Journal of Multidisciplinary Healthcare

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ORIGINAL RESEARCH

Attitudes and Practices of the Public Toward Precautionary Measures Post-COVID-19 Pandemic in Saudi Arabia

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Objective: This study aimed to assess the practices and attitudes of the general population towards coronavirus disease-2019 (COVID)-19 after the removal of precautionary and preventive measures in Saudi Arabia.

Methods: A cross-sectional study was conducted among the general population in all regions of the Kingdom of Saudi Arabia, from September 2022 to October, 2022 via a virtual survey to evaluate the practices, and attitudes of the general population towards COVID-19. A stratified random sampling technique was applied to collect the sample with inclusion criteria for all individuals who are Arabic language speakers using social media platforms. The individuals selected for this study were 18 years and older.

Results: A total of 2406 responses were received for the study questionnaire. Most of participants (66.3%) were females aged 18 to 29 years (61.8%). Half of the participants reported a positive history of COVID-19 infection. Nearly 90% of participants still wear masks, 80% attended a crowded event, and 60% often wash their hands even though the Saudi government has erased the precautions. Females, young (30–39 years) and elderly (60 years and over) individuals, singles, those with a postgraduate degree, those who are employed, and healthcare workers were more likely to adhere to COVID-19 precautionary measures ($p<0.05$).

Conclusion: The study's findings indicate that most of the population discontinued practicing precautionary measures after lifting the measures in Saudi Arabia. More public health initiatives should raise the scores of sanitary best practices to prevent the spread of viral illnesses.

Keywords: attitudes, COVID-19, contact precautions, practices, precautions, post-COVID-19 pandemic

Introduction

Coronavirus disease 2019 (COVID-19), also known as Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV -2), is an immensely contagious viral illness.[1–3] It had been discovered first in Wuhan, China, in December 2019; later, it was announced as a pandemic by the World Health Organization (WHO) on March 12th, 2020.[1,3] The presentation of COVID-19 varies in symptoms from asymptotic to multiple organ failure and death, but most commonly, patients present with fever and respiratory symptoms such as cough and shortness of breath.[4–6] It spreads through respiratory droplets with an incubation period of 2–14 days[1,7,8] and the rate of mortality is high in patients with chronic diseases and the elderly.[7] The pandemic affected the public's mental status and different categories, including patients with chronic diseases, the general public, healthcare professionals, and university students.[9–11]

Received: 27 March 2023
Accepted: 11 July 2023
Published: 15 July 2023

As of July 1, 2022, there were more than 500 million confirmed cases, including more than 6 million deaths globally.[12] Particularly in Saudi Arabia, there were 794,488 confirmed cases of COVID-19, with a reported 9207 deaths.[12,13] Since the start of this century, the World Health Organization (WHO) has declared COVID-19 as the sixth public health pandemic following the swine flu (H1N1) 2009,[14] polio (2014), Ebola in West Africa (2014), Zika (2016), and Ebola in the Democratic Republic of the Congo (2019) pandemics.[15]

The WHO has urged international cooperation to stop the rapid spread of COVID-19 due to the severity of the disease and its quick dissemination.[16] Hence, the WHO recommended and oversaw the application of precautionary measures to control and reduce the spreading of the disease by restricting travel to countries with a high incidence of cases, applying processes for identifying, isolating, and caring for infected patients, lowering the transmission from animal sources, developing diagnostic tools, therapeutics, and vaccines, informing all communities of risks and events, and minimizing the social and economic impact of COVID-19 through multi-sector partnerships.[2,17–19]

With regards to individual health and hygiene, standard recommendations to wash hands frequently, follow coughing and sneezing etiquette by covering the mouth and nose while coughing or sneezing, and maintain a physical distance of 1.5 meters from others to prevent the transmission of COVID-19 were propagated at all levels.[20]

There are several vaccinations against COVID-19 that have proven safety and effectiveness.[21,22] Almost 12 billion doses of vaccination were administered worldwide.[12] However, they may experience negative side effects brought on by both identified and unidentified mechanisms, much like other vaccines.[23]

Once the pandemic started, Saudi Arabia implemented extreme measures to control the disease, including halting air travel, enforcing curfews, and quarantining and testing thousands of people.[24] After that, the controlling measures were gradually reduced based on the locational rates of spread. As a result, on June 13th, 2022 the precautionary and preventive measures were lifted by the ministry of interior of Saudi Arabia everywhere, while maintaining the enforcement of face mask adherence for patients and healthcare providers at healthcare facilities.[12,13]

There will be "breakthrough infections", where people contract the virus despite having received all of the recommended vaccinations, because vaccines do not offer complete (100%) protection.[25] This can be found in previous literature, which also showed that various social and personal protective measures, such as social distancing, face mask use, and hand washing, are associated with reducing the incidence of COVID-19.[15] Previous studies examined public knowledge, attitudes, and practices toward COVID-19 and its vaccination across different study populations, including patients with diabetes mellitus and cancer.[26–29] There are limited studies in Saudi Arabia that examined public attitudes and practices towards COVID-19 precautionary measures. Previous studies examined knowledge, attitudes, and practices during the pandemic. To prevent and control the transmission of COVID-19, individuals must have the necessary knowledge, attitude, and practices against the virus. Understanding the knowledge, attitudes, and practices of the general public towards precautionary measures is important for decision-makers in the healthcare sectors to develop strategies and standard operating procedures (SOPs) to effectively combat any preventable disease.[28,29] Therefore, this study aims to assess the Saudi Arabian population's practices towards COVID-19 after the removal of precautionary and preventive measures in Saudi Arabia.

Methods

Study Design and Population

This is a cross-sectional study conducted among the general population in all regions of the Kingdom of Saudi Arabia, from September 2022 to October 2022 via a virtual survey. The targeted population is the general population aged 18 and older who live in Saudi Arabia. A total of 2406 individuals participated in our study.

Sample Size

The sample size was found to be 385 based on the Saudi statistics estimate. The adult population of Saudi Arabia is around 36 million. The calculation was done using the Statulator online sample size calculator, considering a confidence interval of 95% and a level of significance (p-value) of 5%.

Data Collection

Data was collected for the present using a constructed, web-based questionnaire that was previously used in articles and then translated into Arabic language (using forward-backward translation technique). We constructed the questions based on extensive literature review.[30–32] We constructed the questions based on the findings of these investigations. Then, consultants in public health and infectious diseases modified the queries to meet the aims of our study. A native Arabic speaker and expert in the Arabic language then reviewed the queries for Arabic language errors. A pilot study with 15 volunteer participants was conducted to ensure that the study's questions were plain and understandable. Then, three distinct experts (consultants in family medicine, infectious diseases, and epidemiology) validated the questionnaire and ensured that the questions were valid, consistent, and met the objectives of the study. The questionnaire was composed of two sections: the first includes the consent for participation in the study and socio-demographic data such as gender, age, occupational status, and income status, while the second section includes questions that measure public adherence to precautions post COVID-19 pandemic, such as wearing face masks, and using hand sanitizers after restrictions were eased. The survey link was distributed on various social media platforms (WhatsApp, Telegram, and Twitter) to invite the study population to participate in the study. Using a snowball sampling technique, ten data collectors were utilized to acquire the data. The data collectors distributed the questionnaire through their relatives and friends, who were asked to transmit the questionnaire link to their relatives and friends via multiple social media platforms. The data collectors emphasized the significance of participating in the research, redistributing and reposting the study's link on the aforementioned social media platforms every two weeks to remind individuals to participate.

Data Analysis

Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) software, (version 26; year: 2019, IBM Corp., Armonk, NY, USA). A P-value of ≤ 0.05 was considered statistically significant. Based on the variable's distribution, numerical data were presented as mean, standard deviation (SD). The frequency and percentage were used to present categorical variables. Binary logistic regression analysis was used to identify predictors of adherence to COVID-19 precautionary measures.

Results

Participants' Demographic Characteristics

The majority of the participants were female (66%). Regarding age groups, the majority were 18–29 years (61.8%), followed by 30–39 years (15%), 40–49 years (11.9%), 50–59 years (8.5%), and 60 years or older (2.4%). Most of the respondents were single (63.1%), followed by married (30.8%), divorced (4.7%), and widowed (1.4%). The majority of the participants were college educated (67.6%), followed by high school (21.6%), and postgraduate (7.5%). Half of the participants were students (52.6%), followed by employed (32.4%), and unemployed (15%). The majority were non-healthcare worker (85.6%). Regarding income, most of the respondents reported 5k or less (56.6%), followed by 5k-10k (20.4%), 10k-20k (17.5%), and 20k or more (4.5%). About half of the participants were from the western region (45.5%), followed by the central region (27.9%), the southern region (15%), the eastern region (6.7%), and the northern region (4.8%) (Table 1).

Participants' Practices Post COVID-19 Pandemic

Half of the participants reported a positive history of COVID-19 infection. About 70% of the respondents reported attending social events after restrictions eased. Nearly 80% of the participants reported attending a crowded event after restrictions eased. When asked about practicing social distancing after restrictions eased, the majority (68%) reported no. Most of the respondents (72.5%) reported no when asked about avoiding handshakes after restrictions eased. About 60% of the participants reported yes when asked about washing hands regularly after restrictions eased. The majority (67.5%) responded yes to taking care of personal hygiene after restrictions eased. When asked about covering the mouth/nose after restrictions eased, nearly 90% reported yes. About 65% of the respondents reported not wearing face masks after

Table 1 The Demographic Characteristics of the Participants

Demographics	Frequency (N)	Percentage (%)
Gender		
Male	810	33.7
Female	1596	66.3
Age		
18–29	1488	61.8
30–39	366	15.2
40–49	287	11.9
50–59	206	8.6
60<	59	2.4
Marital status		
Married	741	30.8
Single	1519	63.1
Divorced	112	4.7
Widowed	34	1.4
Education		
Illiterate	14	0.6
Primary school	16	0.7
Secondary school	49	2
High school	520	21.6
College	1626	67.6
Postgraduate	181	7.5
Employment		
Student	1265	52.6
Employed	779	32.4
Unemployed	362	15
Healthcare worker		
Yes	346	14.4
No	2060	85.6
Income (monthly)		
>5k	1385	57.6
5k-10k	492	20.4
10k-20k	420	17.5
<20k	109	4.5
Region		
Western	1095	45.5
Central	673	27.9
Eastern	162	6.7
Northern	116	4.8
Southern	360	15

restrictions eased. Nearly 60% reported wearing face masks when sick after restrictions eased. Half of the participants reported yes when asked about regular cleaning of surfaces after restrictions eased. About 60% reported yes to using hand sanitizers regularly after restrictions eased (Table 2).

Table 2 The Protective Measures Followed by Participants After Restrictions Eased

Protective Measures	Frequency (N)	Percentage (%)
History of COVID19 infection		
Yes	1219	50.7
No	1187	49.3
Attending social event after restrictions eased		
Yes	1678	69.7
No	728	30.3
Attending crowded event after restrictions eased		
Yes	1900	79
No	506	21
Practice social distancing after restrictions eased		
Yes	771	32
No	1635	68
Avoiding handshake after restrictions eased		
Yes	662	27.5
No	1744	72.5
Washing hands regularly after restrictions eased		
Yes	1469	61.1
No	937	38.9
Taking care of personal hygiene after restrictions eased		
Yes	1625	67.5
No	781	32.5
Covering mouth/nose after restrictions eased		
Yes	2110	87.7
No	296	12.3
Wearing masks after restrictions eased		
Yes	832	34.6
No	1574	65.4
Wearing masks when sick after restrictions eased		
Yes	1451	60.3
No	955	39.7
Regularly cleaning surfaces after restrictions eased		
Yes	1201	49.9
No	1205	50.1
Using hand sanitizers regularly after restrictions eased		
Yes	1409	58.6
No	997	41.4

Predictors of Adherence to Precautionary Measures Post the Pandemic

Following the pandemic, the participants in or study demonstrated a moderate adherence to precautionary measures. The average score for adherence to precautionary measures after the pandemic was 6.3 (standard deviation: 2.6) out of 11 (57.3% of the maximum score). Females, young (30–39 years) and elderly (60 years and over) individuals, singles, those with a postgraduate degree, those who are employed, and healthcare workers were more likely to adhere to COVID-19 precautionary measures ($p<0.05$), according to binary logistic regression analysis (Table 3).

Table 3 Binary Logistic Regression Analysis

Variable	Odds Ratio of Being Adherent to Precautionary Measures (95% Confidence Interval)	P-value
Gender		
Male (Reference group)	1.00	
Female	1.33 (1.12–1.58)	<0.001
Age categories		
18–29 years (Reference group)	1.00	
30–39 years	1.48 (1.18–1.85)	<0.001
40–49 years	0.93 (0.72–1.19)	0.538
50–59 years	1.04 (0.79–1.39)	0.768
60 years and older	1.99 (1.16–3.41)	0.012
Marital status		
Married (Reference group)	1.00	
Single	0.78 (0.66–0.92)	0.003
Divorced	1.09 (0.74–1.59)	0.672
Widowed	0.96 (0.49–1.89)	0.908
Level of education		
Illiterate (Reference group)	1.00	
Primary school	0.84 (0.31–2.26)	0.730
Secondary school	0.74 (0.42–1.32)	0.308
High school	0.85 (0.70–1.03)	0.095
College	1.01 (0.85–1.20)	0.878
Postgraduate	1.54 (1.14–2.10)	0.006
Job status		
Student (Reference group)	1.00	
Employed	1.27 (1.07–1.51)	0.006
Unemployed	1.19 (0.95–1.48)	0.136

(*Continued*)

Table 3 (Continued).

Variable	Odds Ratio of Being Adherent to Precautionary Measures (95% Confidence Interval)	P-value
Healthcare worker		
Yes (Reference group)	1.00	
No	0.56 (0.44–0.70)	<0.001
Income level		
Less than 5k (Reference group)	1.00	
5k-10k	1.29 (1.06–1.57)	0.013
10k-20k	1.23 (1.00–1.52)	0.051
More than 20k	0.88 (0.60–1.29)	0.509

Discussion

Despite the fact that COVID-19 has not been entirely eradicated and that new variants are constantly emerging, not all people take the same precautionary measures to protect themselves. In our study, 90% of the participants reported that they are still wearing face masks, and 60% often wash their hands even though the Saudi government has erased the precautions, as shown by our results. Previous studies indicated that a positive attitudes toward COVID-19 preventive measures such as hand hygiene, social distancing, donning face masks, and avoiding crowded areas is crucial for preventing the spread of COVID-19.[33–35] On the other hand, some studies reported not wearing a mask in crowded areas or when exiting the house.[33,36] Besides, previous studies reported that females have a more negative attitudes towards COVD-19 prevention than males.[37,38]

Ayaz Ahmad et al have studied the possible precautions that were taken to keep COVID-19 contained, and the study demonstrated that wearing a mask, maintaining a 6-foot distance, and using hand sanitizer are the most effective measures to prevent the transmission of COVID-19.[39,40] However, as a consequence of the continuing COVID-19 immunization programs, several countries are implementing strategies for a return to normal life and eradicating some or even all restrictions. However, as SARS-CoV-2 variants may limit the vaccinations' efficacy by 66%-88% some measures must remain unchanged.[41,42]

Ko et al, found that the policy of keeping the face mask on can be kept if the number of SARS-CoV-2 variant cases is kept under control. Meanwhile, face masks at hospitals should stay in place to safeguard the elderly.[43]

Bin Abdulrahman et al studied the obligation of Saudi citizens toward the governmental prevention guidelines during the pandemic. Most of the residents and healthcare workers have been compliant with the instructions given by the ministry of health. The findings of our study also show people are still using protection measures after lifting precautions.[30,44]

A study written by Alahdal et al considered that raising awareness is a crucial part of preventing the spread of SARS-CoV-2. Several features, including the route of transmission, symptoms, incubation period, re-infection, and sensitive populations, were poorly understood by society. Therefore, it is suggested that a well-planned and structured teaching program be implemented to increase awareness and promote improved practice, thus decreasing the spread of the virus.[45]

Bazaid et al, have a study on personal protective measures among the Saudi population, which includes hand washing, wearing gloves, and wearing masks, which are important to limit the spread of SARS-CoV-2. As shown in the results of this study, a higher understanding of the benefits of hand hygiene and wearing surgical masks and gloves is associated with age, gender, financial status, and educational level.[44]

Additionally, in the healthcare sector, maintaining the enforcement of face masks for patients and healthcare providers while at healthcare facilities and healthcare providers with better knowledge of the disease tend to decrease the infection rate among other hospital workers. Also, the factor of anxiety plays a major role in the attitude of healthcare providers, as it has a direct relation to taking precautions, as shown in the Alshagrawi et al study.[46]

In our study, we found that females, young (30–39 years) and elderly (60 years and over) individuals, singles, those with a postgraduate degree, those who are employed, and healthcare workers were more likely to adhere to COVID-19 precautionary measures ($p<0.05$). Due to a variety of factors including individual social dynamics, traits, and personal beliefs, the adherence to COVID-19 preventative measures can differ across various groups of individuals. Females are more inclined to value their own and other people's health and demonstrate higher levels of health consciousness. Younger people, who may be worried about spreading the virus to vulnerable groups, and older people, who are at a higher risk of serious COVID-19 problems, may be more aware of the risks. Increased adherence to safety measures may result from this awareness. Singles may feel a greater feeling of responsibility for their own health and the health of others, especially if they live alone or have a smaller social circle. They might be inspired to follow safety precautions to stop the virus's spread. People with postgraduate degrees frequently have a higher level of knowledge, which can help them interpret scientific data and public health recommendations better. People who are working, especially those who work in healthcare environments, may be better knowledgeable about infectious diseases and infection control procedures. Their professional background may result in better adherence to safety measures.

However, several limitations of this study should be acknowledged. First, the lack of interest in COVID-19 precautions published in the literature resulted from the introduction of vaccinations and the elimination of limitations in the vast majority of countries. Secondly, since respondents were required to conduct the questionnaire independently, there may be biases arising from self-reporting and recalling. A significant proportion of the targeted population may lack access to social media websites. Nevertheless, according to the most recent available data from 2023, approximately 79.3% of the Saudi Arabian population uses social media. Finally, extending the findings to worldwide populations may be challenging due to the limited population sample in Saudi Arabia. Therefore, future research should aim to remove these limits.

Conclusion

The current study reported that participants in Saudi Arabia have moderate adherence to hygienic practices and compliance with guidelines. The majority of the population showed non-commitment to practices of precautionary measures towards COVID-19 after the removal of precautionary and preventive measures in Saudi Arabia. In order to have the best results, more public health initiatives should raise the score for sanitary best practices. Females, college students, working individuals, and those between the ages of 18 and 29 should be the target of increased public health initiatives.

Data and Materials Availability

All data are available on reasonable request from the corresponding author.

Ethical Approval

The study was approved by the Institutional Review Board at Umm Al-Qura University, Makkah, Saudi Arabia gave their clearance. This study was conducted in accordance with the World Medical Association (WMA) Declaration of Helsinki.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Funding

This study has not received any external funding.

Disclosure

The authors declare that there are no conflicts of interests.

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