

### MEDICAL PERSONNEL VERSUS THE OTHERS: COMPARATIVE ASSESSMENT FOR ADVERSE EFFECTS OF FACEMASKS USE DURING COVID-19 IN TURKEY

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**Abstract:** The study is focusing on the judgements regarding the adverse effects of facemask use during the COVID-19 outbreak. Not only medical personnel but also the general public are bound to wear masks protecting them from highly transmissible diseases. The question to look for the answer is how medical personnel's complaints related to these facemasks differ compared to others. The online survey was applied to 675 respondents residing in Istanbul, Turkey. The complaints experienced in 377 medical personnel were inability to wash the face comfortably, headache, difficulty breathing, sweating, excessive hot flashes, not being recognized by the surrounding people, and to damage the face. The complaints reported by 298 general public were difficulty breathing, sweating, excessive hot flashes, and to damage the face. The side effects such as allergic effects, difficulty to wear on and take off the mask, feeling ugly when the mask is on the face, and perceiving high-priced were not felt much by the whole participants in the survey. They all were ambivalent on some effects that were thirsty feeling, the feeling of repression associated with the forced wearing of the mask and inability to see one's around on the road easily. Complaints differing significantly in the general public and medical staff include the inability to wash face comfortably, headache, thirsty feeling, allergic effect, high priced perception, damaging face, and inability to see one's around easily when one was on the road. For all negative effects caused by mask use, medical personnel had more strongly complaints in comparison with the others.

**Keywords:** Adverse Effects, COVID-19, Facemask, General Public, Medical Personnel

#### INTRODUCTION

COVID-19 is a virus that infects humans and probably animals. The World Health Organization (WHO) Emergency Committee declared a global emergency on January 30, 2020, due to increased cases of COVID-19 in China and international locations (Velavan and Meyer 2020). WHO raised its alert status to epidemic level in March 2020 as cases continue to infect millions of people across all continents (Jung et al., 2021). WHO has encouraged personal protective measures since there were no adequate vaccines and drugs to be used in the epidemic. Personal protection measures promoted by WHO; wearing a mask, practicing hand hygiene, and social distance (Shen et al. 2020). In some countries, these personal protective measures have been made mandatory (Jung et al., 2021). Measures taken to prevent the risk of virus transmission have been applied in terms of life risk. Nonetheless, it is important to understand what people are going through for the quality and comfort of daily life associated with long-term mask use.

Although it is obligatory to wear a mask by law, users can feel better about mask use if the complaints about wearing a mask are relieved, and they can meet wearing a mask with more positive thoughts. To increase compliance with the use of the mask, it is necessary to understand the comfort characteristics of the mask. Prolonged use of N95 and surgical masks when caring for patients during the SARS (severe acute respiratory syndrome) led healthcare professionals to experience some negative effects (Rosner, 2020). In health care workers from mask use, headaches (Lim et al., 2006), and adverse skin reactions such as rashes, acne, and itching (Foo et al., 2006) were observed. In addition to these negative effects mentioned on healthcare professionals who are forced to use masks with the COVID-19 outbreak at the

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beginning of May 2020, loss of cognition has also been observed (Rosner, 2020). The most common complaints of facemask use include increased headaches, anxiety, tremors, muscle cramps (İpek, 2021). In addition, it's mentioned that excessive sweating around the mouth, difficulty breathing, itchy nose, and acne formation on the face (Purushothaman et al., 2021; Galanis, 2021). Negative notices have also been received, such as humidity in the facemask, blurring of glasses, makeup removal for women, intense tear evaporation (Labiris, 2021). Similarly, some researchers have spoken of difficulty breathing, sweaty face, foggy glasses, or some skin diseases (e.g., physical discomfort and adverse effects such as rash and acne are common). They also in addition have stated that mask users have concerns about damage to the immune system (He et al. 2021).

### PURPOSE

In the literature, various side effects of prolonged mask use experienced by health professionals have been extensively discussed. Health workers were required to wear masks as part of personal protection measures while caring for their patients. So did the general public to prevent the spread of the epidemic. In this study, the side effects of facemask use during the COVID-19 outbreak in Turkey were evaluated comparatively between medical personnel and the general public.

### RESEARCH SCOPE

As two different consumer groups, those who were medical personnel and those who were not were compared, and a set of comfort criteria were evaluated for the facemask they used most during the COVID-19 epidemic. The research includes every person who was a user of a face mask during the pandemic. People who can be reached online from different parts of Turkey, whether they are medical personnel or not, are included in the scope of the research.

### METHOD

By literature research and face-to-face interviews with people around us, many side effects that may occur when using a facemask were determined. Based on the evaluation with a preliminary test, the 14 most common complaints were examined within the scope of the study. Data was collected from 675 people in total, including 377 medical personnel and 298 non-medical personnel, using an online questionnaire consisting of judgements regarding adverse effects of mask use. The survey was applied for one month. As a result of the examination carried out by the Ethics Committee of the Institute of Science, Marmara University, the survey study used in the study is decided as ethical with the reference of E-44174047-050.01.04-131763.

The mask has been described by the Turkish Standards Institute as “equipment covering the mouth, nose, and chin that can surround the head and face or be worn on the ears.” (Türk Standartları Enstitüsü, 2020). Respirators mask are protective devices that cover a part of the face. These masks are designed to protect the wearer from inhalable pollutants (respiratory poisons or bacterial/viral pathogenic organisms) in their immediate vicinity (Matuschek, et al. 2020). Protective masks against COVID-19; EU, USA, etc. it is produced with different standards in countries. This situation causes masks with similar features to take place in the market with different names (Küçük and Aral 2020). The most commonly known mask types in Turkey are cloth masks, surgical masks and some respiratory mask types (FFP1, FFP2, FFP3, N95, and N99, see Appendix for detailed information about masks). In this study, the

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facemask that people most often use during the COVID-19 outbreak while maintaining their daily lives was identified as a research unit.

### FINDINGS

Sample description: Medical personnel and the general public were separately defined by their characteristics. The parameters used to define the sampling were; gender, marital status, age, the last level of education they graduated from, total operating year, total monthly income, the mask they most often use during the day, and how many hours they use this mask on average per day. The points where the rates obtained for each of these statistical parameters were concentrated show similarities between people who were medical personnel and people who were not. There were some differences between them only in terms of marital status, total operating year, total monthly personal income, and daily duration of mask use. The number of men and women in both groups was very close. As for marital status, the rates of married and single people who were not medical personnel are quite close, while the number of married in the medical staff group was almost twice the number of single people. Their ages mainly ranged from 19 to 49 years. According to the last level of education that they graduated from, mainly university graduates were in the first place, while in the second place there were people with master's degrees, doctoral degrees, and high school graduates with close percentile slices. In terms of working time, people working outside the health sector had an equal distribution between intervals of 4 years and intervals determined by starting from “up to 5 years” to “26 years and above”. However, some of the employees in the health organization were mainly concentrated in the period of “5 years or less”, and the other part was spread at a close level between the determined intervals, starting with 6 years and increasing by 4 years to “26 years and above”. In total, about 70 people who had not yet started work had no personal monthly income. While the total monthly income of medical personnel was ahead of other income ranges by a significant margin of USD 463-694, their total monthly income spread equally between USD 327-810, regardless of whether they were medical personnel or not. When asked about the mask they most often use during the day, whether medical personnel or not, the surgical mask response was taken by separating from other masks with a noticeable difference. When asked how many hours a day they used facemasks on average, people who did not work in the health sector responded as 0-3 hours at the first order with the highest ratio, 4-7 hours were the second, and 8-11 hours were the third. However, medical personnel wears masks during the day for the busiest 8-11 hours, then 4-7 hours, and then 0-3 hours.

Descriptive statistics and independent t-test: Among a number of problems identified related to the comfort of using the mask, we tried to understand which of them are the situations that people face. However, it was aimed to determine whether there were significant differences between medical personnel and the general public in terms of complaints of facemask use. An Independent t-test performed for this purpose was performed for each adverse effect. Descriptive statistics were included in Table 1 and t-test results were included in Table 2.

Respondents were asked to rate the degree of participation in the judgments given about the mask they use most (see adverse effects of facemask use in Table 1). Likert type scale was used, ranging from 1 to 5: 1) I do not agree at all, (2) I do not quite agree, (3) I am indecisive, (4) I partially agree, (5) I completely agree. Data were analyzed using the IBM SPSS 20 program.

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First, the average values of negative situations that might be encountered when wearing a mask were evaluated comparatively for both groups. Some adverse effects of facemask use had values about 3 or higher than 3 for the general public. These were the inability to wash the face comfortably when wearing a facemask, the need to breathe deeply, sweating, excessive hot flashes, damage to the face, and not being recognized by the surrounding people. In the face of the same conditions, the discomfort experienced by medical personnel was above 3. However, compared with others who were non-medical personnel, they rated on them at a higher level. In addition, headache complaints, thirsty feeling, and the probability of creating an accident risk because the facemask could obstruct your view on the road were other conditions that were evaluated by medical personnel on average above 3 or around 3. However, these complaints were below 3 for the general public. The average value of all adverse effects that could arise due to wearing a mask is higher in the medical staff group. Among the adverse effects having an almost equal level for both, medical staff and not, the first is the difficulty of wearing and removing the mask and the second was the feeling of repression associated with the forced wearing of the mask, but their ratio was below 3. They both were either indecisive about these adverse effects of facemask use or had not experienced them. For both medical personnel and non-medical personnel, their condition, such as allergic effects on the face, difficulty to wear on and take off the mask, feeling ugly with the mask on your face, and the perception that facemask was expensive, had the lowest average. The complaints had been valued below 3 by all participants. It meant that they had not been exposed to these negative experiences or were ambivalent about them.

**Table 1. Descriptive group statistics**

Adverse effects of facemask use		Group	N	Mean	Std. Deviation	Std. Error Mean
1.	I cannot wash my face comfortably.	The general public	298	2.97	1.567	.091
		Medical personnel	377	3.37	1.523	.078
2.	It gives me a headache.	The general public	298	2.64	1.549	.090
		Medical personnel	377	3.15	1.557	.080
3.	It makes me thirsty.	The general public	298	2.42	1.391	.081
		Medical personnel	377	2.80	1.552	.080
4.	I cannot get any air. (It makes me want to breathe deeply).	The general public	298	3.47	1.412	.082

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		Medical personnel	377	3.53	1.353	.070
5.	It gives me an allergy.	The general public	298	1.84	1.212	.070
		Medical personnel	377	2.28	1.466	.075
6.	It makes me sweat.	The general public	298	3.39	1.460	.085
		Medical personnel	377	3.43	1.426	.073
7.	It gives me too warmth.	The general public	298	3.34	1.357	.079
		Medical personnel	377	3.52	1.388	.071
8.	I find hard to wear on and take off it.	The general public	298	2.22	1.401	.081
		Medical personnel	377	2.32	1.453	.075
9.	It is hard for people around me to recognize me when I'm masked.	The general public	298	2.97	1.455	.084
		Medical personnel	377	3.12	1.428	.074
10.	I feel ugly when the mask is on my face.	The general public	298	1.95	1.369	.079
		Medical personnel	377	2.02	1.410	.073
11.	Expensive (the price is high for me)	The general public	298	2.10	1.279	.074
		Medical personnel	377	2.36	1.456	.075
12.	It damages my face (for example, it crushes the back of the ear).	The general public	298	3.19	1.560	.090
		Medical personnel	377	3.77	1.401	.072

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13. Wearing mask is mandatory and there is penalty of removing it. That is why I feel repression.	The general public	298	2.68	1.543	.089
	Medical personnel	377	2.65	1.634	.084
14. With facemask, I cannot see ahead of me while walking thereby creates a risk of accident (falling, crashing, etc.)	The general public	298	2.60	1.469	.085
	Medical personnel	377	2.93	.750	.039
N: Sample size, Std.: Standardized					

There were many negative situations that people could face associated with wearing a mask. In this study, 14 possible adverse effects were mentioned. Independent t-tests were performed to determine whether the complaints of facemask use differed between employees in the health sector and other people. According to the results (see Table 2), it was found that there was an understandable difference between them in terms of seven possible negative results. These were inability to wash the face comfortably, headache effect, thirsty feeling, allergic effects on face, the perception that facemask was high priced, damaging to the face, the probability of creating an accident risk based on the fact that facemask could obstruct you to see one's surroundings or road properly when walking. Medical personnel had accepted these negative results from mask use at a higher rate than other people did. However, when these adverse effects were evaluated among themselves, medical personnel did not complain about the price of the mask and considered the problem of allergies unlikely. They were more ambivalent about the fact that wearing a mask created thirst and posed the risk of accidents such as crashing and falling while walking. On the other hand, they were relatively more likely to complain about the inability to wash their face comfortably, experiencing headaches and damage to the face. Although their assessment of the remaining adverse effects was at different levels, this difference between medical staff and others was not found to be significant.

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Table 2. Independent samples test

Adverse effects number	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
1	.921	.338	-3.408	673	.001	-.408	.120	-.642	-.173
2	.195	.659	-4.243	673	.000	-.511	.120	-.747	-.274
3	8.138	.004	-3.348	673	.001	-.385	.115	-.611	-.159
4	2.059	.152	-.487	673	.627	-.052	.107	-.262	.158
5	42.827	.000	-4.171	673	.000	-.440	.105	-.647	-.233
6	.350	.554	-.308	673	.758	-.034	.112	-.254	.185
7	.094	.759	-1.642	673	.101	-.175	.107	-.384	.034
8	1.331	.249	-.904	673	.366	-.100	.111	-.318	.117
9	.009	.924	-1.364	673	.173	-.152	.112	-.371	.067
10	2.415	.121	-.663	673	.507	-.072	.108	-.283	.140
11	23.976	.000	-2.374	673	.018	-.254	.107	-.464	-.044
12	18.883	.000	-5.078	673	.000	-.580	.114	-.804	-.356
13	4.466	.035	.248	673	.804	.031	.124	-.212	.273
14	341.327	.000	-3.779	673	.000	-.330	.087	-.501	-.158

Note: Equal variances assumed

## DISCUSSION

As different from the previous study, the adverse effects of mask use were studied by comparing complaints of not only medical personnel but also the general public who did not work in any health organization. According to the survey performed in Istanbul, Turkey, the results to provide support for the development facemask could help the medical personnel when performing direct care for patients with COVID-19 and the others when getting on with daily life comfortably. In future research, the series of complaints about wearing masks can be evaluated more thoroughly.

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Some negative notifications related to mask use were raised by only medical personnel. These are the inability to wash the face comfortably, headache, as well as not being recognized by the surrounding people. Especially in the working environment, in the crowd of patients, the opportunities for removing masks that health workers used to protect against the epidemic can be quite limited. In such an environment, there is probably not much opportunity to take off their masks and relax at any time during busy working hours. That's why they have experienced mask-induced headaches and have been unable to wash their faces comfortably. It is also possible that when every health worker wears a mask like their colleagues in the same environment, they can not be recognized in that crowd with a mask. The general public, on the other hand, may have the opportunity to remove their masks, even for a short time at home or on the street, depending on their will, so they may not be bothered by such problems. Rather, they were ambivalent in that sense. In particular, in terms of wash face comfortably and headaches, the evaluations of medical personnel significantly differ from those of the general public.

The adverse effects related to mask use such as difficulty breathing, sweating, excessive hot flashes, and damage to the face were reported by all participants. However, medical staff experienced much more these side effects of wearing facemasks. Perhaps, when mask acquisition was less possible at that time, they often did not have the opportunity to replace their masks with a new one. Among these negative results, the assessments of medical personnel about facemask in terms of the damaging face are significantly different from those of the general public. The fact that they felt this effect stronger may be related to long working hours. Because the time to use the mask during the day is relatively longer.

All participants, whether medical personnel or not, either did not complain or were indecisive regarding some adverse effects of mask use, which include allergic effects on the face, perceiving high-priced, thirsty feeling and inability to see one's surrounding or ahead on the road when walking. However, compared to the general public, relatively medical personnel again perceived the probability of these negative results at a higher level, as in other results.

During the pandemic, people may complain about some conditions caused by the use of face masks. It was predicted that the expected possible negative assessments related to the use of masks were different between medical personnel and other people. The results obtained in this study have shown results consistent with this expectation. A review has been carried out looking at a number of possible complaints notices relating to the use of masks. The results confirm our expectations. The results confirm our expectations. Possible negative situations related to the use of masks, in which the assessments of medical personnel differ significantly from others: inability to wash face comfortably, headache, thirsty feeling, allergic effect, high priced perception, damaging face, and inability to see one's around easily when one was on the road. At the same time, the medical staff perceived these negative ethics at a higher level. However, there are also cases when there are undifferentiated assessments: difficulty breathing, sweating, excessive hot flashes, difficulty to wear on and take off the mask, feeling ugly when the mask is on the face, the feeling of repression associated with the forced wearing of the mask.

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## APPENDIX

**Fabric masks:** They are usually made of pillowcases and/or 100% cotton T-shirts (Dente and Hashimoto, 2020). It has been suggested that these masks should be used by children under 2 years of age and people who have difficulty breathing, are mentally retarded, have a loss of consciousness, or are unable to remove the mask themselves (Yalçın, 2020). These masks are less effective than medical masks in preventing infectious respiratory diseases. However, some test results have shown that these masks filter some amount of virus particles (Perencevich, 2020).

**Surgical mask:** It is the mask usually worn during surgery to capture the aerosols and droplets from the user in order to protect the patient from contamination such as cough, sneezing, etc. Surgical masks are not designed to protect the user, and the vast majority do not have any safety standards. (e.g. NIOSH American National Institute for Occupational Safety and Health or EN) (Küçük and Aral, 2020). It has higher filtration efficiency compared to fabric facemask (Rizki and Kurniawan, 2020). They can filter small particles by 60-80%. They can also help prevent the spread of COVID-19 by catching droplets when coughing or sneezing when properly fitted (Yalçın, 2020).

**FFP1 masks:** They are masks that are capable of filtering 80% of toxic and non-fibro genic solid (dust) and liquid aerosols with a particle size of 0.6 microns and above. **FFP2 mask:** Compared to the FFP1 mask, the mask body thickness is 2 times more, and the particle size is the masks that filter 94% of low/medium toxicity solid and liquid aerosols of 0.3 microns and above. **FFP3 mask:** Compared to the FFP1 Mask, the filter thickness is 3 times more, the particle size is 0,1 micron and above, the masks are capable of filtering 99% of the high toxicity solid and liquid aerosols (Toktaş, 2020; Ünal and Gökçen, 2021). **N95 mask:** It is the mask produced according to US standards and is the equivalent of the FFP1 mask of the EU. However, the filtering efficiency is higher than the FFP1 mask, at the level of 95%.

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Other features are the same as FFP1. **N99 mask:** It is the mask produced according to US standards and is the equivalent of the FFP2 mask of the EU. It has all the features of the FFP2 mask (Toktaş, 2020; Ünal and Gökçen, 2021).

### NOTES

As a result of the examination carried out by the Ethics Committee of the Institute of Science, Marmara University, the survey study used in the study is decided as ethical with the reference of E-44174047-050.01.04-131763.