# The positive impact of social media on the level of COVID-19 awareness in Saudi Arabia: a web-based cross-sectional survey

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## SUMMARY

In late December 2019, the COVID-19 pandemic started to spread from Hubei province in China. Currently there are many affected countries worldwide, including Saudi Arabia. This study aimed to assess the use of social media as a source for COVID-19 awareness in Saudi Arabia. An online survey was conducted between 9 and 13 May 2020 and a total of 3,204 subjects participated in the survey. We used snowball sampling techniques through an online structured questionnaire. The data were cleaned, coded and analysed using the Statistical Package for the Social Sciences SPSS version 25.0. A chi-square test was used to find the associations between variables. Of all participants, 75.4% had a high level of awareness of the COVID-19 pandemic. Saudi participants above 18 years old and medical practitioners showed a high level of awareness. All participants from all regions of Saudi Arabia showed a high level of awareness except for those from the northern region. The most common source of information was the official government social media, and 44.1% reported the use of Twitter. Our findings show that social media have a positive impact on the circulation of information about the COVID-19 pandemic in Saudi Arabia.

*Keywords*: SARS-CoV-2, 2019-nCoV, social network, twitter, misinformation, health policy, health communication.

## INTRODUCTION

On 31 December 2019, the China Country Office of the World Health Organization (WHO) was informed of a cluster of cases of acute respiratory illness caused by an unknown pathogen and was associated with the Huanan Seafood

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Wholesale Market in the city of Wuhan, Hubei Province [1, 2]. Subsequently, on 7 January 2020, a novel coronavirus was identified by the Chinese Center for Disease Control and Prevention (CDC) [2]. Later, the virus was named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), and the disease was named Coronavirus diseases-2019 (COVID-19).

On March 2nd, 2020, the first case of COVID-19 was reported in Qatif city, Eastern region of Saudi Arabia in a returning traveller from Iran via Bahrain [3, 4]. Afterwards, the Saudi ministry of health (MOH) took proactive steps to mitigate the risk of the spread of SARS-CoV-2. The Saudi MOH implemented strict measures to contain the disease and to raise awareness [3-5]. The Saudi MOH launched several digital platforms, such as the 'My Health' application and additional efforts to enhance awareness via social media platforms, such as Twitter [5].

Social media plays a significant role in changing public opinion. According to the World Economic Forum (WEF), social media is potentially a critical threat to society due to the spread of unfounded rumours. A lot of information had spread on social media in relation to COVID-19 pandemic.

One commentary called social media as a friend or a foe in the COVID-19 pandemic [6]. Social media platforms such as Facebook redirect users to the World Health Organization (WHO) website [7]. Moreover, social media can offer powerful tools, if used correctly, to change people's behaviour and to promote the well-being of the society [7]. On the other hand, social media may play a destructive role if not utilised properly [7, 8].

In Saudi Arabia, the number of Twitter users approaches 12 million [9]. We are not aware of any study assessing the impact of social media on the level of awareness of COVID-19 during this pandemic in Saudi Arabia. Thus, we undertook this survey to fill this gap in order to understand different sources of information about the COVID-19 pandemic, to assess the differences in awareness between Saudi and non-Saudi individuals, to discover any associations between the level of awareness of the COVID-19 pandemic and demographic characteristics, and finally to evaluate the extent of compliance with the instructions of the Saudi MOH.

## MATERIALS AND METHODS

*Study area, design and period*

A cross-sectional, web-based survey was distributed to the public via social media. A snowball sampling technique was used to collect data between May 9 and May 13, 2020 across all regions of Saudi Arabia.

*Study participants*

A total of 3,204 participants answered the questionnaire. The study included Saudis and non-Saudis living in Saudi Arabia, able to speak and read Arabic, and older than 15 years.

*Data collection tools and procedure*

Data were collected anonymously using online Google Forms. The structured questionnaire was designed with closed-ended questions, a multiple-choice format and a three-level Likert scale. The questionnaire was distributed via social network applications, such as WhatsApp, Twitter, Instagram, Facebook and Telegram. All participants provided written consent in the first section of the online survey before participating. All participants were notified of the objectives of the study and offered the opportunity to decline their participation. We also requested that participants circulate the survey link among their family members, friends and colleagues.

*Questionnaire*

The questionnaire was developed in English and then translated into Arabic. The questionnaire was pilot tested by 40 participants on 8 May 2020 to determine its suitability and adequacy. We then made slight modifications to the final version. The last modified version was revised to guarantee content and construct validity. Cronbach's $\alpha$ coefficient, which was used to calculate the internal consistency of the questionnaire, was above 0.7.

The questionnaire consisted of four sections. The first section is related to demographic characteristics. (*i.e.*, gender, nationality, age, place of living, education level, and occupation status). The second section assesses the level of awareness of COVID-19 and has 17 questions. The third section measures the means by which information spread during the COVID-19 outbreak. Each question has only one correct answer out of three choices (I do not know, I do not agree, I do agree). The 17

questions were then coded as (1) for the correct answer and (0) for the incorrect choices. The last section focuses on the source of information received about COVID-19.

*Statistical analysis*

Data collected via Google forms were transferred to an Excel sheet. The study data were cleaned, coded and measured for reliability and validity, then analysed using the Statistical Package for the Social Sciences (SPSS version 25.0; IBM Corp., Armonk, NY: USA). Descriptive statistics were used to analyze the demographic data, which were presented as numbers (n) and percentages (%). The study used 95% confidence intervals (95% CI). Awareness of the COVID-19 pandemic was classified into two levels. The levels were based on the number of correct answers, and a score of 0-8 was considered low and a score of 9-17 was considered high. A chi-square test was used to find the association between variables. For all tests, a P-value <0.05 was considered statistically significant.

*Ethical considerations*

No ethical approval was required for this survey. Participation in this study was voluntary. Informed consent was obtained from all the participants after they were offered information about the purpose of this study. To ensure anonymity and confidentiality, we did not request any medical or personal information such as names, contact information or addresses. Thus, the response to the questionnaire was anonymous and no personal data were collected.

## RESULTS

*Sample characteristics*

Of the 3,204 participants, 1,550 (48.4%) were male and 1,654 (51.6%) were female, 3,116 (97.3%) were

**Table 1** - Demographic characteristics and association with the awareness of COVID-19 outbreak (N=3,204).

| | | *No.* | *(%)* | *Low* | *High* | *P-Value* |
|---|---|---|---|---|---|---|
| Gender | Male | 1550 | (48.4) | 24.3% | 75.7% | *NS* |
| | Female | 1654 | (51.6) | 24.8% | 75.2% | |
| Nationality | Saudi | 3116 | (97.3) | 24.3% | 75.7% | *0.027** |
| | Non-Saudi | 88 | (2.7) | 34.1% | 65.9% | |
| Age | 15 to under 18 | 102 | (3.2) | 34.3% | 65.7% | *0.004*** |
| | 18-22 | 540 | (16.9) | 25.0% | 75.0% | |
| | 23-39 | 1514 | (47.3) | 21.9% | 78.1% | |
| | 40-59 | 897 | (28.0) | 26.8% | 73.2% | |
| | 60 and above | 151 | (4.7) | 29.8% | 70.2% | |
| Place of living | Central province | 903 | (28.2) | 28.2% | 71.8% | *0.004*** |
| | Eastern province | 1742 | (54.4) | 22.3% | 77.7% | |
| | Western province | 236 | (7.4) | 24.6% | 75.4% | |
| | Northern province | 49 | (1.5) | 36.7% | 63.3% | |
| | Southern province | 274 | (8.6) | 24.5% | 75.5% | |
| Education level | Under high school | 149 | (4.7) | 45.6% | 54.4% | *0.000*** |
| | High school/diploma | 969 | (30.2) | 31.5% | 68.5% | |
| | Bachelor's degree | 1812 | (56.6) | 20.6% | 79.4% | |
| | Graduate studies | 274 | (8.6) | 15.0% | 85.0% | |
| Occupation Status | Student | 809 | (25.2) | 25.2% | 74.8% | *0.000*** |
| | Non-medical practitioner | 957 | (29.9) | 28.3% | 71.7% | |
| | Medical practitioner | 560 | (17.5) | 7.3% | 92.7% | |
| | Unemployed | 878 | (27.4) | 30.9% | 69.1% | |

Note: Count (percentage), level of awareness, and chi-square test, bold italic indicates statistically significant *p<.05, and **p<.001.

Saudi, and 88 (2.7%) were non-Saudi. Of all the participants, 1,742 (54.4%) lived in the Eastern province, and only 49 (1.5%) lived in the Northern province. Most (n=1,812, 56.6%) of the participants held bachelor's degrees. Most of the participants (n=1,514, 47.3%) were between 23 and 39 years old. Out of all the respondents, 957 (29.9%) were not medical practitioners, 560 (17.5%) were medical practitioners, 809 (25.2%) were students, and 878 (27.4%) were unemployed (Table 1).

**Table 2** - How participants deal with information received in relation to COVID-19 outbreak.

| *N (percentage)* | |
|---|---|
| *1) What I do when I receive messages via social media related to the "COVID-19" outbreak?* | |
| I forward messages directly | 63 (2.0) |
| I forward messages directly and sometimes stop or slow to post | 213 (6.6) |
| I publish after a while and after confirming the source | 1380 (43.1) |
| I do not forward messages at all | 1472 (45.9) |
| I do not know | 76 (2.4) |
| *2) What is my source of information?* | |
| Informal social media | 31 (1.0) |
| The official government social media | 2677 (83.6) |
| All official and unofficial social media | 496 (15.5) |
| *3) How do I rate my commitment or adherence to the Ministry of Health instructions on social media websites?* | |
| Wholly committed | 2202 (68.7) |
| Somewhat committed | 981 (30.6) |
| Not fully committed | 21 (0.7) |

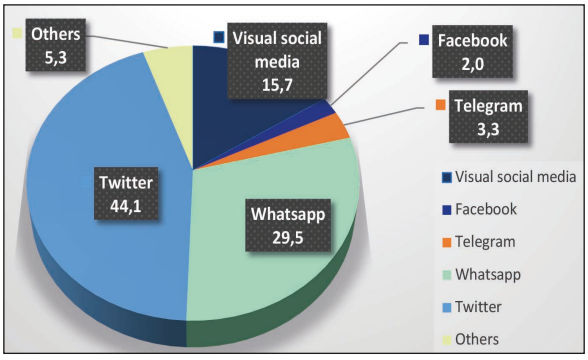


**Figure 1** - Percentage of social media used in communication of COVID-19.

*Sources of information on the COVID-19 pandemic*
Table 2 shows data about the received messages about COVID-19. 45.9% did not forward these messages at all, and 43.1% confirmed the source of the information before acting. In addition, 83.6% got their information from official government sources. Of the participants, 68.7% trusted the information from the Saudi MOH, and only 0.7% doubted the information supplied by the MOH. Twitter was the most popular social media outlet in Saudi Arabia (used by 44.1% of participants), followed by WhatsApp (used by 29.5% of participants), visual social media such as YouTube, Instagram, Snapchat and TikTok (used by 15.7% of participants), and Facebook (used by 2.0% of participants) (Figure 1).

*Association between the level of awareness of the COVID-19 pandemic and demographic characteristics*
There were statistically significant associations between the level of awareness of the COVID-19 pandemic and demographic variables such as nationality, age, place of living, education level and occupation status. However, there were no statistically significant associations between the level of awareness and the other demographic variables (gender, and source of information) ($p > 0.05$) (Table 1).

*Level of awareness of the COVID-19 outbreak*
Out of the 3,204 participants, 2417 (75.4%) had a high level of awareness of the COVID-19 pandemic, whereas 787 (24.6%) had a low level of awareness.

## DISCUSSION

Social media is one of the most used methods for following emerging topics and news about the spread of infectious diseases. Social media has played an essential role in the distribution of both accurate and misleading information during the COVID-19 pandemic. Various sources of information had become available on various topics since the COVID-19 pandemic. In Canada, a study showed a link between disinformation on social media and behaviors and attitudes related to COVID-19 [10]. To the best of our knowledge, no studies of the role of social media and its impact on COVID-19 awareness were done in Saudi Arabia and other Arabic countries. The purpose

of this study was to obtain data regarding the role of social media and its impact on the level of awareness of the COVID-19 pandemic. The data may help in predicting different dimensions within social media to understand the perceptions spreading through social media.

The current study showed that a larger proportion (68.7%) of participants were committed to the Ministry of Health's instructions. This demonstrates the extent of the Ministry of Health's efforts to spread awareness and guidelines through various channels such as social media and television. The most (83.6%) common source of information was official government social media; similar results were observed in a study on the issue of obtaining information through official sources [11, 17]. In this study, the most used social media platform was Twitter (44.1%) indicating Twitter's impact lasted through previous and current epidemics and pandemics [11]. The second-most (29.5%) used platform was WhatsApp. During the COVID-19 pandemic, WhatsApp was used as an educational tool in Pakistan and to mediate questions about the COVID-19 pandemic [12, 13]. It was also used to provide quick answers to inquiries from cancer patients during the COVID-19 pandemic in Italy [14]. Furthermore, WhatsApp was used to analyze misleading information about the COVID-19 pandemic during the quarantine in India [15].

Based on the current study, the third-most used platform was visual media, such as YouTube, Snapchat, and TikTok. Visual communication not only plays a role in educating people about epidemics and diseases but also in spreading rumors [16]. The existing study revealed that Facebook was the fourth-most used platform during the COVID-19 pandemic. During the lockdown in Pakistan, Facebook was used as an educational platform for teachers and students [12]. Telegram was less used to receive information about the COVID-19 pandemic.

In the present study, we found a higher (75.4%) level of awareness of the COVID-19 pandemic than in a previous study conducted in Riyadh, Saudi Arabia (58%) [18]. It was however similar to that from a study conducted in several Arab countries where the higher level of awareness correlated with older age, higher level of education and training as healthcare professionals [19].

The findings in the current study showed that Saudi Arabians had a higher level of awareness of the COVID-19 pandemic than non-Saudi Arabians (75.7% vs 65.9%), which supported the results of another study [20]. The younger participants, aged 15 to 18, showed a good level of awareness (65.7%). Our findings are similar to the report of another study conducted in Saudi Arabia [20]. All regions of Saudi Arabia showed a high level of awareness except the northern region [20]. This may be because the study was online and did not reach a large section of the population.

This study has numerous limitations. First, our study provides a 'snapshot' of responses at one moment in time. Second, this study was via the internet and can be biased to one region to another region and limited to some social class like higher educated, so it had better not be generalized to all populations. However, it is also important to survey and interview face-to-face with low educated people and other professional workers. So, it cannot be generalized to all Saudi Arabia. A more significant nationalized survey should be done to obtain a comprehensive interpretation of awareness about the COVID-19. Third, the use of social media in getting knowledge and news about the COVID-19 was evaluated as a whole; therefore, other applications of social media have not been considered here. Forth, also, in this study sample, there was an inequality in the number of Saudi (3116, 97.3%) and Non-Saudi (88, 2.7%). Besides, the data offered in this study are self-reported and somewhat dependent on the participants' integrity and recall competence; consequently, they may be an issue to recall bias.

*Recommendations*

Mask usage has become controversial in certain parts of the world like the USA. Despite, good evidence of reliable protection from the same there is a need to survey populations and communities in a scientific fashion leveraging social media. And looking at the acceptance of masking in different cultures and countries [21]. Further longitudinal studies, such as cohort studies, are necessary for the future.

In conclusion, this is the first study to investigate the role of social media on the COVID-19 pandemic among the general population of Saudi Arabia. Our findings suggest that Saudi residents have a good awareness of COVID-19 and that social media has a positive impact on the circulation

of information about the COVID-19 outbreak in Saudi Arabia.

**Authors contributions**
All the authors contributed to the concept, acquisition, and analysis of data, drafting of the article, and critical revision for important intellectual content.

**Conflict of interest**
The authors have no conflicts of interest to disclose.

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