

## Knowledge, Attitude and Practice of Saudi Population towards COVID-19

Elsadig Yousif Mohamed<sup>1\*</sup>, Abdulaziz Abdullah Almutairi<sup>2</sup>, Fahad Muthyib Albaqami<sup>2</sup>,  
Abdulrahman Mubarak Alosaimi<sup>2</sup>, Mohammed Salem Alanizy<sup>2</sup>, Fahad Dhaifallah Almutairi<sup>2</sup>,  
Sultan Mohammed Alqahtani<sup>2</sup>, May Musaad Alelaiwi<sup>2</sup>, Ghadeer Hamdan Alanezi<sup>2</sup>, Eman Yahya  
Hazazi<sup>3</sup>, Saja Dawi Alyami<sup>4</sup>

<sup>1</sup>Department of Community Medicine and Public Health, Majmaah University, Al -Majmaah 11952, Saudi Arabia

<sup>2</sup>College of Medicine, Majmaah University, Majmaah 11952, Saudi Arabia

<sup>3</sup>College of Medicine, King Abdulaziz University, Jeddah 21589, Saudi Arabia

<sup>4</sup>College of Medicine, Najran University, Najran King Abdulaziz Road, Saudi Arabia

### ABSTRACT

**Background:** Coronavirus Disease-19 (COVID-19) is an emerging respiratory infection characterized by rapid transmission mainly by close contact with an infected person. To control its spread, Saudi Arabia adopted a very strict control measures including raising public awareness by all available means. The current study investigated the knowledge, attitudes, and practice of Saudi population, towards COVID-19 pandemic.

**Method:** This study was cross-sectional. The study population were Saudis from the five regions of the kingdom. Data were collected by an electronic questionnaire after obtaining an ethics approval and informed consents. Three thousand six hundred and forty-two subjects were included in the study. Data analysis was performed by SPSS version 23.

**Results:** Most of the participants had average and good knowledge about COVID-19 constituted 52.7% and 44.8% respectively. The population practice and attitude towards COVID-19 was 84.0% and 96.9% respectively. Males had better COVID-19 knowledge compared to females. Nine hundred and ninety-two (48.3%) and 704 (40.9%) of males and females had good knowledge respectively. Females had more positive attitude towards COVID -19 than males (98.4% versus 95.5%). The positive COVID-19 attitude for the single, the married, the divorced and the widow were 95.7%, 98.2%, 97.3% and 96.6% respectively.

**Conclusion:** The level of COVID-19 knowledge of Saudi population is average and the attitude of most population is positive. Males have better COVID-19 knowledge compared to females; however, most females have positive attitude towards the disease compared to males. The level of COVID-19 knowledge increases with age and education level of the population. Population who have higher level of knowledge have positive attitude. The social media (Twitter) is the main source of COVID-19 information for the Saudi population.

**Key words:** Knowledge, Attitude, Practice, Saudi population, COVID-19

**HOW TO CITE THIS ARTICLE:** Elsadig Yousif Mohamed, Abdulaziz Abdullah Almutairi, Fahad Muthyib Albaqami, Abdulrahman Mubarak Alosaimi, Mohammed Salem Alanizy, Fahad Dhaifallah Almutairi, Sultan Mohammed Alqahtani, May Musaad Alelaiwi, Ghadeer Hamdan Alanezi, Eman Yahya Hazazi, Saja Dawi Alyami, Knowledge, Attitude and Practice of Saudi population towards COVID-19, J Res Med Dent Sci, 2021, 9 (2): 105-111.

**Corresponding author:** Elsadig Yousif Mohamed

**e-mail:** ey.mohamed@mu.edu.sa

**Received:** 12/01/2021

**Accepted:** 02/02/2021

### INTRODUCTION

Coronaviruses (CoV) are a large family of viruses that cause illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS-CoV) and Severe

Acute Respiratory Syndrome (SARS-CoV). There are seven different strains of corona virus, including the novel coronavirus which causes coronavirus disease 2019, or COVID-19 [1].

At the end of 2019, a novel coronavirus was recognized as the cause of a cluster of pneumonia cases in Wuhan, China. In February 2020, the World Health Organization designated the disease as Coronavirus disease 2019 (COVID-19) [2]. COVID-19 is an emerging respiratory

infection characterized by rapid transmission mainly by close contact with an infected person as person- to person transmission [3-8]. The incubation period for COVID-19 is thought to be within 14 days following exposure, with most cases occurring approximately four to five days after exposure [9]. The disease is highly prevalent, a study conducted in china, reported that among 138 patients infected with the disease, 43 percent acquired the infection in a hospital setting [10]. Since the disease has no vaccines or treatment, the rational and appropriate use of personal protection equipment (PPE) is essential to prevent transmission and controlling the infection [11-12].

In Saudi Arabia, the first reported case of COVID-19 was a citizen who was in contact with a previously reported case [13]. The Saudi government have developed a country specific strategy in line with the WHO guidelines in dealing with the pandemic [14]. Public adherence to the measures established by the government is highly important for COVID-19 prevention and control. Public knowledge of and attitude towards the disease are corner stones in the success of the preventive strategy [15,16]. Assessment of population knowledge and attitude towards COVID -19 will help to identify public perceptions, influences of public health practices and identify gap in public knowledge that helps to strengthen the ongoing preventive efforts. The objectives of the current study were to determine Saudi population knowledge and practice of COVID-19 and to determine their attitude towards the disease.

#### METHODS

A cross-sectional study was conducted in the Kingdom of Saudi Arabia. The five regions: North, South, East, West and Central were included in the study. The selected cities for the study were Mecca, Al-Madina, Riyadh, Qassim, Dammam and Abha. Three thousand six hundred and forty-two Saudis responded to the pre-tested online questionnaire.

**Inclusion and exclusion criteria:** Saudi nationality who agreed to participate was considered in the study. Non-Saudi nationality and those infected with COVID-19 were excluded from the study.

Data were collected by a pre-tested, validated and electronic questionnaire. Data collection was performed between April 22 and May 26, 2020. Likert scale was used to determine the level of COVID-19 knowledge and attitude. Nine questions about the disease were asked. Respondents who answered 7 to 9 questions correctly were considered to have good (adequate) knowledge. Participants who answered correctly 4 to 6 and Zero to 3 questions were considered to have average and poor knowledge respectively.

To determine the attitude towards COVID-19, three questions about attitude towards the disease were asked. Respondents who employed two to three attitudes consistently were considered to have positive attitude towards COVID-19. Respondents who applied Zero to one attitude consistently were considered to have negative attitude towards the disease.

Data analysis was performed by statistical package for social sciences (SPSS), version 23 (SPSS, Chicago, Illinois, USA). Descriptive and inferential statistics were employed. Comparison between qualitative variables was performed by person's chi-square to test significance; p value less than 0.05 was considered significant. The study acquired ethics approval from Majmaah University IRB. Informed consent was obtained from the participants.

#### RESULTS

The demographic characteristics of the participants are shown in Table 1. Most of the sample was between the age group 21-30 years (38.8%). Males were slightly more in number than female (52.8% versus 47.2%). Most of the population were single (51.1%), married were (46.1%). Most of the participants were having bachelor's degree (52.3%). The central region of Saudi Arabia was the place of residence for most of the study population (53.4%).

Table 2 shows the knowledge questions about COVID-19. The question which was answered correctly by most of the subjects (97.2%) is "Maintaining a good hand washing is one of the ways to prevent COVID-19". The most poorly answered question (47.7%) was related to prevention methods against the COVID-19. The mean score for knowledge question was 81.5%.

Knowledge score of Saudi population about

**Table 1: Demographic characteristics (n=3642).**

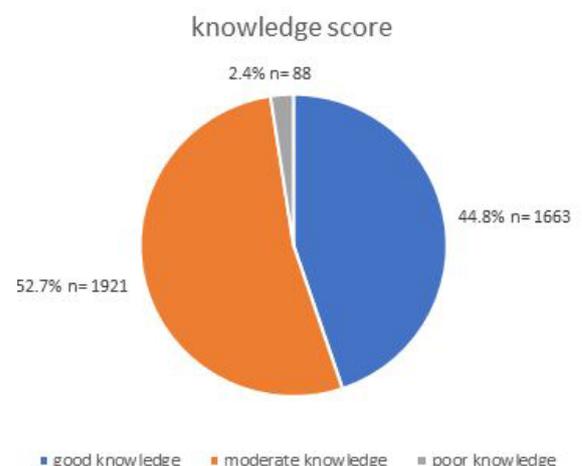
Variable	No.	Percent
Age/ years		
15-20	687	18.90%
21-30	1414	38.80%
31-40	757	20.80%
41-50	566	15.50%
More than 50	218	6.00%
Gender		
Male	1922	52.80%
Female	1720	47.20%
Social states		
Single	1862	51.10%
Married	1678	46.10%
Divorced	73	2.00%
Widower	29	0.80%
Educational level		
Elementary	36	1%
Average	154	4.20%
Secondary	870	23.90%
Diploma	445	12.20%
Bachelor	1905	52.30%
Higher diploma	76	2.10%
Master's degree	114	3.10%
PHD	42	1.20%
Residence area		
Central region	1946	53.40%
The northern area	251	6.90%
Southern area	230	6.30%
Western area	771	21.20%
Eastern area	444	12.20%

**Table 2: Knowledge of participants about COVID-19 (n=3.642).**

Knowledge	Correct No.	Percent
Maintaining a good hand washing is one of the ways to prevent COVID-19	3541	97.2
Knowledge on what to do If tissues are not available	3299	90.6
Touching contaminated surfaces and tools considered a method of transmission	3469	95.2
Prevention methods against the emerging COVID-19	1737	47.7
MOH number to contact If you have shortness of breath, cough, high fever	2588	71
Knowledge of the main clinical symptoms of emerging COVID-19	3000	82.4
People with the emerging COVID-19 can spread the virus to others when the fever is not present	3219	88.4
COVID-19 emerging is spread by respiratory droplets from infected people	3260	89.5
The symptoms of the emerging COVID-19 and seasonal influenza is similar	2604	71.5

COVID-19 is presented in Figure 1. Most of the participants had moderate knowledge about COVID-19 (52.7%). Good knowledge was acquired by (44.8%) of the participants and (2.4%) had poor knowledge. Table 3 shows the attitude and practice of Saudi population towards covid-19. The mean score of attitudes towards Covid-19 was 89.7%, the range was between 72.8% and 98.8%. The mean score of Saudi population practice towards Covid-19 was 84.0%, the range was between 81.8% and 88.3%.

Table 4 shows the association between COVID-19 knowledge and the socio-demographic characteristics of the sample. Males had better



**Figure 1: Knowledge score of Saudi population about COVID-19.**

**Table 3: Population Attitude and preventive practices towards COVID-19 (n=3,642).**

Attitude and practice	No	Percent
Attitude		
I usually apply the precautionary direction reported by the ministry of health	3549	97.40%
I isolate myself before starting the curfew decision	2653	72.80%
I understand this infection is very contagious	3599	98.80%
Practice		
Staying home and not going to crowded places in the recent days	3215	88.30%
Wearing masks when leaving the house	2980	81.80%
Wearing gloves when leaving the house	2980	81.80%

**Table 4: Relation between level of knowledge and Socio-demographic factors.**

Variables	Knowledge No. (%)			Total No. (%)	P value	
	Good No. (%)	Average No. (%)	Poor No. (%)			
Gender	Male	929(48.3%)	940(48.9%)	53(2.8%)	1922(52.8%)	< 0.001
	Female	704(40.9%)	981(57.1%)	35(2%)		
Age/yrs.	15-20	198(28.8%)	455(66.2%)	34(5%)	687(18.9%)	< 0.001
	21-30	620(43.8%)	761(53.8%)	33(2.3%)	1414(38.8%)	
	31-40	383(50.6%)	362(47.8%)	12(1.6%)	757(20.8%)	
	41-50	293(51.8%)	265(46.8%)	8(1.4%)	566(15.5%)	
	Above 50	139(63.8%)	78(35.8%)	1(0.5%)	218(6%)	
Marital status	Single	712(38.2%)	1089(58.5%)	61(3.3%)	1862(51.1%)	< 0.001
	Married	878(52.3%)	776(46.2%)	24(1.4%)	1678(46.1%)	
	Divorced	35(47.9%)	36(49.3%)	1(2.7%)	73(2%)	
	Widower	8 (27.6%)	20(69%)	1(3.4%)	29(.8%)	
Level of education	Primary	13(36.1%)	18(50%)	5(13.9%)	36(1%)	< 0.001
	Intermediate	54(35.1%)	95(61.7%)	5(3.2%)	154(4.2%)	
	Secondary	366(42.1%)	471(54.1%)	33(3.8%)	870(23.9%)	
	Diploma	183(41.1%)	249(56%)	13(2.9%)	445(12.2%)	
	Bachelor	878(46.1%)	996(52.3%)	31(1.6%)	1905(52.3%)	
	Higher diploma	40(52.6%)	36(47.4%)	0(0%)	76(2.1%)	
	Master	74(64.9%)	39(34.2%)	1(0.9%)	114(3.1%)	
PHD	25(59.5%)	17(40.5%)	0(0%)	42(1.2%)		
Region of Residence	Central region	875(45%)	1028(52.8%)	43(2.2%)	1946(53.4%)	< 0.001
	Northern	88(35.1%)	150(59.8%)	13(5.2%)	251(6.9%)	
	Southern	98(42.6%)	125(54.3%)	7(3%)	230(6.3%)	
	Western	390(50.6%)	366(47.5%)	15(1.9%)	771(21.2%)	
	Eastern	182(41%)	252(56.8%)	10(2.3%)	444(12.2%)	

COVID-19 knowledge compared to females. Nine hundred and ninety-two (48.3%) and 704 (40.9%) of males and females had good knowledge respectively. Good COVI-19 knowledge in the age group 15-20 years was 28.8%. Good COVI-19 knowledge in the age groups 21-30, 31-40, 41-50 and above 50 years was 43.8%, 50.6%, 51.8% and 63.8% respectively. The good COVI-19 knowledge for the single, the married, the divorced and the widow were 38.2%, 52.3%, 47.9% and 27.6% respectively. The level of COVID-19 knowledge among primary and secondary school students was 36.1% and 42% respectively while among Bachelor and PHD holders was 46.1% and 59.5% respectively. The residents of the Western region had the highest level of COVID-19 knowledge (50.6% had good knowledge) followed by the

population of the central region (45% had good knowledge).

Table 5 shows the association between attitude towards COVID-19 and Socio-demographic characteristics of the population. Females had more positive attitude towards COVID -19 than males (98.4% versus 95.5%). Positive COVI-19 attitude in the age group 15-20 years was 95.2%. Positive COVI-19 attitude in the age groups 21-30, 31-40, 41-50 and above 50 years was 95.8%, 98.2%, 98.8% and 99.5% respectively. The positive COVI-19 attitude for the single, the married, the divorced and the widow was 95.7%, 98.2%, 97.3% and 96.6% respectively. 1015 (95.8%) General school students had positive attitude towards COVID-19 compared to 2514 (97.4%) who had university education and above. The residents of the Southern region had

Table 5: Association between attitude and sociodemographic factors.

Factor	Attitude No. (%)		Total No. (%)	P value
	Positive	Negative		
Gender				
Male	1836(95.5%)	86(4.5%)	1922 (52.8%)	> 0.001
Female	1693(98.4%)	27(1.6%)	1720 (47.2%)	
Age/ years				
15-20	654(95.2%)	33(4.8%)	687 (18.9%)	> 0.001
21-30	1355(95.8%)	59(4.2%)	1414 (38.8%)	
31-40	743(98.2%)	14(1.8%)	757 (20.8%)	
41-50	560(98.8%)	6(1.1%)	566 (15.5%)	
Above 50	217(99.5%)	1(0.5%)	218 (6.0%)	
Marital status				
Single	1782(95.7%)	80(4.3%)	1862 (51.1%)	> 0.001
Married	1648(98.2%)	30(1.8%)	1678 (46.1%)	
Divorced	71(97.3%)	2(2.7%)	73 (2%)	
Widow	28(96.6%)	1(3.4%)	29 (0.8%)	
Education level				
General	1015 (95.8%)	45 (4.2%)	1060	0.53
University and above	2514 (97.4%)	68 (2.6%)	2582	
Residence				
Central region	1880(96.6%)	66(3.4%)	1946 (53.4%)	0.116
Northern region	239(95.2%)	12(4.8%)	251 (6.9%)	
Southern region	228(99.1%)	2(0.9%)	230 (6.3)	
Western region	751(97.4%)	20(2.6%)	771 (21.2%)	
Eastern region	431(97.1%)	13(2.9%)	444 (12.2%)	

Table 6: Relation between knowledge and attitude towards COVID-19.

Attitude	Knowledge No. (%)			Total No. (%)	P value
	Good	Average	Poor		
Positive	1603(45.4%)	1854(52.5%)	72(2%)	3529(96.6%)	>0.001
Negative	30 (26.5%)	67(59.3%)	16(14.2%)	113(3.1%)	

the highest level of COVID-19 attitude (99.1%) followed by the population of the Western region (97.4%). 45.4% of the population with positive attitude have good knowledge of COVID-19, 26.5% of population with poor knowledge have negative attitude. The relation is significant ( $p > 0.001$ ) (Table 6).

## DISCUSSION

Three thousand six hundred and forty-two participants were included in this research. Population who acquired a good level of knowledge were 1663 (44.8%). This finding is lower than the level of knowledge reported among general population of Saudi Arabia [17,18], it is also lower than the findings reported by Zhong et al. in China [19]. A study conducted in Lahore among medical students showed that 80% of participants had good knowledge about coronavirus [20]. In a study conducted in Jordan among University students, the overall knowledge about COVID-19 was reported in more than 90% of the respondents [21].

Males have better COVID-19 knowledge compared to females and the relation is significant ( $p < 0.001$ ). This finding is consistent with Alahdal et al. who demonstrated a higher level of COVID-19 knowledge among males compared to females in Riyadh, Saudi Arabia [18]. However, it contradicts other studies [17,22,23]. The higher level of males' awareness regarding COVID-19 compared to females may be explained by the fact that the literacy level of males is higher than females in Saudi Arabia will give males better access to educational materials [24].

Level of COVID-19 knowledge increases as the age of the respondents increases; the relation is significant ( $p < 0.001$ ). This finding is consistent with studies conducted elsewhere [23,25]. The level of COVID-19 knowledge is more in the married compared to the singles, divorced and widow; and the relation is significant ( $p < 0.001$ ). This may be explained by the fact that the responsibility of the married population goes beyond themselves to care for the families which may include children and elder population who

need more care to prevent COVID-19.

The level of COVID-19 knowledge increases as the educational level increases. and the relation was significant ( $p < 0.001$ ). This finding is consistent with another study [23]. COVID -19 is a very Serious condition, this was more realized by the higher educated compared to those with lower education level.

Population of the western region acquired more knowledge of COVID-19 compared to other regions of Saudi Arabia ( $p < 0.001$ ). This may be explained that, Mecca AlMokaramh is in this region, many visitors go to Umrah and Hajj, so the population feel that they are at high risk of acquiring the virus, so they tend to increase knowledge about COVID-19.

In this study the mean score of attitudes towards Covid-19 was 91.2%. This finding is in line with studies that reported positive attitude of the Saudi population towards COVID-19 [17,18,20]. Positive attitude towards COVID-19 was also demonstrated in studies conducted in Pakistan, Malaysia and Jordan [20,22,23]. The level of COVID -19 practice among the population is good (range 81.8%-88.3%). This finding is consistent with other studies conducted in Saudi Arabia and Malaysia [17,18,22].

This result showed that population with good knowledge have positive attitude ( $p < 0.001$ ), this finding is consistent with Alahdal et al. [18]. In a study conducted among secondary school students in Majmaah area, Saudi Arabia the students' attitude towards MERS-CoV was significantly associated with the disease knowledge [26].

The main source of COVID-19 knowledge in this research was the social media (Twitter) followed by the television [21,26]. Another study showed that the World health organization (WHO) and the Ministry of Health (MOH) were the main sources of COVID-19 information [18].

### CONCLUSION

The study concluded that the level of COVID-19 knowledge of Saudi population is average and the attitude of most population is positive. Males have better knowledge and lower attitude towards COVID-19 compared to females. The level of COVID-19 knowledge increases with age and education level of the population. The

married have better COVID-19 knowledge and attitude compared to the singles. Population of the western region acquired the best COVID -19 knowledge and the residents of the Northern region acquired the lease level of knowledge. Population of the southern region have the best COVID -19 attitude and those reside in the Northern region acquired the lease level of attitude towards the disease. Populations who have a higher level of COVID-19 knowledge have the positive level of attitude. The social media (Twitter) is the main source of COVID-19 information for the Saudi population.

### REFERENCES

1. <https://www.cdc.gov/ncird/index.html>
2. <https://www.who.int/>
3. <https://www.moh.gov.sa/Pages/Default.aspx>
4. Shereen MA, Khan S, Kazmi A, et al COVID-19 infection: Origin, transmission, and characteristics of human coronaviruses. J Adv Res 2020; 24:91-98.
5. Phan LT, Nguyen TV, Luong QC, et al. Importation and human-to-human transmission of a novel coronavirus in Vietnam. N Engl J Med 2020; 382:872.
6. Parry J. China coronavirus: Cases surge as official admits human to human transmission. BMJ 2020; 368:236.
7. Li Q, Guan X, Wu P, et al. Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. N Engl J Med 2020;
8. 382:1199-1207.
9. [https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200402-sitrep-73-covid-19.pdf?sfvrsn=5ae25bc7\\_6](https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200402-sitrep-73-covid-19.pdf?sfvrsn=5ae25bc7_6)
10. Guan W, Ni Z, Yu Hu, et al. Clinical characteristics of coronavirus disease 2019 in China. N Engl J Med 2020; 382:1708-20.
11. Lindsley W, Martin S, Thewlis R, et al. Effects of ultraviolet germicidal irradiation (UVGI) on N95 respirator filtration performance and structural integrity. J Occupational Environ Hygiene 2015; 12:509-517.
12. <https://www.thehealthworkforcehub.org/strategies-for-optimizing-the-supply-of-ppe/>
13. <https://www.ecdc.europa.eu/sites/default/files/documents/COVID-19-infection-prevention-and-control-healthcare-settings-march-2020.pdf>
14. <https://www.arabnews.com/node/1635781/saudi-arabia>
15. MOH. Saudi Arabia. COVID-19 Monitoring committee reviews positive outcomes of the precautionary measures
16. Chirwa GC. Who knows more, and why? Explaining

- socioeconomic related inequality in knowledge about HIV in Malawi. *Sci African* 2020; 7:e00213.
17. Chirwa GC. Socio-economic Inequality in comprehensive knowledge about HIV in Malawi. *Malawi Med J* 2019; 31:104–111.
  18. Al-Hanawi MK, Angawi K, Alshareef N, et al. Knowledge, attitude and practice toward COVID-19 among the public in the Kingdom of Saudi Arabia: A cross-sectional study. *Front Public Health* 2020; 8:217.
  19. Alahdala H, Basingabb F, Alotaibic R. An analytical study on the awareness, attitude and practice during the COVID-19 pandemic in Riyadh, Saudi Arabia. *J Infection Public Health* 2020; 13:1446-1452.
  20. Zhong BL, Luo W, Li HM, et al. Knowledge, attitudes, and practices toward COVID-19 among Chinese population during the period of rapid rise of COVID-19 outbreak: Rapid online cross-sectional survey. *Int J Biol Sci* 2020; 16:1745-1752.
  21. Ikhlaq A, Bint-e-Riaz H, Bashir I, et al. Awareness and attitude of undergraduate medical students towards 2019-novel corona virus. *Pak J Med Sci* 2020; 36.
  22. Alnawaiseh AN, Al-Mnayyis A, Abu- Lubada M, et al. COVID-19 knowledge, attitude and practice among medical and non-medical university students in Jordan, *J Pure Appl Microbiol* 2020; 14:17-24.
  23. Azlan AA, Hamzah MR, Sern TJ, et al. Public knowledge, attitudes and practices towards COVID-19: A cross-sectional study in Malaysia. *PLoS ONE* 2020; 15:e0233668.
  24. Olaimat AN, Iman A, Shahbaz Hafiz M. et al. Knowledge and information sources about COVID-19 among university students in Jordan: A cross-sectional study. *Frontiers Public Health* 2020; 8:254.
  25. [https://www.unicef.org/infobycountry/saudi Arabia\\_statistics.html](https://www.unicef.org/infobycountry/saudi Arabia_statistics.html)
  26. Rahman A, Sathi NJ. Knowledge, attitude, and preventive practices toward COVID-19 among Bangladeshi internet users. *Electron J Gen Med* 2020; 17:245.
  27. Al-otaibi AA, Al-Zahrani AA, Al-sheikh HA, et al. Knowledge and attitude of secondary school students in Sudair area, Saudi Arabia about middle east respiratory syndrome coronavirus (MERS-CoV). *Majmaah J Health Sci* 2017; 5:76-86.