



## **Willingness to Test for COVID-19: A Cross-Sectional Study on the Population in the Ha'il Region, KSA**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors designed the study, managed the literature searches, collected the data, performed the statistical analysis, managed the analyses of the study, wrote the protocol and wrote the first draft of the manuscript. All authors read and approved the final manuscript.*

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### **ABSTRACT**

**Aims:** To measure the degree to which the Ha'il community is willing to test for COVID-19 and assess the possible factors that may influence their decision.

**Study Design:** Descriptive and analytical cross-sectional study.

**Place and Duration of Study:** The study was conducted in Ha'il Community. And the data was collected from October to November of 2020.

**Methodology:** Participants comprised of both Saudi and non-Saudi males and females who were 18 years or older and living within the Ha'il region. Participants were recruited via convenience sampling by distributing the electronic questionnaire throughout various social media platforms.

**Results:** Of the 664 participants, 80.9% reported their willingness to test for COVID-19 if they had olfactory dysfunction with, 80.3% reporting their willingness to test if they had difficulty breathing. However, only 61.7% of participants said that they would be willing to be tested if they had been in contact with someone who had tested positive, whilst they themselves were asymptomatic. More than half of the participants reported that they were confident in the results (81%). Bio-demographic

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factors that influence the degree of public trust were as follows; females (83.8%); living with others (81.8%); history of not gathering with more than 10 people outside their household (87.9%).

**Conclusion:** Our finding revealed that the vast majority of the Ha'il community are willing to test for COVID-19, with a high proportion of females, participants who are living with others and participants who do not usually mix with more than 10 people at the same time showing a greater degree of trust in the results of the COVID-19 test. Furthermore, when participants had experienced olfactory dysfunction or and breathing difficulties themselves, they tended to exhibit greater trust in the COVID-19 test results.

*Keywords: COVID 19; Ha'il; Ha'il population; KSA; test for COVID-19; trust.*

## 1. INTRODUCTION

The COVID-19 outbreak which originated in Wuhan city and became the most serious epidemic in China has gradually become a global pandemic and was declared a Public Health Emergency of International Concern on 30 January 2020 [1]. The virus can be detected using real-time RT-PCR (rRT-PCR), a viral whole-genome sequencing showing high homogeneity, a specific IgM antibody and IgG antibody to SARS-CoV-2 in serum test; or titer rising  $\geq 4$  times in the recovery phase above that in the acute phase [2,3]. Imaging can be reliable as well, a recent study showed that CT examinations were more sensitive 97.2% first-round rRT-PCR 84.6% [4].

Based on their past experience with SARS-CoV, China was able to swiftly implement early screening which significantly helped in controlling the transmission. On 10<sup>th</sup> of March 2020, the number of new cases in China decreased to 20 [5]. At the same time Italy was at the beginning of the outbreak there, with the basic reproduction number ( $R_0$ ) -which denotes the communicability of infectious agents standing at  $R_0 = 2.38$ . After the implementation of a broader testing programme in Italy, the  $R_0$  subsequently decreased to 0.85 [6].

In South Korea, the Korean Disease Control and Prevention Agency (KCDC) prioritized nationwide testing which included the innovative drive-through testing, medical tents, and walk-through testing. On 26 February 2020, the number of new cases in South Korea exceeded 1000, but by 17 March 2020 this had fallen to 84 [7]. This can be seen as an indication of the importance of early detection and screening when it comes to swiftly controlling and overcoming epidemics [8,9] As previously noted, countries that implemented early testing and detection have a far lower number of cases when compared to countries

who implemented their screening programmes later [7–9].

The Saudi Ministry of Health (MOH) have made tremendous efforts to educate the public about the virus, its nature, transmission and how to protect one's self against it. In order to facilitate testing MOH explicitly designed apps for booking appointments, notifying, informing and educating individuals [10]. Moreover, MOH have provided multiple centers in each city for detecting cases by mass screening in crowded neighborhoods, home-based testing, drive-through testing and clinic-based testing, with the TAAKAD clinics and 24hour TATAMAN clinics being for symptomatic and asymptomatic individuals respectively [11].

Ultimately, these efforts are dependent on the willingness of the general population to undergo a test. Sharot and Sunstein examined how people's knowledge about a subject correlated with their behavior, with one of their findings being that people willingly chose to remain ignorant when it came to possible bad results e.g. by rejecting medical screening. One of the main concerns for individuals was the effect that any such information might have on their mental state [12]. People generally tend to speculate on the possible outcomes of any action on their part, and only when the outcome is considered to be favorable for them will they actually take action [13].

It is fair to say that a tremendous amount of information about COVID-19 is misleading and disinformation such as this can have a profound effect on how individuals perceive the threat of the virus [14,15] Basic epidemiological models suggest that because of the contagiousness of the virus and an absence of immunity in the general population, 40-70% of the population could become infected [16]. It is therefore essential for the public to understand that they have an important part to play in containing the spread of the virus, by taking precautions and

undergoing testing when required. In order to understand more about the epidemiology of COVID-19 in Saudi Arabia, it is essential to contain the spread of the virus in a variety of ways, one is being testing. People's willingness to test is therefore critical [10,17,18].

To the best knowledge of the researchers, no study has been conducted to date with the aim of assessing the attitude of the general population of Saudi Arabia towards testing for COVID-19. Therefore, the present study aims to provide an overview of the mindset of the Ha'il community towards testing for COVID-19 and the associated factors that can influence their decision. One of the characteristics of the Ha'il population is being extremely sociable, which meant that there were incidents of peaking cases there while other cities of Saudi Arabia were witnessing a drastic decrease. Hence the reason that this area was chosen for the study.

## **2. MATERIALS AND METHODS**

### **2.1 Study Design and Methods**

This cross-sectional study was conducted on a sample of Ha'il community in Saudi Arabia. Participants were recruited by convenience sampling by distributing the electronic questionnaire via various social media platforms. These platforms offer an extremely quick and cost-effective method of reaching a large number of people in a matter of seconds. The study goals and outcomes were outlined at the beginning of the questionnaire, thereby enabling potential participants to fully understand the aims of the study and make an informed decision whether or not they wish to participate in the study. Potential participants comprised of both Saudi and non-Saudi males and females, aged 18 years or older and living within Ha'il region. The sample calculation formula was used to calculate the sample size. According to the latest censuses in Saudi Arabia, Ha'il population was 699774. Therefore, allowing for a 5% margin of error and a 95% confidence level, and the eligible sample size for the study is 384. Taking into account the possible lack of responses, it was decided to oversample, thereby making the final sample size 664.

### **2.2 Data Collection**

From October 21st to November 4th, 2020 a self-administered online questionnaire was used to collect the data. A pilot questionnaire was distributed in order to measure potential

participant's understanding of the questions as a whole and included a feedback section to identify any lack of clarity within the questions. We received ten responses which demonstrated a complete understanding of the questions. The questionnaire measured several variables and was composed of five sections. The first section covered the sociodemographic of the participants, including age, gender, nationality, residence, educational level, living condition and current level of social distancing. The second section comprised of ten questions and included the participant's willingness to test for COVID-19 whilst exhibiting symptoms (e.g., fever, dry cough, fatigue, muscle pain or body pain, nasal congestion). The third section comprised of two questions to establish the participant's knowledge about the testing methods available in their residential area and their confidence in the result. The fourth section was comprised of three questions to test the participant's willingness to test for COVID-19 in the absence of any symptoms (I will, or I will not test). The fifth section comprised of four questions to establish the participant's willingness to test for COVID-19 when symptoms are present. (I will, or I will not test).

### **2.3 Data Analysis**

After the data was collected, modified, coded and entered into statistical software IBM SPSS version 22 (SPSS, Inc. Chicago, IL). All statistical analysis was done using two tailed tests. P value less than 0.05 was considered to be statistically significant. Descriptive analysis based on frequency and percentage distribution was completed for all variables, including demographic data, willingness to test for COVID-19 by symptoms and reasons for a willingness or an unwillingness to test for the disease. Cross tabulation was used to test for the distribution of public trust regarding the COVID-19 test, by their bio-demographic data and willingness to take part in the test. The Pearson chi-square test was used to test for relations significance.

## **3. RESULTS**

A total of 664 participants completed the survey questionnaire, aged between 18 to 65 years old with an average age of 31.2.  $\pm$  12.9 years. 490 (73.8%) of participants were females and 647 (97.4%) were Saudi nationals. The majority of respondents were from Ha'il city (619 or 93.2%) and 519 (78.2%) were university graduates or higher. 625 individuals (94.1%) were living with their families and 425 (64%) had recently met

with more than 10 people outside their home (Table 1).

Table 2 indicated how willing people are to undergo a test for COVID-19 if they exhibit suspicious symptoms. 80.9% of the participants stated that they were willing to test for COVID-19 if they had olfactory dysfunction, 80.3% if they had difficulty breathing, 68.7% if they had fever and 57.8% if they had a dry cough. On the other hand, only 34.6% reported willingness to test for covid-19 if they had rhinorrhea and 39% if they felt tired for few days. As for the most familiar testing methods as reported among study respondents (Fig. 1), clinic was the most reported site (57.1%) followed by private car testing (47.9%), and at home (8.4%).

Table 3 illustrated the reasons why the respondents might be more or less willing to take a COVID-19 test and their attitude towards the test. The reason given by most respondents (32.7%) is that they would not take a test because they thought they had flu or the common cold, rather than COVID-19 followed by having mild symptoms (29.8%), refuse to be isolated (8.9%), and fear of being harassed and embarrassed by my neighbors and friends

(8.7%). Regarding Causes of willingness to be tested, the most reported was knowing people who had positive results while being asymptomatic (61.7%), (35.1%) because they wanted to make sure they were not infected and (24.8%) because the test is free of charge or the place of testing is near them. About participants attitude towards COVID-19 testing, 81% reported that they trust the results of the COVID-19 testing.

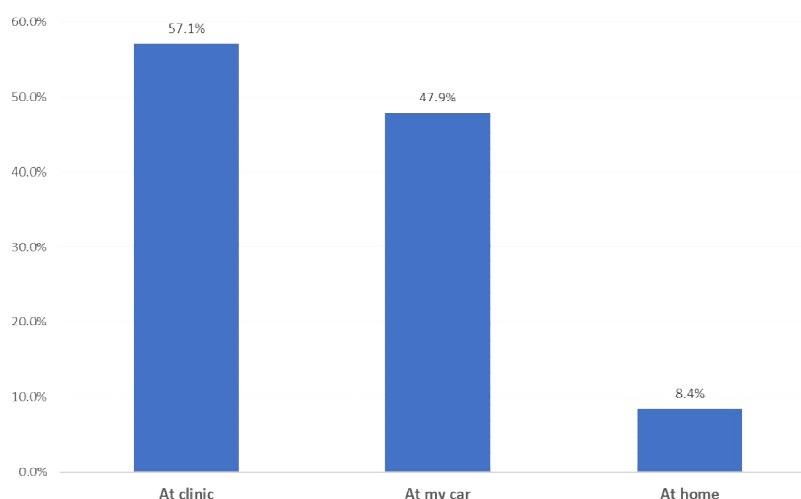
Table 4 illustrated the degree of public trust in the COVID-19 test according to bio-demographic data. 83.8% of female participants trust the COVID-19 test as compared to 74.7% of males, with reported statistical significance ( $P=.013$ ). Also, 81.8% of those who lived with others trusted the test results in comparison to 69.2% of those who lived alone ( $P=.049$ ). 87.9% of participants who did not generally meet with more than 10 people outside their home trust the COVID-19 test as compared to 77.2% of those who did ( $P=.001$ ). Moreover, significantly higher trust was reported among participants who were willing to undergo the test if they had difficulty breathing and among those who had a sudden loss of taste or smell (82.6% 83.2%, respectively).

**Table 1. Personal data of study participants, Ha'il, Saudi Arabia**

Personal data	No	%
<b>Age in years</b>		
18-30	509	76.7%
31-40	79	11.9%
41-50	53	8.0%
51-60	20	3.0%
60+	3	.5%
<b>Gender</b>		
Male	174	26.2%
Female	490	73.8%
<b>Nationality</b>		
Non-Saudi	17	2.6%
Saudi	647	97.4%
<b>Residence</b>		
Urban	619	93.2%
Rural	45	6.8%
<b>Education</b>		
Secondary / below	145	21.8%
University / above	519	78.2%
<b>Living with</b>		
Alone	39	5.9%
With others	625	94.1%
<b>Have you met with more than 10 people outside your home recently?</b>		
Yes	425	64.0%
No	239	36.0%

**Table 2. Willingness to test for COVID -19 if exhibiting suspicious symptoms amongst the general population. Ha'il, Saudi Arabia**

Willingness to test	Yes	
	No	%
If you have a fever will you get tested for Corona virus?	456	68.7%
If you have a dry cough will you get tested for Corona virus?	384	57.8%
If you feel tired for a few days will you get tested for Corona virus?	259	39.0%
If your body and bones seem to ache will you get tested for Corona virus?	266	40.1%
If you have nasal congestion will you get tested for Corona virus?	273	41.1%
If you have rhinorrhea will you get tested for Corona virus?	230	34.6%
If you have a sore throat will you get tested for Corona virus?	317	47.7%
If you have diarrhea will you get tested for Corona virus?	291	43.8%
If you have olfactory dysfunction will you get tested for Corona virus?	537	80.9%
If you have difficulty breathing will you get tested for Corona virus?	533	80.3%



**Fig. 1. Preferred examination methods for COVID-19 among general population, Ha'il, Saudi Arabia**

**Table 3. Reasons for either accepting or refusing a test for COVID-19 amongst the general population, Ha'il, Saudi Arabia**

Reasons for either accepting or refusing a test	Yes	
	No	%
<b>Reasons given for not being tested</b>		
I will not get tested because I think that the disease I had is not Corona virus (flu or common cold)	217	32.7%
I will not get tested as my symptoms are mild	198	29.8%
I will not get tested because I do not want to be isolated	59	8.9%
I will not get tested because I will be harassed and embarrassed by my neighbors and friends	58	8.7%
<b>Reasons given for being tested</b>		
I have no symptoms, but I will get tested because either the test is free of charge or I live near the testing site.	165	24.8%
I have no symptoms, but I will do a test because I know people who have had positive results	410	61.7%
I have no symptoms, but I will do a test to make sure I am not infected	233	35.1%
<b>Attitude towards COVID-19 testing</b>		
Do you trust the results of the corona virus test?	538	81.0%

**Table 4. Degree of public trust in the COVID-19 test according to bio-demographic data**

Factors	Trust the results of the corona examination?				P-value
	Yes		No		
	No	%	No	%	
<b>Age in years</b>					.138
18-30	417	81.9%	92	18.1%	
31-40	61	77.2%	18	22.8%	
41-50	41	77.4%	12	22.6%	
51-60	18	90.0%	2	10.0%	
60+	1	33.3%	2	66.7%	
<b>Gender</b>					.013*
Male	130	74.7%	44	25.3%	
Female	408	83.3%	82	16.7%	
<b>Nationality</b>					.266
Non-Saudi	12	70.6%	5	29.4%	
Saudi	526	81.3%	121	18.7%	
<b>Residence</b>					.317
Urban	499	80.6%	120	19.4%	
Rural	39	86.7%	6	13.3%	
<b>Education</b>					.547
Secondary / below	120	82.8%	25	17.2%	
University / above	418	80.5%	101	19.5%	
<b>Living arrangements</b>					.049*
Alone	27	69.2%	12	30.8%	
With others	511	81.8%	114	18.2%	
<b>Have you met with more than 10 people outside your home recently?</b>					.001*
Yes	328	77.2%	97	22.8%	
No	210	87.9%	29	12.1%	
<b>If you have difficulty breathing will you get tested for Corona virus?</b>					.043*
Yes	440	82.6%	93	17.4%	
No	98	74.8%	33	25.2%	
<b>If you have olfactory dysfunction will you get tested for Corona virus?</b>					.003*
Yes	447	83.2%	90	16.8%	
No	91	71.7%	36	28.3%	

*P*: Pearson  $\chi^2$  test; \* *P* < .05 (significant)

#### 4. DISCUSSION

The entire world is currently facing a global pandemic. At such a critical time it is of utmost importance to recognize the public's knowledge and attitude regarding COVID-19 [14,18–20]. Living through the MERS epidemic has taught Saudi Arabia many valuable lessons, including the fact that frontline experience then has helped in mitigating the effects of COVID-19 pandemic now [21]. Combatting a pandemic requires a cooperative effort from many different parties, and testing is undoubtedly a vital tool to achieve an understanding regarding the epidemiology of COVID-19 [16,17] Therefore, testing for COVID-

19 can be considered to be a preventative measure. The official website of MOH conducted a poll regarding peoples' willingness to test for COVID-19. Out of 102310 people 94.8% voted yes, they were willing to take the COVID-19 test [22]. As of January 17<sup>th</sup> 2020, there had been more than 11 million tests for COVID-19 [23]. This aligns with the findings of the current study, indicating that people are generally more willing to test. These findings also give an insight into the attitude of the Ha'il community towards testing for COVID-19 and how much confidence they have in the results. There is currently a great deal of misinformation and misconceptions regarding the pandemic, which means that fully

understanding peoples' attitudes towards the virus is of paramount importance when it comes to controlling the outbreak.

Exhibiting respiratory symptoms is generally one of the most important factors in determining whether an individual undergoes a test for COVID-19. Appearance of symptoms such as shortness of breath and olfactory dysfunction indicates that greater numbers of people are prepared to have the test, 80.3% and 80.9% respectively. A Filipino study reported similar results [24]. Age was also seen as an influencing factor, although the results over several studies were inconsistent. In one study, younger people were found to be more willing to undergo COVID-19 testing than elderly people [24]. However, other studies found that it was more likely that older people would take the test (96.39%) or even that age was irrelevant [14,18].

Most people within the Ha'il community are familiar with clinic-based testing, with home-based testing being the least well known as this is only available through the private sector. The reason for this unfamiliarity can be attributed to a lack of advertisement on the part of the private sector.

Our results indicated that people are also more likely to get tested if they know someone who has had positive results. This is borne out by results from other countries which show that first-hand knowledge of a positive case of COVID-19 can strongly influence someone's decision as to whether or not they get tested themselves [14,18]. This might be due to an increasing awareness of the seriousness of this virus and how rapidly it can spread through communities. One such study suggested that there is a positive link between a willingness to test and general knowledge about the virus - the more people are concerned about their families the more willing they are to undergo a test [18,25]. This awareness was measured by the degree to which people adhere to the measures implemented by their countries during the COVID-19 pandemic. Some people may be sceptical about the existence of the virus, which explains the 32.7% of respondents who refuse to believe they are suffering from COVID-19 even when they exhibit symptoms. The two most serious falsehoods regarding COVID-19, is that the virus is not real or that it is not serious. This was also the case during outbreaks of other infectious diseases such as Ebola, where 49% of

the general public of the Democratic Republic of Congo believed that the virus was nothing but a piece of fake political propaganda [26].

Our data revealed that the main reasons respondents would not get tested is because either that they believed they had another illness such as flu or the common cold or they believed their symptoms to be mild, which is findings similar to that of another study examining the same factors [24]. Providing the public with more information about the important differences between COVID-19 and other illnesses with similar presentation is key to avoiding any confusion and rule out any possibility of willful ignorance. In addition, fear of being isolated along with fear of discrimination from neighbours and friends was not seen as being a major factor. Other previous infectious epidemics caused by respiratory viruses, where many health care workers reported that they were stigmatised by neighbours or family members [27,28].

Since the implementation of wide-scale testing there have been many newspaper headlines questioning the results of COVID-19 tests from such well-respected newspapers as the New York Times. Media outlets such as these provide ammunition for many conspiracy theories. Research shows that if people have any concerns that the result of their test may contradict their desired outcome they will be susceptible to impact bias, leading them to avoid "bad news"- in this case avoiding information about their health condition [12]. However, there is currently no research regarding the degree to which the public has confidence in the results of COVID-19 testing. Our study revealed that the vast majority of the Ha'il community have confidence in the test results, with females and people living with others being the most trusting. The latter can be due to people feeling that they have a moral responsibility towards their partners, with one study reporting that participants who lived with a partner were more likely to take a test and adhere to social distancing and preventative measures than people who lived alone [14]. Overall, these results may be due to a high level of public trust in government decisions. The Saudi general public showed immense support for the implementation of preventative measures by the government e.g. lockdown, curfews etc. [19]. In addition, Saudi Arabia did well both in distributing tests and determining who gets tested, as well as being viewed as a reliable source of accurate

information. This can be attributed to the fact that Saudi Arabia was proactive in their efforts to spread awareness about the virus including MOH broadcasting information all over social media platforms, the enormous surge in apps developed solely for health information and a designated hotline and SMS text messages for all citizens and residents, to provide the general public with all the information needed [29,30]. Studies reported that people's perception of the government being untruthful is associated with lower mental well-being and less engagement with preventive behaviors [26,31]. This situation can be rectified by local authorities encouraging people to be responsible and test, and reinforcing trust, which by the Saudi model was, delivering accurate information through easily accessible digital sources [17,29,30].

People's knowledge about COVID-19 determines any preventative actions that they are willing to take [14,32]. Studies conducted in other countries regarding willingness to test showed that the more knowledge individuals have about COVID-19, the more they are willing to test for COVID-19 [18,25]. Moreover, the current study only focuses on participants willingness to test for COVID-19, not their knowledge regarding COVID-19, which could be seen as a limitation. Furthermore, the sample has been collected before the discovery of the COVID-19 vaccine. This fact might alter the viewpoint of some participants and could be seen as being a limitation to the present study.

## 5. CONCLUSION

The present research finding revealed that the vast majority of the Ha'il community were willing to test for COVID-19. Furthermore, participants showed a significant trust of COVID-19 test results in case they experienced olfactory dysfunction or/and breathing difficulties with a significant high proportion of females and people living with others exhibiting more trust of COVID-19 test results.

## CONSENT AND ETHICAL APPROVAL

This study has been reviewed and approved by the research Ethics Committee (REC) at the University of Ha'il and approved by the University president. The research project is numbered H-2020-195. Participants in the study were informed that their participation was voluntary, and that their contribution was of great value. No personal identifiers were collected. All authors

declare that informed consent was obtained from the participants for publication of this original article.

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## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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