed to self-

isolate for a period if they experienced symptoms such as high fever or cough, and 77.5% reported using masks correctly. Furthermore, 25.9% expressed willingness to get vaccinated, while 43% remained undecided. The study also noted that healthcare workers had a more positive attitude towards COVID-19 vaccination compared to workers in other sectors, and 5.5% of participants reported experiencing a health issue during the pandemic that required them to visit a hospital/health center but did not do so due to the potential risk of infection (Dermitzakis et al., 2021). In research by Huang et al., (2022) the prevalence of vaccine hesitancy for COVID-19 was reported as 15.6%, with 23.9% of students, 21.2% of the general population, 13.1% of healthcare workers, and 10.4% of public health professionals expressing vaccine hesitancy. Another study found that participants who received negative information about COVID-19 vaccines and had doubts about the information source were more likely to have vaccine hesitancy (Muslih et al., 2021). Providing advice on vaccination by healthcare workers and delivering accurate information from authoritative sources are believed to increase people's confidence in getting vaccinated. While similarities between the findings stem from common global messages in countries' vaccination campaigns, differences can be explained by populations' level of trust in health systems, exposure to misinformation, and variations in past epidemic experiences.

Participants in our study perceived COVID-19 as a viral disease causing more deaths as the average age increased, while perceiving it as a flu-like infectious disease as the average age decreased. However, it was found that as the participants' average age increased, they lacked sufficient knowledge about the transmission route of COVID-19, whereas as the average age decreased, they believed that COVID-19 is transmitted through coughing, sneezing, speaking, breathing, and touching surfaces. Moreover, it was determined that participants with a relatively higher average age washed their hands with soap and water to eliminate the risk of COVID-19. In cases where the average age of the participants was lower, it was determined that they did not believe in preventing COVID-19 by avoiding touching the eyes, nose, and mouth. Sulistyawati and colleagues (2021) found that participants aged 26-35 had a significantly higher average score in terms of COVID-19 prevention, protecting others, and total knowledge score about COVID-19 compared to other age groups. In the study conducted by Muslih and colleagues, similar to the research conducted by Zhong et al. (2020), Azlan et al. (2020), and Narayana et al. (2020), it was found that participants aged 30 and above had a higher knowledge score about COVID-19. It was determined that the vast majority of older adults living in Lima, Peru demonstrated high levels of knowledge, attitudes, and practices regarding the COVID-19 vaccine and held a positive perception of vaccination (Vidal-Cuellar et al., 2022). Differences between age groups may be explained by the level of access to digital health information and the ability of younger adults to access more up-to-date information through social media; similarities stem from the global dissemination of essential health messages related to the pandemic across all ages.

Male participants in our study were found to go to crowded places during the COVID-19 pandemic unnecessarily and not cover their mouth and nose with a tissue when sneezing or coughing, compared to female participants. In their study, where they examined the knowledge, attitudes, and preparedness for COVID-19 of 520 individuals travelling between certain areas in Northern Thailand, Srichan et al. (2020), found that women and young adults with a bachelor's degree were more prepared for COVID-19 compared to other groups. In the research conducted by Zhong et al. (2020), it was found that individuals, especially women, with high socioeconomic status had better knowledge and optimistic attitudes towards COVID-19. Research findings in the literature share similar characteristics with our research results. However, in the study conducted by Muslih et al. (2021), while it was found that women were more likely to wear masks when going out compared to men, men were found to have a higher likelihood of exhibiting a positive attitude towards COVID-19 compared to women. A study showed that the reason for women having higher knowledge and positive attitudes compared to men is

attributed to their biopsychosocial characteristics, their higher ability to comply with rules, and their greater emphasis on hygiene (Ceylan & Uzuntarla, 2020). While the similarities in the studies stem from the fact that women tend to be more compliant and careful about health behaviors in many cultures, the differences can be explained by the fact that men have a lower risk perception in some societies or that gender roles have an impact on behavior.

As the education level of the participants in our study increased, it was determined that the vaccination rates were higher, belief in COVID-19 being transmitted through blood decreased, there was a belief in maintaining a healthy lifestyle, keeping the house clean, and ventilating reducing the risk of disease. More than 90% of university students participating in the study conducted by Sulistyawati et al. (2021) stated that traveling and physical contact with infected patients could increase the risk of contracting COVID-19, while three-quarters of the participants considered working or visiting healthcare facilities as a risk factor, and 72.3% would avoid traveling out of the city to prevent the spread of COVID-19. Additionally, 85.7% planned to go to healthcare facilities for testing if they had COVID-19 symptoms, while less than half preferred to stay at home (45.4%). A study conducted in Indonesia found that the public had satisfactory knowledge about COVID-19, exhibited a positive attitude, and followed appropriate practices in combating the pandemic. Moreover, the study reported that more educated individuals had a more positive attitude (Sulistyawati et al., 2021). A study in Malaysia found that individuals with higher education levels had higher knowledge about COVID-19 (Lee & Lee, 2020). A study conducted on academics in Turkiye revealed that participants had a good level of knowledge, attitude, and behaviour towards COVID-19 (Ceylan & Uzuntarla, 2020). In a study evaluating adherence to COVID-19 health precautions and willingness to be vaccinated among the Palestinian population, it was observed that individuals with a higher perceived threat of COVID-19, higher education levels, and those residing in urban areas were more compliant with health measures, in contrast to male students and unemployed participants (Hamdan et al., 2024). It is believed that higher education levels positively influence knowledge, attitude, and behaviour. Similar results are consistent with health literacy increasing with increasing education level; differences may be related to the quality of health communication, access to information resources, and variability in pandemic management policies across countries.

### **Limitations of the Study**

Our study was limited to a city in Turkiye and citizens of a certain nationality. In future studies, conducting research using probability-based sampling methods to obtain representative and generalizable results will make significant contributions to the literature. In addition, future studies can compare the knowledge and attitudes of foreign citizens with other diseases that cause pandemics and with their own citizens.

### **Conclusion**

COVID-19 has created severe effects on a global scale, deeply impacting the health systems, social life, and economic conditions of societies. The novelty and uncertainties surrounding the disease have made it difficult for health authorities to develop appropriate strategies to prepare and manage the public. Therefore, assessing societies' knowledge and attitudes regarding COVID-19 is critically important for developing effective preventive measures and protecting high-risk groups.

This study was conducted to evaluate the knowledge and attitudes of Somali foreign citizens living in Ankara during the pandemic period. The findings showed that the majority of participants had sufficient knowledge about the transmission routes and clinical symptoms of COVID-19 and that they adhered to basic preventive measures such as mask use, hand hygiene, and social distancing. In addition, a significant portion of the participants indicated that vaccination is an effective method of protection against COVID-19 and reported having received the vaccine. Significant relationships were found

between knowledge and attitude levels and variables such as age, gender, marital status.

Consistent with previous studies, adequate knowledge levels and positive attitudes appear to be closely related to the successful control of COVID-19. Therefore, regularly evaluating the knowledge, attitudes, and practices of both citizens and foreign citizens living in the country is important. Consistent messaging by the government and health authorities, targeted health education programs, and activities aimed at increasing risk awareness will contribute to the development of positive behaviors related to the disease and adherence to preventive measures among both citizens and foreign citizens. Based on the findings of the study, the following recommendations were made:

Although participants were generally knowledgeable about COVID-19, their knowledge levels varied by age, gender, and educational status; therefore, tailored informational materials should be prepared for these groups. COVID-19 information and training programs adapted to the cultural context of foreign citizens should be developed.

- Culturally appropriate training sessions can be conducted in cooperation with universities.
- Compliance with mask use, hygiene, and social distancing appears to be high. To maintain this compliance, up-to-date informational activities for foreign-national communities should continue.
- Special counseling and information support lines for foreign citizens should be established in Migrant Health Centers and Family Health Centers.
- Awareness campaigns should be conducted on social media platforms frequently used by migrants.

#### **Ethical Approval of the Study ▪ Etik Kurul Onayı**

Ethical approval was obtained from the Ankara Yıldırım Beyazıt University Ethics Committee (Date: 27/09/2021 no:394).  
▪ Bu çalışma Ankara Yıldırım Beyazıt Üniversitesi Sağlık Bilimleri Etik Kurulu tarafından onaylanmıştır (Tarih: 27/09/2021 sayı:394).

#### **Informed Consent ▪ Bilgilendirilmiş Onam**

Verbal consent was obtained from participants participating in the study. ▪ Çalışmaya katılan katılımcılardan sözlü onam alınmıştır.

#### **Peer-review ▪ Hakem Değerlendirmesi**

Externally peer-reviewed. ▪ Dış bağımsız.

#### **Author Contributions ▪ Yazar Katkıları**

Concept- MAF, NT; Design- MAF, NT; Data Collection and/or Processing- MAF, NT; Analysis and/or Interpretation- MAF, NT; Literature Search- MAF, NT; Resources- MAF, NT; Writing Manuscript- MAF, NT; Critical Review- NT. ▪ Fikir- MAF, NT; Tasarım- MAF, NT; Veri Toplanması ve/veya işlenmesi- MAF, NT; Analiz ve/veya yorum- MAF, NT; Literatür taraması- MAF, NT; Kaynaklar- MAF, NT; Makaleyi yazan – MAF, NT; Eleştirel inceleme- NT.

#### **Declaration of Interests ▪ Çıkar Çatışması**

The authors declare that there is no conflict of interest. ▪ Yazarlar arasında herhangi bir çıkar çatışması bulunmamaktadır.

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