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Hand hygiene and mask-wearing behaviors and the related factors during the COVID 19 pandemic: A cross-sectional study with secondary school students in Turkey



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ABSTRACT

Purpose: The research was conducted to determine the hand hygiene and mask-wearing behaviors and related factors of secondary school students in the COVID-19 pandemic process.

Design and methods: This descriptive cross-sectional study was conducted between March 02–April 02 2021 with 1284 students who continued their secondary education in a province in the east of Turkey. The data were collected face-to-face through the Descriptive Characteristics Form, the Mask-Wearing Behavior Form, and the Hand Hygiene Behavior Form. Percentage, mean, *t*-test in independent groups, Mann Whitney *U* test and Multiple Regression analysis were used in the evaluation of the data. Ethical principles were observed at all stages of the study.

Results: It was determined that 80.1% of the students used disposable medical masks, 62.1% of their parents chose a mask suitable for the age of the student, and 52.1% used the mask they wore all day long. It was found that 41.4% of the students washed their hands before wearing a mask, and 51.9% after wearing a mask. It was determined that there was a significant relationship between students' mask-wearing behavior and gender, and hand hygiene behavior and gender, grade level, previous training on hand-washing and mask-wearing. As a result of multiple regression analysis, it was found that gender and mother's occupation had a statistically significant effect on mask-wearing behavior, while gender and previous training on mask-wearing had a statistically significant effect on hand-washing behavior.

Conclusions/practice implications: Students exhibited correct behaviors regarding hand hygiene and mask-wearing, but some misbehaviors suggest that training is necessary, especially in the COVID-19 pandemic period.

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Introduction

Children under the age of 15 constitute 6.4% of all SARS-CoV-2 cases recorded in Turkey. This age group constitutes 22.3% of the entire population in Turkey. It has been found that the frequency of COVID-19 infections in children is lower than it is in adults, and that the clinical course of the infection is milder in Turkey than it is in other countries (Köktürk & İtil, 2020). Moreover, children aged 0–1 years are at a high risk of having severe symptoms (Wei et al., 2020).

The rapid spread and the life-threatening consequences of COVID-19 open up both pharmaceutical and non-pharmaceutical measures against the spread of the infection. Although pharmaceutical measures such as vaccines and antiviral drugs are the most effective strategy, these measures cannot take another pandemic under control, as they are specifically designed to respond to a certain type of virus and symptoms. Therefore, alternative actions that can reduce the spread of the virus become important such as non-pharmaceutical measures. These measures are preferred to prevent the spread of the virus, and to protect susceptible populations. In this context, mask-wearing and handwashing can be considered among the non-pharmaceutical measures (Chen et al., 2020).

In response to the pandemic conditions, the World Health Organization (WHO, 2020a, 2020b, 2020c) stated that individuals should wash their hands frequently using water and soap, or use a hand sanitizing gel as the first action in order to protect both themselves and others.

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United Nations International Children's Emergency Fund (UNICEF, 2020) also stated that washing hands is the cheapest, easiest, and most important way to prevent the spread of a virus during a global pandemic. Recommendations have been made by WHO and UNICEF showing how, for how long, and when hands should be washed, not only to reduce the spread of COVID-19, but also to reduce the risk of other infections (Glabska et al., 2020; UNICEF, 2020a, 2020b; WHO, 2020a, 2020b, 2020c). Studies show that there are still false behaviors related to hand washing (Chen et al., 2020; Glabska et al., 2020). Handwashing behaviors are known to be affected by factors such as age (Suen et al., 2019; Wong & Lee, 2019), gender (Dajaan et al., 2018), socioeconomic status (Qorbani et al., 2016), and education level (Wong & Lee, 2019). In the current state of the COVID-19 threat, permanent hand hygiene combined with mask-wearing is an approach that has been proven to slow the spread of the virus (Ma et al., 2020).

Face masks have become a very important part of daily life around the world since COVID-19 was declared a pandemic (Eberhart et al., 2021). Mask-wearing has especially been proposed as an important risk reduction strategy against virus transmission (Cheng et al., 2020; Esposito & Principi, 2020) since it can prevent direct hand-mouth or hand-nose contact and the transmission of respiratory droplets from an infected person, and filter airborne particles (Bartoszko et al., 2020; MacIntyre & Chughtai, 2020; Sivaraman et al., 2020). It has been found that mask-wearing is associated with demographic characteristics such as age, gender, education level, ethnic origin, and place of residence (Chen et al., 2020; Tan et al., 2021; Zhang et al., 2020). In a study conducted by Ma et al. (2020) it was revealed that N95 masks block almost all viruses, medical masks block approximately 97% of viruses, and homemade masks block approximately 95% of the virus.

In terms the relation between mask-wearing behavior and age, children under the age of 2 have a higher risk of suffocation as they may have difficulty breathing because their relatively smaller airways. In addition, they cannot remove their mask without assistance because their fine motor coordination is not developed, so it is recommended that children do not wear a mask. (Centers for Disease Control and Prevention, 2020). WHO (2020) recommends that children over the age of 5 wear a mask; however, it is not recommended for children under the age of 5 as they cannot wear or remove a mask on their own. Nevertheless, it is useful for children under 5 years of age to wear it if they are under the supervision of an adult. WHO (2020) and UNICEF (2020a, 2020b) recommend wearing a mask to children aged between 6 and 11 only under certain conditions. Accordingly, children between the ages of 6 and 11 should wear a mask if they can wear and remove the mask on their own, if they live in an area where the contamination rate is high, if they have contact with a high-risk age group, if they have access to a clean mask when their mask gets dirty, and if the mask does not harm their learning ability and psychology. Moreover, if it is not possible for children over the age of 12 to keep a distance, the methods implemented to adults will apply, especially in areas with high contamination rates (WHO, 2020a, 2020b, 2020c). As a general rule, children are recommended to wash their hands with soap or apply a disinfectant for 20 s before wearing their mask. The mask should cover the chin and nose area, be kept in a bag or container, and not be shared with others (Köktürk & İtil, 2020).

This study was carried out to determine the hand hygiene and mask-wearing behaviors of students in secondary school between the ages of 11 and 14 during the COVID 19 pandemic in order to help identify the obstacles in acquiring appropriate knowledge and practice regarding handwashing habits and mask-wearing behaviors.

Method

Type of the research

The research was conducted in a descriptive cross-sectional manner in order to determine the hand hygiene and mask-wearing behaviors,

and the related factors in secondary school students during the COVID-19 pandemic.

The location and date of the study

The research was conducted face-to-face with students between the ages of 11 and 14 who were attending to a secondary school in the city center of Erzincan, under the Provincial Directorate of National Education between March 2nd and April 2nd of 2021.

Population and sample of the study

The population of the study consists of 5678 students in 15 secondary schools studying in the 5th, 6th, 7th and 8th grades, located in the city center of Erzincan. The sample from 4 of the 15 schools in the study consisted of the 1284 students who were selected by the lottery method among the schools in the city center of Erzincan. The selection was determined by the simple random sampling method, and the selected students were allowed to participate in the research.

Data collection tools

Descriptive Characteristics Form: Seven questions were asked related to the socio-demographic characteristics of the students (age, gender, class level, educational status, and employment status of the parents). Before the data collection phase, a pilot study was conducted with 15 students to evaluate the applicability of the questionnaires and the comprehensibility of the questionnaire questions. As a result of the pilot application, no changes were made in the survey questions, and the students who were taken into the pilot application were not included in the research sample.

Hand Hygiene Behavior Form: There are 21 questions regarding hand hygiene in the Hand Hygiene Behavior Form, which was prepared in line with the literature (Chen et al., 2020; Skolmowska et al., 2020; WHO, 2009; WHO, 2020a, 2020b, 2020c). Answers given to questions are evaluated as "Always = 2 Points", "Sometimes = 1 Point" and "Never = 0 Point". The score obtained from the form ranges from 0 to 42 points. After the Hand Hygiene Behavior Form was prepared, it was presented to the opinions of five experts (Three Experts in Pediatric Nursing, One Experts in Nursing Fundamentals, One Experts in Internal Medicine Nursing) to be evaluated and was finalized after the expert opinion. The internal consistency coefficient of the Hand Hygiene Behavior Form was found to be 0.79.

Mask-Wearing Behavior Form: In this form prepared in line with the literature, there are 18 questions on mask-wearing behaviors and 3 questions about mask selection and frequency of use (Chen et al., 2020; Tan et al., 2021; WHO, 2020a, 2020b, 2020c). Answers given to questions are evaluated as "Always = 2 Points", "Sometimes = 1 Point" and "Never = 0 Point". The score obtained from the Mask-Wearing Behavior Form range from 0 to 36 points. After the Mask-Wearing Behavior Form was prepared, it was presented to five experts (Three Experts in Pediatric Nursing, One Experts in Nursing Fundamentals, One Experts in Internal Medicine Nursing) for evaluation, and was finalized after the expert opinion. The internal consistency coefficient of the Mask-Wearing Behavior Form was found to be 0.72.

Data collection

The research data were collected between March 2nd and April 2nd of 2021, when schools across Turkey started face-to-face education during the COVID-19 pandemic. Before starting the data collection process, the "Informed Consent Form" was delivered to the parents, via the students, in a closed envelope to get the written consent of the parents. The consent form signed by one of the parents was returned to the researcher by the students. An appropriate work program was established with the school administrator to implement the data collection forms. It

was stated that participation was voluntary, the students were informed about the study, and their verbal assent was obtained. According to the specified timetable, the data were collected face-to-face in the classroom environment. It took 10–15 min on average for the survey to be filled in.

Analysis and evaluation of the data

The SPSS 25.0 package program was used for the statistical analysis of the data. Percentage, mean, independent samples *t*-test, Mann Whitney *U* test, and Multiple Regression analysis were used to evaluate the data. The statistical significance level was taken as 0.05 in all tests. In order to obtain statistical results, the suitability of the data to a normal distribution was evaluated using the Shao method. Accordingly, skewness value was 0.123, kurtosis value was -1.307 , and the graph was found to have a normal distribution between -3 and $+3$.

The ethical principles of the study

In order to conduct the study, first of all, the ethics committee permission dated 26/02/2021 and numbered 03/17 from the Human Research Ethics Committee, and the legal permissions of the Provincial Directorate of National Education were obtained. After the parents' written consent included in the study was obtained, students were informed about the research, and it was explained that they were free to

participate in the research. Students who accepted to participate in the study were assured that their personal information would not be used anywhere else, and that they had the right to leave the study whenever they wanted. Students who refused to participate in the study were assured that it would not affect their grades or school status.

Results

The distribution of students regarding their descriptive characteristics is presented in Table 1. The findings showed that the mean age of the students was 12.36 ± 1.09 , 52.1% were male, 26.9% were in the 6th grade, 78.8% had housewife mothers, 34.7% had civil servant fathers, 35.1% had high school graduate mothers, 36.7% had fathers with university or postgraduate degree, 63.6% were trained on handwashing before, and 50.3% were not trained on mask-wearing before.

According to the descriptive characteristics of the students participating in the study, the mean scores of mask-wearing behavior and hand hygiene behavior were compared. Among the descriptive features, the variables of gender, age group, and grade level had an effect on the mean score of mask-wearing behavior. On the other hand, the variables of gender, previous training about handwashing, and previous training about mask-wearing affected the mean score of handwashing behavior ($p < 0.05$) (Table 1).

The distribution of the mask-wearing behavior of the students is presented in Table 2. When the mask type used by the students was

Table 1
Descriptive characteristics of students ($n = 1284$).

	n	%	Mask-Wearing Behavior		Hand Hygiene Behavior	
			X \pm SS	Test p	X \pm SS	Test p
Gender						
Women	615	47.9	20.55 \pm 3.99	t:-5.459	34.62 \pm 5.01	t:5.915
Man	669	52.1	22.00 \pm 5.43	p:0.000	32.84 \pm 5.76	p:0.000
Age Group (Year)						
11 ^a	373	29.0	21.35 \pm 5.32	F/Welch:6.155	34.32 \pm 5.33	F:2.442
12 ^b	317	24.7	20.86 \pm 4.56	P:0.000	33.57 \pm 5.25	p:0.063
13 ^c	345	26.9	20.87 \pm 4.34	d > b, d > c	33.30 \pm 5.42	
14 ^d	249	19.4	22.40 \pm 4.97		33.46 \pm 6.00	
Grade Level						
5th Grade ^a	342	26.6	21.40 \pm 5.42	F/Welch:4.832	5.54 \pm 0.29	
6th Grade ^b	345	26.9	20.86 \pm 4.53	p:0.002	4.98 \pm 0.26	F:2.209
7th Grade ^c	310	24.1	20.89 \pm 4.33	Tamhane's	5.55 \pm 0.31	p: 0.085
8th Grade ^d	287	22.4	22.17 \pm 4.92	d > b, d > c	5.85 \pm 0.34	
Mother's Profession						
Housewife	1012	78.8	21.43 \pm 4.83	F:1.701	33.62 \pm 5.40	F:1.058
Self-employment	57	4.4	20.64 \pm 4.71	p:0.147	33.03 \pm 6.37	p:0.376
Officer	126	9.8	21.08 \pm 5.26		34.57 \pm 5.76	
Worker	69	5.4	20.11 \pm 4.13		33.78 \pm 5.29	
Artisan	20	1.6	22.15 \pm 5.37		33.75 \pm 5.31	
Father's Profession						
Self-employment	300	23.4	20.78 \pm 4.38	F: 1.859	33.68 \pm 5.33	F:0.789
Officer	445	34.7	21.31 \pm 4.98	p:0.135	33.51 \pm 5.61	p:0.500
Worker	313	24.4	21.53 \pm 5.07		34.09 \pm 5.40	
Artisan	226	17.6	21.69 \pm 4.84		33.52 \pm 5.54	
Educational Status of the Mother						
Primary school	291	22.7	21.26 \pm 4.60	F: 0.371	33.37 \pm 5.64	F:0.911
Middle School	284	22.1	21.15 \pm 5.05	p:0.774	33.92 \pm 5.46	p:0.435
High school	451	35.1	21.49 \pm 4.97		33.91 \pm 5.34	
University and Above	258	20.1	21.19 \pm 4.70		33.45 \pm 5.56	
Educational Status of the Father						
Primary school	123	9.6	20.76 \pm 4.35	F:0.711	34.39 \pm 5.42	F:2.118
Middle School	232	18.1	21.39 \pm 5.01	p: 0.546	33.23 \pm 5.54	p:0.096
High school	458	35.7	21.46 \pm 4.97		34.02 \pm 5.43	
University and Above	471	36.7	21.25 \pm 4.78		33.43 \pm 5.49	
Status of Receiving Training on Hand Washing Before						
Yes	816	63.6	21.22 \pm 4.49	t:-0.796	34.18 \pm 5.31	t:4.084
No	468	36.4	21.45 \pm 5.42	p:0.426	32.86 \pm 5.68	p:0.000
Status of Receiving Training on Mask Use Before						
Yes	638	49.7	21.28 \pm 4.60	t:-0.164	34.52 \pm 5.18	t:5.389
No	646	50.3	21.32 \pm 5.08	p:0.870	32.89 \pm 5.64	p:0.000
			X \pm SS			
Age (Year)			12.36 \pm 1.09			

Table 2
The Distribution of the Characteristics of the Students on Mask-Using Behaviors (n = 1284).

		n	%
What kind of mask are you using?	Cotton cloth masks	228	17.8
	Disposable medical mask	1028	80.1
	N95 respirators	28	2.2
Does your parent choose a mask suitable for your age for you?	Always	798	62.1
	Sometimes	376	29.3
	Never	106	8.3
	My parent didn't buy a mask	4	0.3
How often do you change your mask?	2–4 Hours	360	28.0
	1 day	676	52.6
	2–5 Days	169	13.2
	more than 5 days	35	2.7
	I continue to use it after cleaning the contaminated mask	44	3.4
How often do you wear a mask when you go out?	Always	1181	92.0
	Sometimes	93	7.2
	No	10	0.8
Do you wear multiple masks at the same time?	Always	226	17.6
	Sometimes	570	44.4
	No	488	38.0
Did you pull the mask down to expose your mouth?	Always	228	17.8
	Sometimes	596	46.4
	No	460	35.8
Did you pull the mask down to expose your nose?	Always	191	14.9
	Sometimes	470	36.6
	No	623	48.5
Do you open your mouth and/or nose to breathe while using the mask?	Always	262	20.4
	Sometimes	656	51.1
	No	366	28.5
Do you touch the mask with your hand while the mask is on your face?	Always	226	17.6
	Sometimes	624	48.6
	No	434	33.8
Do you lower the mask under your chin while using it?	Always	240	18.7
	Sometimes	519	40.4
	No	525	40.9
Can you take off and put on the mask over and over?	Always	158	12.3
	Sometimes	331	25.8
	No	795	61.9
Do you take off other people's masks?	Always	134	10.4
	Sometimes	43	3.3
	No	1107	86.2
Do you wash your hands with soap and water after touching the mask?	Always	874	68.1
	Sometimes	316	24.6
	No	94	7.3
Can you take off the used mask by holding your laces?	Always	973	75.8
	Sometimes	183	14.3
	No	128	10.0
Can you remove the used mask by holding it from the front?	Always	206	16.0
	Sometimes	324	25.2
	No	754	58.7
Before putting on the mask, would you wash your hands with soap and water?	Always	558	43.5
	Sometimes	466	36.3
	No	260	20.2
Can you distinguish the front and back of the mask?	Always	1090	84.9
	Sometimes	137	10.7
	No	57	4.4
Do you wear the mask with the metal strip on the top of the nose bridge, with the folded part on the outside?	Always	1068	83.2
	Sometimes	148	11.5
	No	68	5.3
If the mask is elastic, do you wear the elastics on the sides of the mask by passing it through the auricle?	Always	1010	78.7
	Sometimes	207	16.1
	No	67	5.2
Do you place the metal strip on the top of the mask by pressing it lightly over the bridge of the nose?	Always	1028	80.1
	Sometimes	189	14.7
	No	67	5.2
Do you wear the mask in such a way that it completely covers the nose, mouth and chin and does not allow air passage from the sides?	Always	969	75.5
	Sometimes	244	19.0
	No	71	5.5

examined, it was determined that 80.1% used disposable medical masks, 17.8% used cloth masks, and 2.2% preferred N95 masks. It was determined that the parents of 62.1% of the students chose a mask suitable for the student's age, and the parents of 0.3% of the students did not buy a mask. It was further found that 28% of the students changed masks every 2–4 h, 52.1% after a day, 13.2% after 2–5 days, 2.7% after more than 5 days, and 3.4% continued to use the contaminated mask after cleaning it. Some students reported using more than one mask simultaneously (17.6% Always, 44.4% Sometimes).

It was determined that 46.4% of the students pulled down their mask "sometimes" to leave their mouth open, 48.5% "never" pulled down their mask to expose their nose, 51.1% opened their mouth and/or nose "sometimes" to breathe, 48.6% touched the mask "sometimes" while the mask was on their face, 61.9% did not wear masks and removed them repeatedly, and 68.1% "always" washed their hands after touching the mask. Other mask-wearing behaviors are presented in detail in Table 2.

The distribution of the characteristics of students' handwashing behaviors included in the study is presented in Table 3. It was found that 79% of the students "always" washed their hands before and after eating, 44.2% "always" washed them before, and 96.5% "always" washed them after the toilet. Furthermore, 72.8% "always" washed their hands after waking up in the morning, 40% "always" washed them after brushing their hair, 50.6% "always" washed them after touching things, 41.4% "always" washed them before, and 51.9% "always" washed them after wearing a mask. Finally, 94.3% of the students "always" washed their hands after returning home, 89.3% "always" washed them after contacting animals, 95.5% "always" washed them after contacting tears, mucus, sputum, saliva, and 85% "always" washed them after coughing or sneezing. 86.7% "always" washed their hands when their hands were visibly dirty. It was determined that 89.8% of the students "always" washed their hands with soap and 49.2% with warm water. Other findings regarding hand washing behavior are presented in Table 3 in detail.

According to the regression analysis results in Table 4, when the significance level corresponding to the F value was examined, it was seen that the established model was statistically significant ($F = 4.661$; $p < 0.05$). Considering the beta coefficient value, t value, and the significance level of the effect if the independent variable, it was determined that gender and mother's occupation had a statistically significant effect on the mask-wearing behavior ($t = 5.262$, $p < 0.05$; $t = -2.066$, $p < 0.05$). Moreover, gender, age, grade level, mother's occupation, father's occupation, mother's education status, father's education status, previous training on handwashing and previous training on mask-wearing explained 2.5% of the change in mask wearing-behavior (Adjusted $R^2 = 0.025$). A one-unit increase in the gender variable caused an increase of 1.417 ($\beta = 1.417$) on the mask-wearing behavior, and a one-unit increase in the mother's occupation variable caused a 0.295 decrease ($\beta = -0.295$). There was no autocorrelation problem in the established model. The Durbin W value was between 1.5 and 2.5 ($DW = 1.730$).

According to the regression analysis results in Table 5, when the significance level corresponding to the F value is examined, it is seen that the established model is statistically significant ($F = 8.748$; $p < 0.05$). Considering the beta coefficient value, t value and significance level of the independent variable, it was determined that there is a statistically significant effect of gender and previous training on mask-wearing behavior ($t = -6.073$, $p < 0.05$; $t = -3.867$, $p < 0.05$). In addition, gender, age, grade level, mother's occupation, father's occupation, mother's education status, father's education status, previous training on handwashing, and previous training on mask-wearing explained 5.2% of the change in mask-wearing behavior (Adjusted $R^2 = 0.052$). A one-unit increase in the gender variable caused a decrease by 1.823 ($\beta = -1.823$) in hand hygiene behavior, and a one-unit increase in the previous training variable on mask-wearing caused a decrease of 1.481 ($\beta = -1.481$). There was no autocorrelation problem in the

Table 3
Distribution of Students' Characteristics Regarding Hand Washing Behavior (n = 1284).

		n	%
I wash my hands before and after meals	Always	1014	79.0
	Sometimes	243	18.9
	No	27	2.1
I wash my hands before using the toilet	Always	567	44.2
	Sometimes	395	30.8
	No	322	25.1
I wash my hands after using the toilet	Always	1239	96.5
	Sometimes	33	2.6
	No	12	0.9
I wash my hands after waking up in the morning	Always	935	72.8
	Sometimes	270	21.0
	No	79	6.2
I wash my hands after combing my hair	Always	513	40.0
	Sometimes	488	38.0
	No	283	22.0
I wash my hands after touching things	Always	650	50.6
	Sometimes	490	38.2
	No	144	11.2
I wash my hands before wearing a mask	Always	532	41.4
	Sometimes	447	34.8
	No	305	23.8
I wash my hands after wearing a mask	Always	667	51.9
	Sometimes	360	28.0
	No	257	20.0
I wash my hands after I get home	Always	1211	94.3
	Sometimes	56	4.4
	No	17	1.3
I wash my hands after contact with animals	Always	1147	89.3
	Sometimes	106	8.3
	No	31	2.4
I wash my hands after contact with tears, mucus, sputum and saliva	Always	1226	95.5
	Sometimes	46	3.6
	No	12	0.9
Washes my hands after coughing or sneezing	Always	1091	85.0
	Sometimes	165	12.9
	No	28	2.2
I wash my hands when my hands are visibly dirty	Always	1113	86.7
	Sometimes	99	7.7
	No	72	5.6
I use soap to wash my hands	Always	1153	89.8
	Sometimes	99	7.7
	No	32	2.5
I use warm water to wash my hands	Always	632	49.2
	Sometimes	519	40.4
	No	133	10.4
I take off my jewelry like rings and watches before washing my hands.	Always	804	62.6
	Sometimes	296	23.1
	No	184	14.3
I wet my hands under running water	Always	902	70.2
	Sometimes	237	18.5
	No	145	11.3
I rub my hands vigorously for at least 20 s	Always	942	73.4
	Sometimes	311	24.2
	No	31	2.4
I rinse my hands thoroughly under water	Always	1167	90.9
	Sometimes	107	8.3
	No	10	0.8
I dry my hands with a paper towel starting from my wrists	Always	937	73.0
	Sometimes	269	21.0
	No	78	6.1
I turn off the faucet with the same paper towel	Always	479	37.3
	Sometimes	395	30.8
	No	410	31.9

established model. Durbin W value was between 1.5 and 2.5 (DW = 1.797).

Discussion

Although there is currently insufficient data on treatments for COVID-19 in children, the information obtained from cases in many different countries shows that supportive treatment approaches in children are still sufficient in many cases (Republic of Turkey, Ministry of

Health, 2020). In terms of preventive strategies, approaches towards protection against COVID-19 include hand hygiene, adequate nutrition, strategic recommendations to reduce possible viral transmission, reduction of contact in the general community (protection of physical or social distance), and droplet and contact precautions that ensure the isolation of those with symptoms, and mask-wearing in crowded environments have been the leading ones (Pars, 2020). Handwashing and mask-wearing are two of the most effective strategies to reduce the COVID-19 transmission during the pandemic (Esposito & Principi, 2020; Pars, 2020; Skolmowska et al., 2020; Tan et al., 2021).

As a result of the research, it was found that 50.3% of the students had not received any training on mask-wearing before. When the mask-wearing behavior of children is examined in the literature, it has been reported that they generally do not like to wear masks. There are findings that the use of masks may support the development of the infection, as children will probably try to remove them in addition to touching their faces more (Centers for Disease Control and Prevention, 2020; Esposito & Principi, 2020). Hence, it is concluded in line with these results that if the problems are to be eliminated, it is necessary to prepare a healthy child to use the mask, to clearly explain the reasons for wearing a mask without trying to take it off, and to provide education and training appropriate for the age of the children for maximum adaptation.

Comparing the average score of the mask-wearing behavior according to the descriptive characteristics of the students participating in the study, it was found that the variables of gender, age group, and grade level were effective on the mean score of mask-wearing behavior (Table 1). Similarly, in the studies conducted during the COVID-19 process, the grade level of the students was found to have an effect on their mask-using behaviors (Chen et al., 2020; Mickells et al., 2021). This may be due to the increase in students' awareness with increasing age and grade level, the emphasis on hygiene, and the effectiveness of the training given. Our regression analysis also found that the gender variable was effective on the mask-wearing behavior (Table 4). In other studies, a significant relationship was similarly found between gender and mask-wearing behavior (Guzek et al., 2020; Tan et al., 2021).

When the mask type used by the students was examined, it was determined that 80.1% used disposable medical masks, 17.8% used cloth masks, and 2.2% preferred N95 masks. In a study conducted with university students in Vietnam, it was found that 57.6% of the students used medical masks (Duong et al., 2021). While the effectiveness of homemade cloth masks is discussed in the literature, it is known that surgical/medical and N95 masks can prevent the inhalation of large droplets well, although their ability to filter sub-micron-sized particles in the air is poor (Esposito & Principi, 2020).

The results from our study further showed that the parents of 62.1% of the students chose a mask suitable for the age of the student, and parents of 0.3% of the students did not buy a mask. In addition to the availability of masks in different sizes that can adapt perfectly to the face, it is important to consider parents' behavior to facilitate mask-wearing in children, to ensure child cooperation, and to increase parents' awareness of the size and necessity of masks (Esposito & Principi, 2020). In line with these results, it can be stated that parental behaviors are important in improving the mask-wearing behaviors of children.

In the current study, it was found that 28% of the students changed their masks every 2–4 h, 52.1% after a day, 13.2% after 2–5 days, 2.7% after more than 5 days, and 3.4% continued to use the contaminated mask after cleaning it. The study conducted by Chao (2020) determined that the majority of students used a single mask over and over again for a long time. Although there is no evidence to support the disinfection of disposable masks, most people hang the used mask in well-ventilated places for further use. It is stated in the literature that, in China, other ways of use are also used by some of the people such as using alcohol, steaming, boiling, and placing a gauze cloth inside the disposable mask, or wearing a cloth mask which can easily be washed with soap and water or laundry detergent when it becomes polluted (Desai & Aronoff,

Table 4
Multiple Regression Results on the Effect of Descriptive Characteristics on Mask-Using Behavior (n = 1284).

Model	β	Std. Error	Beta	t	p	Partial	Part	Tolerance	VIF
Constant*	12.338	5.000		2.468	0.014*				
Gender	1.417	0.269	0.146	5.262	0.000*	0.146	0.145	0.988	1.012
Age	0.543	0.491	0.123	1.104	0.270	0.031	0.030	0.062	16.218
Grade	-0.346	0.487	-0.079	-0.712	0.477	-0.020	-0.020	0.062	16.215
Mother's Profession	-0.295	0.143	-0.059	-2.066	0.039*	-0.058	-0.057	0.919	1.088
Father's Profession	0.255	0.132	0.054	1.927	0.054	0.054	0.053	0.975	1.026
Educational Status of the Mother	0.103	0.152	0.022	0.677	0.499	0.019	0.019	0.699	1.430
Educational Status of the Father	0.090	0.161	0.018	0.558	0.577	0.016	0.015	0.741	1.349
Status of Receiving Training on Hand Washing Before	0.359	0.357	0.036	1.007	0.314	0.028	0.028	0.607	1.648
Status of Receiving Training on Mask Use Before	-0.164	0.344	-0.017	-0.479	0.632	-0.013	-0.013	0.606	1.651

Dependent Variables: Mask Use Behavior R: 0.179 R²: 0.32 F: 4.661.

* p:0.000 Durbin Watson:1.730.

2020; Tan et al., 2021). In this direction, it is seen that there are different options preferred for the general population in the face of mask shortage, especially in countries with low socioeconomic level. In addition, it is thought that the reason for parents not choosing masks suitable for children's faces, and the findings about the duration of mask use may be due to the extra economic burden they impose on the family.

According to our results, 63.6% of the students were found to have handwashing training before. Looking at the literature on handwashing, one study found that 89% of students had good knowledge about handwashing (Alam et al., 2020), in a study conducted in Ghana, 46.67% of students received training on handwashing (Dajaan et al., 2018). Furthermore, Hadem and Bahvani (2018) found that 45% of the students had knowledge about handwashing. In this context, personal hygiene practices may vary from individual to individual, depending on cultural characteristics and the education at home. Therefore, it can be argued that the fact that the education level of nearly half of the mothers included in the study is primary and secondary school may have had an effect on the low level of knowledge we found.

When the mean scores of handwashing behavior were compared according to the descriptive characteristics of the students participating in the study, it was found that the variables of gender, and previous training on handwashing and mask-wearing were effective on the mean scores of Hand Washing Behavior (Table 1). In the study conducted by Chen et al. (2020) during the pandemic, it was found that the gender had an effect on handwashing behavior. Similar results were found in other studies in the literature (Guzek et al., 2020; Suen et al., 2019). In our regression analysis, it was found that the effect of gender was significant in terms of handwashing behavior (Table 5). This may have resulted from many factors such as the gender responsibilities of the students in the society they live, parental behaviors, whether they had received education before, their socioeconomic levels and the education level of their parents. It can be concluded that these results are compatible with the literature, and that students' mask-wearing behaviors and handwashing during the pandemic can be improved by education.

Table 5
Multiple Regression Results on the Effect of Descriptive Characteristics on Hand Washing Behavior (n = 1284).

Model	β	Std. Error	Beta	t	p	Partial	Part	Tolerance	VIF
Constant*	34.419	5.574		6.175	0.000*				
Gender	-1.823	0.300	-0.166	-6.073	0.000*	-0.168	-0.165	0.988	1.012
Age	0.572	0.548	0.114	1.044	0.297	0.029	0.028	0.062	16.218
Grade	-0.869	0.543	-0.175	-1.602	0.109	-0.045	-0.044	0.062	16.215
Mother's Profession	0.191	0.159	0.034	1.198	0.231	0.034	0.033	0.919	1.088
Father's Profession	0.117	0.147	0.022	0.794	0.428	0.022	0.022	0.975	1.026
Educational Status of the Mother	-0.010	0.170	-0.002	-0.061	0.951	-0.002	-0.002	0.699	1.430
Educational Status of the Father	-0.238	0.179	-0.042	-1.329	0.184	-0.037	-0.036	0.741	1.349
Status of Receiving Training on Hand Washing Before	-0.366	0.398	-0.032	-0.920	0.358	-0.026	-0.025	0.607	1.648
Status of Receiving Training on Mask Use Before	-1.481	0.383	-0.135	-3.867	0.000*	-0.108	-0.105	0.606	1.651

Dependent Variables: Hand Washing Behavior R: 0.241 R²: 0.58 F: 8.748.

* p:0.000 Durbin Watson:1.79.

In terms of the characteristics of students included in the study regarding handwashing behavior, it was determined that 79% of the students always washed their hands before and after eating, 96.5% always washed their hands after the toilet, and 72.8% always washed their hands after waking up in the morning (Table 3). In a study conducted with adolescents in Poland, Glabska et al. (2020) stated that the rate of handwashing after the pandemic was high (84.5%) before and after meals. They found that 95.7% of the participants washed their hands after using the toilet, and 46.1% after waking up in the morning. Dajaan et al. (2018) found that 32.33% of the students wash their hands before and after meals, 43% after the toilet, and 2.33% after playing with their friends.

In our study, we found that 94.3% of the students always washed their hands after returning home, 86.7% always washed their hands when their hands are visibly dirty, 89.8% washed their hands with soap, and 73% dried their hands with a paper towel. In a study by Glabska et al. (2020), 96.6% of adolescents stated that they washed their hands when they were visibly dirty, 90.1% washed their hands after returning home, 94.7% washed their hands by using soap, and 81.4% dried their hands with a towel. Guzek et al. (2020) reported that the majority of secondary school students stated that they always washed their hands after returning home, used more soap while washing their hands, and dried their hands with a towel. Moreover, Skolmowska et al. (2020) found that the behavior of washing hands before and after eating, before and after using the toilet, and drying hands with a towel was significantly more prevalent in adolescents living in places with high COVID-19 morbidity compared to adolescents living in places with low COVID-19 morbidity. Hence, that our results are compatible with the literature (Glabska et al., 2020; Guzek et al., 2020; Skolmowska et al., 2020). According to these results, it can be concluded that when hand hygiene, which has a very important position in the pandemic process, is transferred to children with the right resources, it can be applied correctly and the percentage of the application can increase.

Practical implications

COVID-19 is an important problem due to its globally continuing and severe consequences, and contagiousness characteristics. The knowledge of correct hand washing and mask-wearing plays an important role in reducing the burden of the infectious disease, especially in childhood. In this context, having knowledge on handwashing, mask-wearing, and the factors affecting these two are critical in helping children acquire the right behaviors. Nurses have an active role in promoting healthy behaviors, and may contribute to raising awareness on this matter by determining risk groups, conducting new research with children of different ages and larger samples, and planning training programs for these groups. The results of the current research reveal that almost all secondary school students use masks, and further show that the hand washing behavior in the context of the COVID-19 pandemic in Turkey involve deficiencies in exhibiting the right behaviors. Therefore, the results of the research will be essential in guiding future research, and the organization of education programs in attempts to raise awareness on hand hygiene and mask-wearing behaviors.

Limitations of the research

The results of the research are limited only to the students aged 11–14, on whom study was conducted. In addition, the mask-wearing behaviors of the students were limited to the structures included in the Mask-Wearing Behavior Form, and their hand hygiene behaviors were limited to the structures included in the Hand Hygiene Behavior Form.

Conclusion

It was found that the gender of the students had an effect on the mask-wearing behavior while gender, grade level, previous training on handwashing, and mask-wearing were found to be effective on the hand hygiene behavior. Overall, it was concluded that the students exhibited correct behaviors in terms of hand hygiene and mask use; however, there were deficiencies in some of the behaviors.

In order to minimize the spread of COVID-19, it is important to raise the awareness (i.e. correct hand washing technique, hand washing time and frequency, selection of appropriate masks, mask-wearing behaviors and the disposal of used masks, etc.) of parents and school-age children, especially in countries where face-to-face education continues. In line with these results, risk groups for COVID-19 can be identified through research, and future studies may be conducted with these groups on hand hygiene and mask-wearing behaviors. In addition to research, training programs can be organized for these groups. This way, the studies that aim to increase the awareness about mask-wearing and hand hygiene behaviors would increase the performance of children in this regard.

Contributors

GA, SK, AS and AÇ conceptualized the study and organized the data collection. GA wrote the first draft of the manuscript. GA, SK AS and AÇ ran the analyses and wrote the results section. AÇ contributed to revision of the final version of the manuscript.

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Declaration of Competing Interest

Authors declare no competing interests.

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