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Original Article

Estimating the public response to mitigation measures and self-perceived behaviours towards the COVID-19 pandemic

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الملخص

أهداف البحث: منذ منتصف مارس ٢٠٢٠، ونسبة انتشار جائحة الحمة التاجية لعام ٢٠١٩ في ازدياد شديد وذلك نتيجة لسرعة انتشار المرض والفحص الموسع والإبلاغ عن المرض، ويتم تحديث الدليل الدولي التوجيهي الموجز بشأن تدابير وطرق مكافحة المرض بشكل متكرر لمساعدة الدول وحكوماتها لاتخاذ التدابير المثلى ضد الجائحة وحماية شعوبها. يهدف هذا البحث لإجراء مسح سريع لتحديد الوعي بجائحة الحمة التاجية لعام ٢٠١٩ في المملكة العربية السعودية ولقياس الاستجابة لإجراءات التخفيف المتخذة للحد من انتشاره.

طرق البحث: أجريت دراسة استقصائية الكترونية وتحليل الردود الأولى التي بلغ عددها ٣٨٨ ردا لنشر تقرير أولي لهذه الدراسة ، وتكونت الاستبانة من ٢٧ سؤالا ومقسمة إلى ٣ أقسام هي الديموغرافية والوعي والاستجابة لاستراتيجيات التخفيف، وسلوكيات المشاركين الذاتية بشأن الحمة التاجية لعام ٢٠١٩، وتمت مقارنة وعي الناس باستجاباتهم لتدابير التخفيف.

النتائج: وجد أن ٨٩.٧٪ يفهمون معنى الجائحة، في حين أن ٨٢.٢٪ اختاروا كبار السن على نحو صحيح كفئات شديدة الخطورة للإصابة بالعدوى. وأجاب ٩٦.١٪ من مجموع المشاركين بأن البقاء في المنزل هو أحد استراتيجيات التخفيف التي يتخذونها، ويفضل ما يقارب من ٣٥٪ تناول أدوية خافضة الحرارة من تلقاء أنفسهم. وقد تبين أن مستوى التعليم العالي، وساعات العمل الأطول يرتبطان بشكل كبير بالاستجابة الإيجابية لتدابير التخفيف.

الاستنتاجات: اتضح من هذه الدراسة وجود معرفة جيدة، واستجابة مناسبة لتدابير التخفيف من حدة جائحة الحمة التاجية لعام ٢٠١٩ خلال فترة الارتفاع السريع بين عامة السكان في المملكة العربية السعودية، وعلى الرغم من ذلك، وجدنا أن ثلث المشاركين في هذا البحث يلجؤون للتطبيب الذاتي عن طريق تناول الأدوية من تلقاء أنفسهم دون وصفة طبية.

الكلمات المفتاحية: كوفيد-19؛ تقدير؛ تخفيف؛ جائحة؛ العلاج الذاتي

Abstract

Objectives: Since March 2020, a rapid increase has been observed in the prevalence of the COVID-19 pandemic, which has essentially resulted from increased disease transmission and intensified testing and reporting. The international guidelines for the prevention and treatment of the COVID-19 pandemic have been frequently updated. Such guidelines assist the governmental regulatory bodies in taking optimal measures and safeguarding their citizens against the pandemic. We conducted a short survey with a Saudi cohort to understand the awareness about COVID-19 and estimate the responses for mitigation strategies.

Methods: An electronic survey was conducted, and the first 388 responses were analysed for publishing an initial report. The questionnaire comprised 27 items and was divided into three sections, namely demographic, awareness, and response to mitigation strategies and participants' self-perceived behaviours regarding COVID-19. The perceptions of the participants were compared with their responses to mitigation measures.

Results: In our study, 89.7% understood the meaning of pandemic, while 82.2% correctly identified that the elderly belonged to a high-risk group for the COVID-19 infection. As many as 96.1% agreed that staying at home was one of the mitigation strategies. Nearly 35% preferred self-medication. Higher educational level (OR: 2.09, 95% CI: 1.02–4.29) and longer working hours were found to be significantly associated with a positive response to mitigation measures with $p < 0.04$ and $p < 0.02$, respectively.

Conclusions: We report better understanding and appropriate response to mitigation measures towards the COVID-19 pandemic among the general population in KSA. Nevertheless, the tendency towards self-medication was reported by one-third of the responders.

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Keywords: COVID-19; Estimation; Mitigation; Pandemic; Self-medication

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Introduction

The COVID-19 outbreak was declared a worldwide pandemic by WHO on 11 March 2020, with a 13-fold increase in the number of cases reported outside China, over a couple of weeks.[1] It has affected more than 2.3 million people in 185 countries in the world. Out of the total global burden, a little above 120 thousand confirmed cases and 5784 deaths were reported in EMRO by 18 April 2020.[2] KSA, with 7142 cases and 87 deaths, is the third country in the region to be affected by the novel coronavirus or SARS-CoV-2 (severe acute respiratory syndrome-CoV-2).[3]

The overall case fatality rate (CFR) among all countries is 6.8%, but the highest is in Italy at 13.1%.[4,5] The COVID-19 pandemic may become a category 3 pandemic, depending on its reproduction number (R_0) and overall fatality ratio thus far.[6,7]

Furthermore, there is an absence of a specific treatment method or vaccine against the novel coronavirus disease. In such a situation, non-pharmaceutical interventions are the mainstay, such as community mitigation strategies and suppression to slow down the transmission, particularly among the high-risk population.[8,9]

An exploratory survey was conducted in the United States of America in 2006, to study the expected public reaction to social distancing and other non-pharmaceutical interventions that may be used during a pandemic. A total of 85 questions were developed to cover the information on the acceptability of mitigation measures and about the problems that the public would face while complying with the recommended measures towards preparedness to a pandemic. It was found that 41% knew what the term 'pandemic' meant, while 25% had never heard of this term. In addition, it was reported that 94% intended to stay at home, away from work, while 85% said that they would be able to take care of sick persons in their household.[9]

The results of the same survey, published later in 2010, reported the ability to comply with isolation recommendations and difficulties faced by low-income and urban populations. Of the respondents, 28% reported that they might lose their job or business because of staying away from work for 7–10 days, during an expected event of an influenza outbreak.[10]

In KSA, a cross-sectional study was conducted in 2015, which showed high levels of concern and widespread utilisation of precautionary measures against MERS-CoV by most participants. The results revealed that gender and knowledge were the predictors of the level of concern.[11] For the current pandemic, mitigation measures have been implemented from 27 Feb 2020, and visits to the Holy Mosques of Makkah Al Mukarramah and Almadinah Almunawwarah have been suspended. The first confirmed case of COVID-19 was reported by the Ministry of Health on the 2 March 2020.[12] This resulted in the following: reinforcement of quarantine or self-isolation; international and domestic travel bans; closure of school and universities; social distancing; avoidance of mass gathering, including even the Friday prayer; mandatory curfews with a penalty for breaking the law; and educational mass media messages to promote healthy and hygienic lifestyle instructions towards containment of the pandemic.[13,14] Media channels and educational messages have shown evidence of affecting public awareness and behaviours by promoting the use of precautionary measures, such as washing hands and maintaining respiratory hygiene, during communicable disease outbreaks.[15]

In addition to worldwide governmental efforts, people are taking various immunity-boosting measures. While many of these are harmless, some have the potential to be extremely dangerous. These self-perceived measures may range from a simple intake of vitamin C or garlic and honey to unsupervised measures of sodium chloride and citric acid solutions.[7]

This survey was conducted to identify people's awareness and response to mitigation strategies and their self-perceived behaviours against COVID-19 in the KSA, during the early phase of the disease outbreak.

Materials and Methods

An electronic survey was conducted among the Saudi population aged more than 18 years when they were under lockdown. The questionnaire was designed on Google forms, and the link was shared on social media, such as Facebook and WhatsApp, during March–April 2020, among residents of KSA through the contact list of investigators. Thus, this is a non-probability sample; to achieve maximum participation, further snowball sampling was done through contact lists of the participants who shared the questionnaire link on their social media groups.

The questionnaire comprised 27 questions and was divided into three sections, namely demographic, awareness, and response to mitigation strategies and participants' self-perceived behaviours regarding COVID-19. The questions were developed by consulting and reviewing currently available international guidelines [Annex: Report of Systematic Literature Reviews pages 2–4]. The tool was designed in English and translated to Arabic by a bilingual co-investigator and back-translated by another bilingual expert. The questions have undergone necessary modifications and corrections to ensure their clarity and ease of understanding. The questionnaire has been tested on 12 persons. The reliability coefficient test (Cronbach's alpha)

was high for all questions. The results of the pilot study were consistent with the study results; therefore, it was included in the main survey.

In this survey, we estimated an optimal sample size of 385 participants by using OpenEpi software version 3.01 (https://www.openepi.com/SampleSize/SSPropor.htm). Invitations to participate in the survey were sent to 1925 individuals, and an accepted minimal response rate of 20% was used while keeping a 5% margin of error. This quick survey was the first phase of a longitudinal mixed method study funded by Taibah University.

For analysis, data were transferred on Microsoft Excel and subsequently imported to IBM SPSS for Windows, v. 22.0 (IBM Corp., Armonk, USA). Descriptive analysis was performed by mean, standard deviations, frequencies, and percentages, as applicable. Inferential analysis was used to relate demographic and awareness variables to responses to mitigation measures by applying the chi-square test. The response was considered as 'positive', if more than two answers were in affirmation and as 'negative', if two or less. Multivariate regression was performed to find the factors predicting responses to mitigation measures. The dependent variable was (response to mitigation measures) and independent variables were (some socio-demographic and occupational characteristics of the participants). The test results were considered significant when p-value ≤ 0.05.

Results

Approximately 60.8% of the participants were younger than 40 years of age, and 60.3% were females. They were mostly residents of Makah (39.7%), Almadinah Almunawwarah (24.2%), and Riyadh (18.6%). Nearly half of the participants were of Saudi nationality (50.3%), and most of them were University graduates or above (59.5%). The majority (95.9%) reported that they have travelled in or out of SA, more than two weeks ago. The mean number of family members in the house was 5.13 ± 3.16 persons, with approximately two children per household, on an average.

While 44% of the participants were working inside the health sector, 26.5% were working outside the health sector, and nearly a third of them were not working (including homemakers/retired). Further, 51% were government employees, and 33% were working in the private sector. Of the respondents, 60.3% reported that their overall work duration was ≤10 years, and 39.7% were working for more than 10 years, with an average of 7.61 ± 2.09 work hours/day.

Table 1 shows the awareness of the COVID-19 pandemic wherein 89.7% reported that they understand the meaning of pandemic. Participants correctly reported high-risk groups for COVID-19 infection as the elderly (82.2%), asthmatics (60.8%), smokers (56.7%), and diabetics (49.2%). Majority of the participants thought that government initiated measures are important for preventing COVID-19 infection and identified these measures as staying at home (96.1%), frequent hand washing (87.6%), avoid handshake (86.9%), and avoid mass gathering 87.1%; only 80.7% and 57% mentioned social distancing and use of face masks, respectively.

The COVID-19 symptoms mentioned by the participants include fever (96.9%), shortness of breath (94.6%), dry cough (91.2%), and sputum (21.1%). Most of them preferred calling helpline (69.3%) or visiting the physician (25.5%), whenever symptoms presented themselves. Only 5.2%

Table 1: Awareness about the COVID-19 Pandemic among the study participants.

Characteristics	Frequency (n = 388)	Percent
How familiar are you with term pandemic?		
• Only heard the term pandemic	25	6.4
• Understand the meaning of pandemic	341	87.9
• Heard but don't know what it is	14	3.6
• Don't know at all	8	2.1
Which of the following are at a greater risk of coronavirus infection?[a]		
• Elderly of age >60ys	319	82.2
• Smoker	220	56.7
• Diabetics	191	49.2
• Asthmatics	236	60.8
• Children <5ys	48	12.4
• Living in crowded place	82	21.1
Do you think that the measures advised by the government are important for preventing COVID-19?		
• Yes	343	88.4
• No	28	7.2
• Don't know	17	4.4
What are the measures taken by the government to prevent the spread of COVID-19?[a]		
• Stay home	373	96.1
• Avoid handshake	337	86.9
• Wash hand frequently	340	87.6
• Use face mask	221	57.0
• Social distance	313	80.7
• Avoid gathering	338	87.1
• Avoid air travel	309	79.6
• Curfew	311	80.2
What are the main symptoms of COVID-19?[a]		
• Fever	376	96.9
• Dry cough	354	91.2
• Sputum	82	21.1
• Shortness of breath	367	94.6
What are you supposed to do if you have any symptoms?		
• Visit doctor	99	25.5
• Call helpline	269	69.3
• Isolate myself, wait and see	20	5.2
Can you take care of a sick person at your house?		
• Yes	191	49.2
• No	84	21.6
• May be	113	29.1

[a] Participants were supposed to choose more than one answer.

Table 2: Response to the COVID-19 pandemic mitigation measures among the study participants.

Mitigation measures	Frequency (n = 388)	Percent
Are you staying home as the government has advised?		
• Yes	373	96.1
• No	15	3.9
Are you self-medicating for fever?		
• Yes	136	35.1
• No	252	64.9
Are you avoiding public meetings like weddings, parties etc.?		
• Yes	379	97.7
• No	9	2.3
Are you taking any immunity-boosting measures?		
• Yes	321	82.7
• No	67	17.3
What are the preventive measures to be adopted before or particularly during this pandemic?[a] (n = 321)		
• Honey	213	66.5
• Olive oil	114	35.6
• Black seed	128	39.9
• Ginger	132	41.0
• Dates	128	39.9
• Warm water	114	35.6
• Gargle with water and salt	77	24.0

[a] Participants chose more than one answer.

responded by isolating themselves, followed by waiting and observing. Participants who reported that they could not take care of a COVID-19 infected person at home constituted 21.6% of the group, and nearly half (49.2%) of them mentioned that they could take care of a sick person at home, as also shown in Table 1.

Table 2 presents mitigation measures during the COVID-19 outbreak, as stated by the participants. Such measures mostly include staying at home (96.1%) and avoiding public meetings (97.7%). Self-medication for fever was mentioned by 35.1% of the participants. Most participants indicated towards measures for boosting immunity (82.7%), such as honey (66.5%), black seeds (39.9%), ginger (41%), dates (39.9%), warm water (35.6%), and olive oil (35.6%).

A higher educational level is associated with a positive response to mitigation measures ($p = 0.04$). Additionally, 76.2% of those working for $\leq$10 years had a negative response to mitigation measures compared to only 23.8% of those working >10 years ($p = 0.02$). Other socio-demographic and occupational characteristics are not significantly associated with response to mitigation measures (Table 3).

Table 4 shows the socio-demographic and occupational characteristics modelled by using multivariate logistic regression for independent association with response to mitigation measures. Only educational level showed a significant independent association with response to mitigation measures (OR: 2.09, 95% CI: 1.02–4.29, $p = 0.04$). However, nationality, residence, and gender have not show any independent association with response to mitigation measures. Among occupational characteristics, longer working hours (OR: 1.5, 95% CI: 1.02–2.39, $p = 0.02$), but neither with a type of occupation nor the work sector were independently associated with higher odds of positive response to mitigation measures. It was also found that participants identified children younger than five years of age as the only high-risk group, which was significantly associated with response to mitigation measures ($p = 0.03$).

Table 3: Response to mitigation measures by socio-demographic and occupational characteristics among the study participants.

Socio-demographic, occupational characteristics	Positive response (n = 346)		Negative response (n = 42)		P value
	No	%	No	%	
Age					
• <40ys	208	60.1	28	66.7	0.4
• ≥40ys	138	39.9	14	33.3	
Gender					
• Men	133	38.4	21	50.0	0.1
• Women	213	61.6	21	52.5	
Nationality					
• Saudi	174	50.3	21	50.0	0.9
• Non Saudi	172	49.7	21	50.0	
Residence					
• Makkah Al Mukarramah	138	39.9	16	38.1	0.8
• Almadinah Almunawwarah	86	24.9	8	19.0	
• Riyadh	62	17.9	10	23.8	
• Dammam	29	8.4	4	9.5	
• Jeddah	31	9.0	4	9.5	
Educational level					
• Primary or less	23	6.6	2	4.8	0.04[a]
• Preparatory	23	6.6	8	19.0	
• Secondary	91	26.3	10	23.8	
• Graduate and above	209	60.4	22	52.4	
Occupation					
• Not working	98	28.3	15	35.7	0.6
• Working inside the health sector	155	44.8	17	40.5	
• Working outside the health sector	93	26.9	10	23.8	
Work sector: (n = 275)	[N = 233]				
• Government	121	52.0	19	45.2	0.6
• Private	76	32.7	15	35.7	
• Self-employed	36	15.3	8	19.0	
Work duration (ys) n = 275	[N = 233]				
• ≤10ys	135	58.4	32	76.2	0.02[a]
• >10ys	98	41.6	10	23.8	

+ve response: > 2 yes answer, -ve response: ≤ 2 yes answer.
[a] Level of significance $p \leq 0.05$.

Table 4: Association of socio-demographic and occupational characteristics with the response to mitigation measures.

Variables	OR	Lower 95% CI	Upper 95% CI	P
Gender	2.0	1.02	4.29	0.4
Nationality:	1.1	0.56	2.24	0.7
Residence	0.9	0.75	1.15	0.5
Educational level	1.1	0.81	1.62	0.04[a]
Occupation	1.1	0.70	1.87	0.5
Work sector	0.8	0.53	1.37	0.5
Work duration (ys)	1.6	1.06	2.43	0.02[a]

[a] Level of significance $p \leq 0.05$.

Discussion

The findings of our study showed good knowledge and positive response to COVID-19 mitigation measures. A high proportion of participants were aware of the importance of government measures to control COVID-19 (88%), had knowledge about the government measures (57–96%), and were familiar with the term pandemic (88%). Most participants had prior knowledge about disease symptoms.

Furthermore, high knowledge levels were also reported in the recent knowledge, attitude, and practices (KAP) study about COVID-19 in China.[17] However, a previous study conducted in Taif, KSA, about the KAP MERS-CoV epidemic in 2015, reported a lower level of knowledge in the general population.[18] Another previous study conducted in Riyadh, KSA, found that the public's knowledge of MERS-CoV was suboptimal.[11] Studies conducted among healthcare providers in Najran and Makah region of KSA also reported low knowledge levels about MERS-CoV.[19,20] Conversely, our participants showed good knowledge and a positive response to mitigation efforts. Such results may be primarily due to the sample characteristics: 85% of our study participants belonged to the secondary or higher education level group. Moreover, because of the overwhelming news reports on COVID-19, educated people could actively acquire knowledge related to this disease from various information portals.

Most participants (82%) were aware that senior citizens are more at risk; however, the other high-risk groups, such as those with co-morbidities, like smokers, asthmatics, and diabetics (50–60%) were not that well known to a majority of the population. Thus, this information must be provided to the people to protect the high-risk groups from the infection. This is akin to the findings of the study conducted among healthcare providers in the Qassim region, which reported that approximately 76% of the participants knew that people with co-morbidities (Diabetes, cancer, and other chronic diseases) were more likely to be infected with MERS-CoV.[21]

Regarding the response to mitigation measures, around 96% were staying at home and approximately 98% were avoiding public gatherings. A somewhat lower response of 57% was reported on the use of face mask. This could be due to participants' lack of understanding about implementation of personal and impersonal measures such as those enacted by the government. However, approximately 83% were taking either of the immunity-boosting measures.

Thus, we recommend that health messages related to COVID-19 should be shared through the electronic media for wider dissemination, and ultimately, better prevention. Such information distribution should be achieved through an authenticated source, such as MOH websites or advertisements with the MOH logo, for authentication purposes. The messages should cover information about the appropriate time when a person should seek care and visit a healthcare facility. The medium of dissemination should be wisely selected to reach out to the general population. Not everyone has access to the internet or reliable information. This can be addressed by sending audio and video messages on mobile phones as a package. Such messages should be developed with illustrations for the less literate segment of the population and should include demonstration videos whenever possible.

Nevertheless, this quick online survey has a few limitations. There was an oversampling of a specific characteristic, for example younger age group, and a high proportion (44%) of healthcare workers (HCWs), leading to selection bias. Moreover, the study mostly represents the literate population living in KSA and those with better knowledge about COVID-19. Thus, we cannot generalise our findings to the general population of KSA. However, the study may serve as an important resource of knowledge and awareness for the younger and educated population living in KSA.

Conclusion

The results of the study revealed that the general population in KSA had good knowledge about the COVID-19 pandemic, and they demonstrated appropriate responses to the outbreak mitigation measures, during the rapid rise period. Nevertheless, there was a lack of awareness regarding high-risk groups. Regarding the response to mitigation measures, a vast proportion of the population preferred staying at home and avoiding public meeting places. However, one-third of the population was self-medicating for fever, which is a cause for concern.

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Conflict of interest

The authors have no conflict of interest to declare.

Ethical approval

This study was approved by the Taibah University College of Dentistry Research Ethics committee. Before starting the online survey, informed consent was electronically obtained from participants. All procedures of the research were conducted according to the World Medical Association (WMA) Declaration of Helsinki on ethical principles for medical research involving human subjects. Written consent was obtained from all the participants at the start of the online survey, after clarification was provided regarding the study's aim and the privacy of personal data.

Authors contributions

FAM conceived and designed the study, conducted research, and provided research materials. MMZ collected, organised, analysed the data statistically, and submitted the paper. AAK collected and interpreted data. EQA wrote the introduction and collected data. HMI obtained ethical approval and wrote results. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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