Role of the Coronavirus Disease 2019 (COVID-19) pandemic in the upgrading of personal hygiene. *A cross-sectional study in Saudi Arabia*

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ABSTRACT

Objectives: To assess the role of the Coronavirus Disease 2019 (COVID-19) pandemic in improving personal hygiene in Saudi Arabia.

Methods: We administered a questionnaire distributed online between 19 and 28 May 2020 to determine alterations in personal hygiene practices during this pandemic compared to the pre-pandemic phase.

Results: We included 211 respondents from the Kingdom of Saudi Arabia (KSA) in this study. Improvement at different levels was detected in all examined personal hygiene items compared to the pre-pandemic stage. The percentages of respondents who always washed their hands after coming back home (34.1%), used soap to wash their hands (58.8%), used a hand sanitizer outside (5.2%), wore a face masks while outside (1.4%) and washed their hands before preparing and/or eating food (74.9%) was increased before the pandemic to 89.6%, 90%, 63.5%, 59.2% and 89.1% during the pandemic, respectively. The percentage of respondents who never shake hands with people they know increased from 0% before the pandemic to 62.6% during the pandemic. The mean duration of washing hands with soap significantly increased from 13.31 seconds before the pandemic to 28.01 seconds during the pandemic (p<0.0001).

Conclusion: The COVID-19 pandemic resulted in a noticeable improvement in the personal hygiene habits in Saudi Arabia mainly those related to COVID-19 prevention.

Keywords: COVID-19, personal hygiene, Saudi Arabia

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The current COVID-19 pandemic was first reported in late 2019 in Wuhan city, Hubei Province, China, and then spread to various cities and countries.[1,2] Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) is the causative agent of COVID -19, which is a worldwide public health concern.[3] Patients with pneumonia due to SARS-CoV-2 show various symptoms including fever (most commonly), cough, dyspnea, headache, and diarrhea, in that order.[4] Globally, 11,125,245 cases of COVID-19 and 528,204 deaths were reported in 5 July 2020.[5] The incubation period of this viral infection ranges from 2 to 14 days; it is transmitted by breathing infected droplets or through the contact with infected droplets.[6] Worldwide, the COVID-19 pandemic has resulted in emotional, psychological, clinical, health system collapse and economic consequences.[6] It has emphasized the vital role of basic public health concepts such as personal protective equipment, personal hygiene and quarantine as tools for minimizing the spread of this disease.[7] Certain personal and home hygiene practices could be effective in reducing the risk of transmitting or contacting the virus causing COVID-19.[8] These low-cost interventions that include physical distance and enhanced hygiene could decrease both the number and severity of COVID-19 cases.[9] These practices include hand-washing with soap and alcohol-based sanitizers,[10] nail hygiene,[11] wearing a face mask,[12] respiratory and environmental hygiene.[8] Improving oral hygiene and health could also decrease the risk of complications caused by COVID-19.[13] Additional hygiene practice such as gargling with disinfectant compounds (namely, PVP-I 1% or other disinfectants) several times a day could help to prevent the transmission of COVID-19 mainly in the first stage of the disease.[14] The media has an essential role in providing trustworthy information regarding the needed precautions during the current pandemic. Recently, social media seem to be the main source of both information and misinformation.[15] However, misinformation and news regarding COVID-19 pandemic, mainly in social media, may result in negative consequences.[16]

To date, there is no vaccine or definite medication for COVID-19; therefore, physical distance and personal hygiene are essential for containing this pandemic.[17] Thus, the aim of this study is to assess the current personal hygiene practices and to test the effect of COVID-19 pandemic in improving these practices compared to the pre-pandemic era among individuals living in KSA.

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Methods. This cross-sectional survey study aimed to assess the impact of COVID-19 pandemic on the alteration of personal hygiene practices in Saudi Arabia. For this purpose, a questionnaire was designed and distributed online. The questionnaire was generated using Google forms and distributed online using WhatsApp. The respondents in this study were reached by distributing the electronic questionnaire in different groups in WhatsApp application. The description and information related to this study were demonstrated at the beginning of the online questionnaire. Additionally, it was clarified for the participants that by completing and sending the online questionnaire they agreed to be a part of this study and the outcomes would be dedicated for research and scientific use. The responses were collected from May 19, 2020 to May 28, 2020.

Designing of the questionnaire. The questionnaire included sociodemographic information, level of following the news of the pandemic, the main source for learning about personal hygiene practices in addition to 14 questions dedicated to personal hygiene practices (before and during COVID-19 for each question). The sociodemographic data included nationality, whether the participant was living in Saudi Arabia, gender, age (years), educational level, occupation and marital status. The level of following the news of COVID-19 pandemic choices included excessively, moderately, and rarely. The main source for learning about personal hygiene practice options included school, TV, radio, books, journals, friends, parents, Internet, and social media. The questions regarding personal hygiene habits included washing hands before preparing and/or eating food, washing hands after coming back home, washing hands after going to the toilet, using soap to wash hands, duration of washing hands with soap (in seconds), having a shower daily, regular cutting of nails, daily teeth brushing, using a hand sanitizer outside, hand shaking, wearing a face mask outside, washing hair with soap or shampoo weekly, turning away from other people and covering the nose and mouth with a tissue or the hand when coughing or sneezing, and washing dirty clothes with laundry soap before wearing them again.

All respondents who were living in Saudi Arabia during the time of filling the questionnaire were included in this study. Repeated responses and participants who were outside Saudi Arabia at the time of the questionnaire were excluded.

The ethical approval of this study was obtained from the ethical committee of the College of Medicine, University of Hail, Hail, Saudi Arabia. Approval number: HREC 00125/CM-UOH.04/20

Statistical analysis. Data analysis was performed using SPSS (IBM SPSS Statistics, version 22). Descriptive statistics were carried out for the sociodemographic data. The paired samples t-test was performed for certain variables with a significance level indicated by p-value less than 0.05.

Results. The responses of 211 participants currently living in KSA were included in the current study. The mean age of the study subjects was 38.38 years; 111 (52.6%) of the study subjects were Saudi nationals, while 100 (47.4%) were non-Saudi. The female-to-male ratio was 1.06:1 (**Table 1**), which shows

Table 1 - Sociodemographic characteristics of the study population.

Sociodemographics	n	(%)
Nationality		
Saudi	111	(52.6)
Non-Saudi	100	(47.4)
Total	211	(100)
Gender		
Male	102	(48.3)
Female	109	(51.7)
Total	211	(100)
Age (years)		
> 20	9	(4.3)
20-30	52	(24.6)
31-40	48	(22.7)
41-50	65	(30.8)
51-60	35	(16.6)
< 60	2	(0.9)
Total	211	(100)*
Education level		
Basic education	29	(13.7)
Undergraduate	87	(41.2)
Postgraduate	95	(45.0)
Total	211	(100)*
Occupation		
Unemployed	3	(1.4)
Housewife	8	(3.8)
Student	48	(22.7)
Employee	117	(55.5)
Self-employed	2	(0.9)
Retired	11	(5.2)
Other	22	(10.4)
Total	211	(100)*
Marital status		
Single	59	(28.0)
Married	139	(65.9)
Divorced	9	(4.3)
Widow	4	(1.9)
Total	211	(100)*
Level of following the news of COVID-19	86	(40.8)
Excessively	113	(53.6)
Moderately	12	(5.7)
Rarely	211	(100)*
Total		

the sociodemographic characteristics of the study population. Most of the study subjects 69 (32.7%) stated that the Internet is their primary source for information about personal hygiene practices, followed by social media (n=63; 29.9%), parents (n=46; 21.8%), TV (n=16; 7.6%), books (n=11; 5.2%), and school accounting (n=6; 2.8%). Improvement at different levels was detected in all personal hygiene practices during the pandemic compared to pre-pandemic era as shown in **Figure 1** and **Tables 2 & 3**. The percentages of the participants who always washed their hands after coming back home, used soap to wash hands, used a hand sanitizer outside, wore a face mask outside and washed hands before preparing and/or eating food were

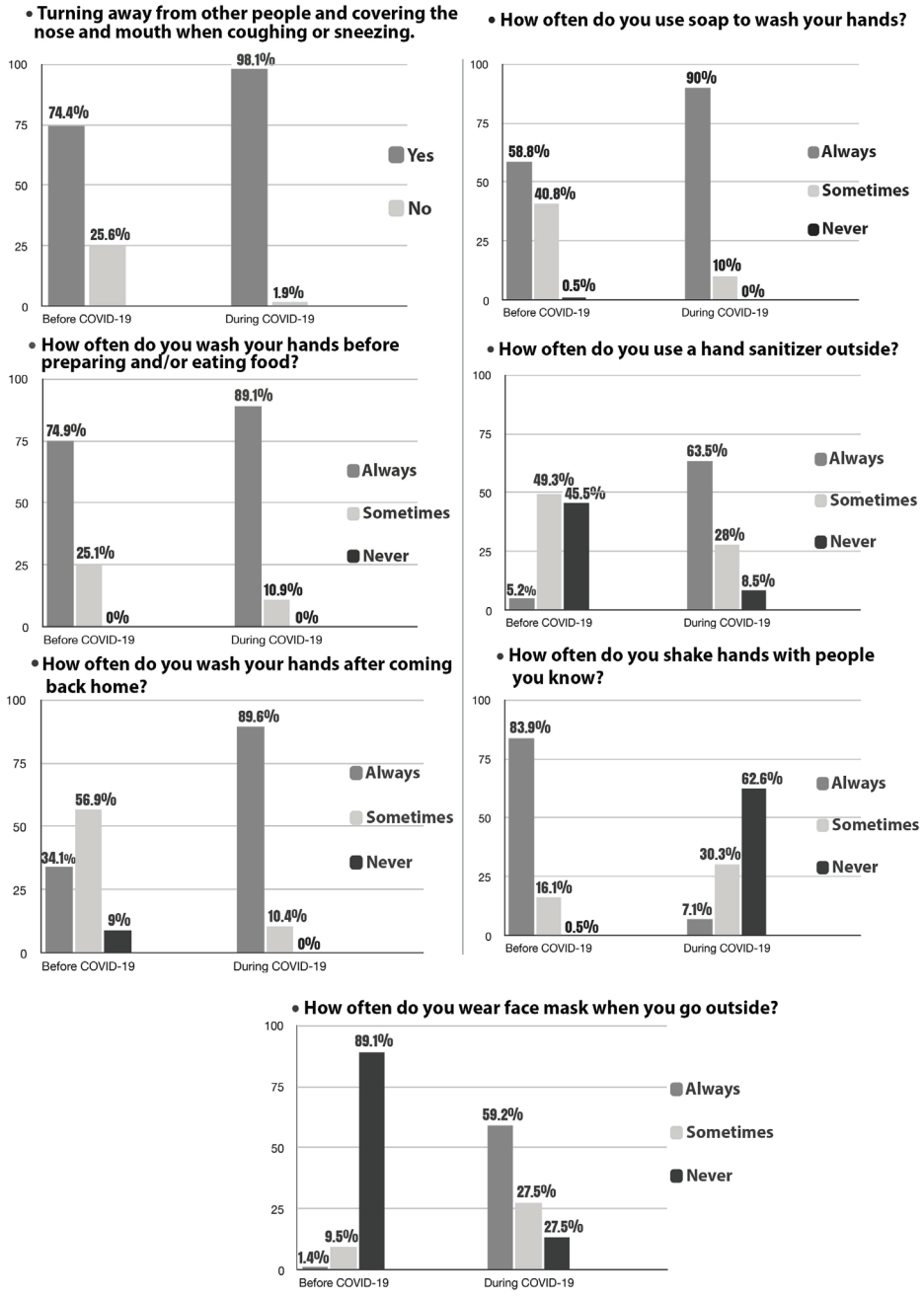

Figure 1 - Improvement of personal hygiene practices during the covid-19 pandemic.

Table 2 - Personal hygiene practices before and during COVID-19 pandemic.

Personal hygiene practice	Before COVID-19		During COVID-19	
	n	(%)	n	(%)
How often do you wash your hands before preparing and/ or eating food?				
Always	158	(74.9)	188	(89.1)
Sometimes	53	(25.1)	23	(10.9)
Never	0	(0)	0	(0)
Total	211	(100)	211	(100)
How often do you wash your hands after coming back home?				
Always	72	(34.1)	189	(89.6)
Sometimes	120	(56.9)	22	(10.4)
Never	19	(9.0)	0	(0)
Total	211	(100)	211	(100)
How often do you wash your hands after going to the toilet?				
Always	188	(89.1)	199	(94.3)
Sometimes	22	(10.4)	9	(4.3)
Never	1	(0.5)	3	(1.4)
Total	211	(100)*	211	(100)
How often do you use soap to wash your hands?				
Always	124	(58.8)	190	(90)
Sometimes	86	(40.8)	21	(10)
Never	1	(0.5)	0	(0)
Total	211	(100)*	211	(100)
How often do you use a hand sanitizer outside?				
Always	11	(5.2)	134	(63.5)
Sometimes	104	(49.3)	59	(28.0)
Never	96	(45.5)	18	(8.5)
Total	211	(100)	211	(100)
How often do you shake hands with people you know?				
Always	177	(83.9)	15	(7.1)
Sometimes	34	(16.1)	64	(30.3)
Never	0	(0)	132	(62.6)
Total	211	(100)	211	(100)
How often do you wear face mask when you go outside?				
Always	3	(1.4)	125	(59.2)
Sometimes	20	(9.5)	58	(27.5)
Never	188	(89.1)	28	(13.3)
Total	211	(100)	211	(100)

elevated (**Table 2**). The percentage of respondents who never shake hands with people they know increased from 0% before COVID-19 to 62.6% during the pandemic. An improvement was detected regarding cutting nails regularly and participants who always turned away from other people and covered their nose and mouth when coughing or sneezing (**Table 3**).

As shown in **Table 4**, the mean of duration of washing hands with soap increased significantly from

Table 3 - Alteration of personal hygiene practices before and during COVID-19 pandemic.

Personal hygiene practice	Before COVID-19		During COVID-19	
	n	(%)	n	(%)
Do you wash your body at least once a day?				
Yes	128	(60.7)	144	(68.2)
No	83	(39.3)	67	(31.8)
Total	211	(100)	211	(100)
Do you cut your nails regularly?				
Yes	176	(83.4)	189	(89.6)
No	35	(16.6)	22	(10.4)
Total	211	(100)	211	(100)
Do you brush your teeth daily?				
Yes	183	(86.7)	187	(88.6)
No	28	(13.3)	24	(11.4)
Total	211	(100)	211	(100)
Do you wash your hair with soap or shampoo at least once a week?				
Yes	202	(95.7)	205	(97.2)
No	9	(4.3)	6	(2.8)
Total	211	(100)	211	(100)
Do you always turn away from other people and cover the nose and mouth when coughing or sneezing?				
Yes	157	(74.4)	207	(98.1)
No	54	(25.6)	4	(1.9)
Total	211	(100)	211	(100)
Do you always wash dirty clothes with laundry soap before wearing them again?				
Yes	203	(96.2)	208	(98.6)
No	8	(3.8)	3	(1.4)
Total	211	(100)	211	(100)

Table 4 - The mean duration of washing hands with soap before and during COVID-19 pandemic.

Phases	n	Means (seconds)	Std. Deviation	Std. Error Mean	*P*-value
Before the COVID-19 pandemic	211	13.32	12.092	0.832	0.000
During the COVID-19 pandemic	211	28.01	18.853	1.298	

13.31 seconds before the pandemic to 28.01 seconds (p<0.0001).

Discussion. In this study, we assessed the role of the COVID-19 pandemic in the improvement of personal hygiene practices in 211 participants living in KSA. We detected an overall improvement in personal hygiene practices. This improvement seems to be directly related to the COVID-19 pandemic. It resulted in noticeable differences in several hygiene habits when compared to the pre-COVID-19 pandemic era. In particular, the improvement was particularly associated with the practices that seem to be effective in protection from this disease and minimizing its spread. For instance, the percentage of participants who always used soap to wash hands elevated to 90% during the pandemic compared to 58.8% beforehand. The percentage of respondents who wore face masks increased to 59.2% during the pandemic compared to 1.4% beforehand. Similarly, the percentage of participants who always used hand sanitizer outside was 63.5% compared to 5.2% before the pandemic. Practices such as turning away from other people and covering the nose and mouth when coughing or sneezing, regular cutting of nails, washing hands after coming back home also showed noticeable improvement during COVID-19 pandemic. The mean duration of washing hands with soap in seconds increased significantly from 13.31 before the pandemic to 28.01. These findings are consistent with data published by Kwok et al.[18] They studied the community responses during the early stage of COVID-19 epidemic. They reported that the percentages of adoption of personal hygiene practices, including disinfecting home (77.8%), washing hands frequently (95.8%), using hand sanitizer/alcohol gel (97.1%), covering nose and mouth when sneezing or coughing and wearing face masks (99%).[18]

Chen et al[19] studied the behavior of mask-wearing and hand hygiene in primary school students during the COVID-19 Epidemic in Wuhan, China. They found that 51.6% of students showed a good behavior regarding mask-wearing and 42.1% concerning hand-washing. The community spread and transmission of the virus causing COVID-19 can be minimized via the practice of careful and regular hand hygiene; however, overzealous hand hygiene for COVID-prevention was associated with the occurrence of eczema of the hands and other skin complications.[20-22] Also, there are some concerns regarding the possible health risks to environment and human health due to the frequent use of hand sanitizers.[23] However, the possibility of occurrence of these dermatological issues should never prevent people from strict hand hygiene regulations.[20] Inhalation of small airborne droplets is considered as a route of SARS-COV-2 infection.[24]

Therefore, it is essential for people to wear face masks in order to make the inter-personal distance an effective protection tool.[25] Howard et al[26] recommended the public wearing of cloth masks as an efficient mean of source control during the COVID-19 pandemic in association with existing contact tracing, social distancing and hygiene strategies. They also recommended that governments and public official encourage using of face mask in public. Eikenberry et al[27] reported, based on their study findings, that wearing a face mask by the general public could be of high value in minimizing the transmission as well as the burden of COVID-19 pandemic.[27] Using face masks has become very common in China and some other countries such as Japan and South Korea since the outbreak of SARS-CoV-2; and some provinces in China have made it compulsory to wear the face mask in public places.[28] Wu and Lipner[11] recommended keeping nails short and clean their undersides for a proper hand-washing. This is because long nails harbour higher numbers of microorganisms and the virus that causes COVID-19 is likely remain viable on the nails. Nail care is important for healthcare workers during COVID-19 because long nails may cause puncture of gloves may harbor microorganisms on the undersurface.[29]

Interestingly, the Internet and social media seemed to overcome the conventional media as a source of information regarding the personal hygiene practices, according to the current study. This might be due the wide spread use of smart phones connected to the Internet which makes it easier for people to rely on these tools as approachable sources of information. This shows the value of using these means for promoting ideal hygiene practices to protect society from this disease as well as minimizing its spread. The overall improvement in hygiene practices in KSA during this pandemic reflects the effectiveness of the early and efficient health education campaigns through media and telecommunication tools such as Short Message Service (SMS). Yousuf et al[17] found that exposure to a targeted public health campaign about COVID-19 using social media platforms and digital news was associated with an increase in the odds of washing all required areas in hands as well as longer hand-washing duration in the Netherlands.

Study limitations. Despite the importance of this study in shedding light on the current situation of

the personal hygiene practices during COVID-19 pandemic in Saudi Arabia, some limitations are present. The major limitations include lack of personal contact with the respondents because of the COVID-19 pandemic situation, and the need of making the online questionnaire brief and precise to ensure the respondents will complete it. Considering the large number of online questionnaires during that time, people might have been discouraged to participate and complete it if it was long. Generalization of the results could also have been more valuable if a larger sample size was obtained. Therefore, we suggest further studies in this field which include larger sample size, more variables and coverage of all regions in Saudi Arabia in balanced matter.

In conclusion, COVID-19 has had a great influence on individuals. At the level of the current study, the COVID-19 pandemic has resulted in a noticeable overall improvement in the personal hygiene habits in the studied group of participants who live in Saudi Arabia. This change in hygiene practices seems to be related to the current pandemic which has resulted in significant differences in several hygiene habits compared to those in pre-pandemic era. This improvement is mainly related to the practices that seem to be effective in the protection against COVID-19 and minimizing its spread.

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