

The impact of Saudi lockdown to counter COVID-19



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ABSTRACT

The study aimed to assess the impact of awareness of citizens and residents in Saudi Arabia toward the home isolation and social distancing during lockdown that might decrease the outbreak of COVID-19, to measure the importance of social behavior to maintain the constant decline of COVID-19 cases and to determine if there is a difference in the level of awareness and behavior between citizens and residents in Saudi Arabia toward the governmental measures during the pandemic. We have adopted a cross-sectional survey design to investigate the impact of Saudi lockdown on blockade COVID-19 by using an anonymous online questionnaire. The targeted population of the study was Saudi citizens and non-Saudi residents of different ages. The collected data were entered into Microsoft Excel (version 2011) and analyzed by using the Statistical Package for Social Sciences (SPSS), version 23. The Chi-square test with 95% confidence intervals (CI) was used to examine significant associations between the socio-demographic characteristic of participants, their awareness, and their behavior towards the COVID-19 pandemic. AP value of <0.05 was considered statistically significant. The total number of the current study participants was 1168. The majority (70.50%) were married males with children (73.50%). Three-quarters of the participants were equally distributed between the age groups of 30-39, 40-49, and 50-59 years old. Almost all (90.90%) of the participants have received higher education, 73.60% living in the central region, and in large and crowded cities (75.30%). More than half (58.50%) of the Saudi respondents know about the coronavirus from media sources, while for the non-Saudis, 54.50% are well informed regarding the virus. The results of the current study revealed that the majority of the population in the country believe in home isolation and social distancing for the COVID-19 blockade. Additionally, they also consider non-compliance to these measures as one of the main factors for the disease outbreak. Most of the participants were committed to home isolation, social distancing, and personal protective measures including wearing masks, gloves, and avoiding face contact.

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1. Introduction

Coronavirus (COVID-19) is a new disease that was discovered recently, and in early 2020 this virus was declared a public health emergency (Lau et al., 2020). It has been breaking out massively, infecting hundreds of thousands of people worldwide (Hawryluck et al., 2004). This pandemic is a tragedy that has severely affected different fields, including health, social, and economy (Musunguzi and

Asamoah, 2020). According to WHO (World Health Organization), 1 in 6 coronavirus patients consider in serious condition (WHO, 2020a). Also, Saudi Arabia's Ministry of Health (MOH) stated that 30% of COVID-19 patients require medical attention, and 10% require intensive care.

COVID-19 causes a lot of terrifying concerns, and it daily sends more people to the hospitals with damaged lungs, which could eventually lead to Airway Respiratory Stress Syndrome (ARDS) (Musunguzi and Asamoah, 2020; Mahmud and Al-Mohaimed, 2020). Shortness of breath, fever, cough, sore throat, myalgia, nausea, vomiting, and diarrhea are additional symptoms of this disease (Chen et al., 2020). In April 2020, COVID-19 has spread to 213 countries and resulted in 1,954,724 confirmed cases and 126,140 deaths globally (WHO, 2020a).

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Meanwhile, there is no effective vaccine to cure COVID-19, and the only treatment options are still considered experimental. Therefore, patients with coronavirus symptoms are only receiving supportive care with antibiotics to treat secondary bacterial infections. (Huang et al., 2020).

COVID-19 is not just a virus that is causing serious illness and threatening lives. It is also severely affecting the global economy, where shopping centers, businesses, and travel agencies have stunted their growth and have been shutting down for the safety of consumers (ARABNEWS, 2020). Entertainment has also been affected by COVID-19's rapid growth, where events and concerts have been canceled due to the decreased interest of the public who hesitate to participate in outdoor activities (CBC, 2020). Many people have started working from home since schools and businesses have moved their operations online, using available technology (Mack e al., 2007; Maragakis, 2020). Beyond the negative impact of the severe economic disaster, COVID-19 has produced further challenges through the spread of fear of the virus, causing collective grief, prolonged physical distancing, and associated social isolation.

Social engagement is one of the top factors that have led to the massive outbreak of COVID-19, along with poor social awareness regarding the seriousness of the disease. These factors tend to prolong the pandemic further, resulting in continued escalating damage to the global economy and society at large. This poor awareness and carelessness of people have influenced governments around the globe to issue worldwide "lockdowns" to eliminate social engagement, enhance social distancing, and to force people to stay home in order to reduce the infection rate that we may win the battle with COVID-19 (Lau et al., 2020). Many countries, including Saudi Arabia, locked their borders and applied different degrees of blockade locally to promote social distancing and to contain the spread of COVID-19 (Lau et al., 2020; Mahmud and Al-Mohaimed, 2020).

Some sources claimed that the date of the first COVID-19 cases was reported around the second of January 2020, while other data indicated that cases began appearing in late December (Wu et al., 2020; Cheng and Shan, 2020; Bogoch et al., 2020). Since then, international flights and travel have been greatly restricted: For example, both Hubei and Wuhan in the Republic of China were placed under lockdown weeks after the beginning of the COVID-19 outbreak (Lau et al., 2020). Therefore, social distancing was encouraged worldwide by canceling events and by closing public places as well as schools and universities. Moreover, outdoor activities were also limited, and residents were required to obtain permission to be allowed to leave their homes for urgent needs.

According to public health officials, social distancing is directly increasing the physical space between people to avoid spreading illness

(Maragakis, 2020). It is considered a minimum of six feet of space between people to avoid spreading the virus and to reduce the chances of contracting or transmitting the disease. Home isolation, on the other hand, is remaining home as much as possible without leaving except for necessities. Most retail stores and offices are closed until the governmental order is lifted. Only essential businesses can remain open, like grocery stores, banks, post offices, and necessary transportation services (Suppawittaya et al., 2020).

Saudi Arabia is the largest country in the Arabian Peninsula, with a population of . million, including approximately 21 million citizens and 13 million foreign residents (The General Authority for Statistics, 2010). The geography of Saudi Arabia is diverse, with deserts, mountains, and forests. Temperatures can reach over 45 degrees Celsius in the summer, while in the winter, temperatures may drop to below freezing in some regions, with some rainfall in other regions.

The government of Saudi Arabia has taken immediate action since the first case of COVID-19 was reported on the second of March 2020, including the official approval and execution of several decisive measures to reduce the virus outbreak (Fig. 1). Suspension of domestic flights, buses, and trains was announced on the 20th of March. Nation-wide partial curfew was issued on the 24th of March. A complete lockdown of the two holy cities (Makkah and Madinah) was issued on the 2nd of April, followed by the complete nation-wide curfew of the entire country on the 6th of April. The closure of shopping malls, national parks, coffee shops, and gyms was announced on 14th of April 2020.

Furthermore, effective on March 23rd, 2020, citizens and residents in Saudi Arabia were not allowed to leave their cities, and stricter lockdown measures were announced in the following weeks preventing people from leaving their homes without permission (Mahmud and Al-Mohaimed, 2020). Moreover, the Saudi government went a step further evacuating Saudi nationals worldwide and bringing them home to ensure their safety and security.

The study aims to assess the impact of awareness and behavior of citizens and residents in Saudi Arabia toward the home isolation and social distancing during lockdown that may hinder the COVID-19 outbreak and to maintain constant reduction for the safety of the community. The study was meant to highlight the awareness and commitment of people in Saudi during the pandemic that might assist the effort of the government to control the virus outbreak. However, the study needs more variations of participants that may include citizens and residents with less education who might have less knowledge and responsibility to appreciate the consequences. Technological and language barriers were among the weaknesses that restrained us from obtaining diversity in the study.

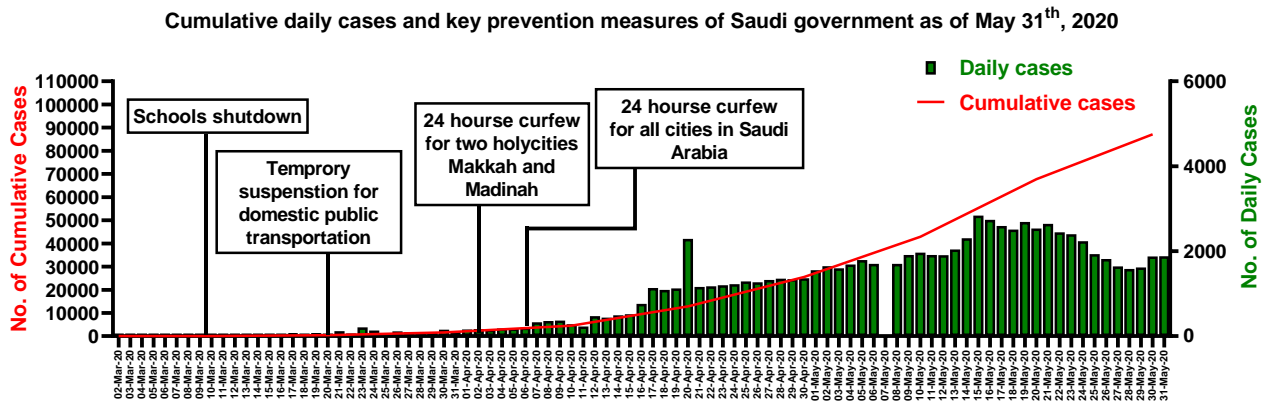


Fig. 1: Cumulative daily cases and key prevention measures of the Saudi government

2. Methods

2.1. Setting and participants

We have adopted a cross-sectional survey design to investigate the impact of Saudi lockdown on blockade COVID-19 by using an anonymous online questionnaire. A virtual snowball sampling strategy, focused on recruiting the public living in Saudi Arabia during the epidemic of COVID-19, was utilized. The online survey was first disseminated to groups of social media influencers, encouraging them to pass it on to others. The targeted population of the study was Saudi citizens and residents of different ages. A sample size of 1168 participants was calculated with a single proportion formula at a 95% level of significance and 5% margin of error, according to findings of previous studies.

2.2. Procedure

Since the Government of Saudi Arabia has recommended the public to minimize physical interaction and encouraged home isolation, potential respondents were invited to participate by filling an online questionnaire they could access remotely from their homes. They completed the online questionnaires through an online survey platform from Google Forms.

Expedited ethics approval of the study was approved by the Institutional Review Board (IRB) of the Research Centre, College of Medicine at King Saud University. Respondents were informed about the study objectives, and data was kept confidential and used only for research purposes. Data collection took place in April 2020 after the government of Saudi Arabia declared the COVID-19 outbreak as a public health threat of national concern. Inclusion criteria were Saudi citizens, residents, males, and females of different ages, all of whom have internet access in order to fill out the survey (Survey was made accessible via Twitter, Whatsapp, Snapchat, and Google Docs).

Exclusion criteria were illiterates, ages younger than 18 years old, and individuals who did not have internet access and therefore could not access the survey.

2.3. Survey development

A structured questionnaire of 22 questions was designed following an extensive literature review based on previous studies to fulfill the study objectives and research questions. A Pilot study was applied to test the reliability and validity of the questionnaire on a sample of 110 participants (which represent 10% of the sample size) who were excluded from the final study. The pilot study was also designed to acquire feedback on the ease of the questionnaire as well as to estimate the time needed to complete it. The questionnaire consisted of two parts; the first part (7 questions) dealt with socio-demographic characteristics of participants, which included identity (Saudi and non-Saudi), gender, social status, age, educational level, region, and city of residence (large crowded city vs. small less crowded city).

The second part (15 questions) investigated the level of awareness and behavior of both citizens and residents in Saudi Arabia toward the home isolation and social distancing during the lockdown. Question 8 and 9 asked participants about their level of knowledge and concerns regarding COVID-19, respectively.

Questions 10, 11, 12, 13, 14, and 15 tested participants' beliefs on the importance of home isolation and social distancing. Questions 16 and 17 investigated the commitment of participants toward the recommended health measures that included wearing masks, gloves and avoiding direct facial contact. Question 18 was about the educational level of individuals and their own social culture that could play an important role in the epidemic outbreak. Question 19 measured the level of satisfaction of participants regarding the safety measures that were taken by the government of Saudi Arabia to combat the epidemic.

Question 20 asked participants about what, in their opinion, was the most critical factor that led to the coronavirus outbreak in Saudi Arabia. Question 21 asked participants if they had committed to the rules of home isolation and social distancing during the outbreak. Question 22 was the only open-ended format question that was seeking any further measures, decisions, or recommendations that

participants thought were appropriately combatting the COVID-19 outbreak for reduction and elimination.

2.4. Data collection

The valuable data was done over a one-week period during April 2020, where an online questionnaire, in Arabic, was distributed via several social media applications, including Twitter, Snapchat, and WhatsApp, since these applications are the most popular in Saudi Arabia. A random convenient sampling technique was used to select participants. Data was stored in a protected electronic format using an anonymous self-administered Google online questionnaire.

2.5. Statistical analysis

The collected data were entered into Microsoft Excel version 2011 and analyzed by using the Statistical Package for Social Sciences (SPSS), version 23. The Chi-square test with 95% confidence intervals (CI) was used to examine significant associations between the socio-demographic characteristic of participants, their awareness, and

their behavior toward the COVID-19 pandemic. P-value <0.05 was considered statistically significant.

3. Results

We set out this cross-sectional survey study to assess the awareness and behavior towards the home isolation and social distancing during lockdown that might decrease the outbreak of COVID-19 in Saudi Arabia. The baseline characteristics of the study participants are shown in Table 1. The total number of the current study participants is 1168, the majority (70.50%) being married males with children (73.50%). Three-quarters of the participants were equally distributed between the age groups of 30-39, 40-49, and 50-59 years old. Almost all (90.90%) of the participants have higher education, 73.60% living in the central region, and in a large and crowded city (75.30%). Since the identity item (Saudi and non-Saudi) was later added to the questionnaire, it was missed for almost half of the sample, and according to the available data for it, which is 590 participants, more than half (55.10%) of them were non-Saudi (Fig. 2).

Table 1: Characteristics of the study participants

		Count	%
Identity	Saudi	265	44.90%
	Non-Saudi	325	55.10%
Gender	Male	824	70.50%
	Female	344	29.50%
Social Status	Single	251	21.50%
	Married no Kids	58	5.00%
	Married with Kids	859	73.50%
Age	> 20	43	3.70%
	20-29	200	17.10%
	30-39	292	25.00%
	40-49	290	24.80%
	50-59	286	24.50%
Educational Level	< 60	57	4.90%
	Basic	10	0.90%
	Intermediate	96	8.20%
	Advanced	1062	90.90%
Region	Middle	860	73.60%
	Eastern	87	7.40%
	Western	103	8.80%
	Northern	53	4.50%
	Southern	65	5.60%
Nature of City	Large Crowded	879	75.30%
	Mid-Sized Uncrowded	231	19.80%
	Small Village	58	5.00%

More than half (58.50%) of the Saudi respondents know about the coronavirus from the media sources, while for the non-Saudis, 54.50% were well informed. The vast majority of the non-Saudi participants (91.10%) believe in home isolation and social distancing compared to only 76.60% of the Saudi. Higher percentages of females reported that they know and read a lot about the disease and have absolute belief in home isolation and social distancing compared to males who reported lower levels of knowledge and conviction of said points; 53.8% males compared to 93.60% females for home isolation, and 46.80% males

compared to 86.20% females for social distancing. The majority of the participants believe in home isolation and social distancing regardless of their marital status. However, the highest percentage who reported a high level of knowledge and reading about the coronavirus were married participants with children at 63.80%. Participants from all age groups reported their knowledge about the virus, and the majority were among either knowledgeable and well-read or obtained their knowledge of their virus via media sources, while only small percentages (0.00%-5.30%) expressed/reported that they had little/low knowledge.

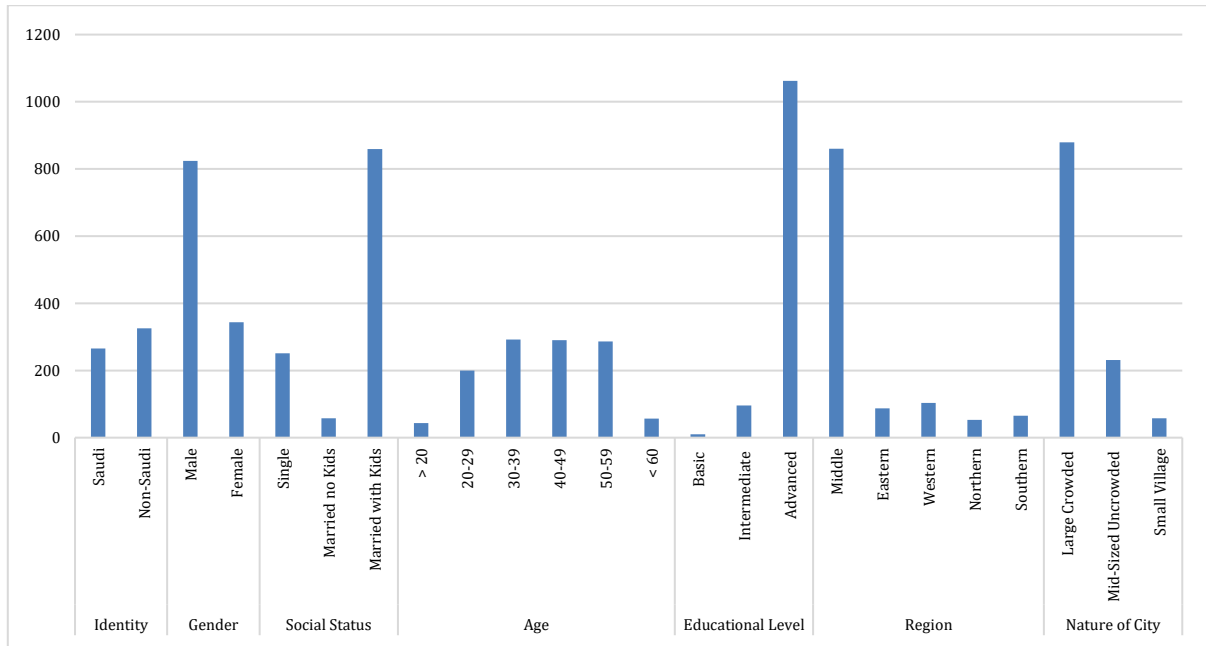


Fig. 2: Characteristic of study participants

The results of the current study show a positive correlation between the educational level of participants and both their knowledge of COVID-19 and belief in home isolation and social distancing. Where the percentage of subjects who believed in home isolation gradually increased with increasing levels of education as represented in the data; 40% of the participants with higher education compared to 20% of the participants with lower education. The highest percentage who reported knowledge and

well-read about the coronavirus were from the Northern region (58.50%), while those who believe more in-home isolation were from the Eastern region (94.30%) and a large crowded city (88.70%). Knowledge about the coronavirus was significantly correlated with age, gender, identity, educational level, and marital status since all the P values were <0.05. The same factors were significantly correlated with belief in home isolation and social distancing except for marital status. Data are shown in Table 2.

Table 2: The association between characteristics of participants and both knowledge of COVID-19 and belief of home isolation and social distancing

		N (%)	Do you know much about COVID-19?			Do you believe in Home Staying & Social Distancing?		
			YES	FROM MEDIA	LITTLE	YES	MAYBE	NO
Identity	Saudi	N (%)	105 (39.6%)	155 (58.5%)	5 (1.9%)	203 (76.6%)	54 (20.4%)	8 (3%)
	Non-Saudi	N (%)	177 (54.5%)	145 (44.6%)	3 (0.9%)	296 (91.1%)	25 (7.7%)	4 (1.2%)
Gender	Male	N (%)	386 (46.8%)	431 (52.3%)	7 (0.8%)	710 (86.2%)	99 (12%)	15 (1.8%)
	Female	N (%)	185 (53.8%)	152 (44.2%)	7 (2%)	322 (93.6%)	18 (5.2%)	4 (1.2%)
Social Status	Single	N (%)	135 (53.8%)	113 (45%)	3 (1.2%)	239 (95.2%)	9 (3.6%)	3 (1.2%)
	Married No Kids	N (%)	37 (63.8%)	21 (36.2%)	0 (0%)	50 (86.2%)	7 (12.1%)	1 (1.7%)
	Married with Kids	N (%)	399 (46.4%)	449 (52.3%)	11 (1.3%)	743 (86.5%)	101 (11.8%)	15 (1.7%)
Age	> 20	N (%)	20 (46.5%)	21 (48.8%)	2 (4.7%)	42 (97.7%)	1 (2.3%)	0 (0%)
	20-29	N (%)	118 (59%)	80 (40%)	2 (1%)	188 (94%)	8 (4%)	4 (2%)
	30-39	N (%)	155 (53.1%)	136 (46.6%)	1 (0.3%)	265 (90.8%)	24 (8.2%)	3 (1%)
	40-49	N (%)	133 (45.9%)	155 (53.4%)	2 (0.7%)	253 (87.2%)	32 (11%)	5 (1.7%)
	50-59	N (%)	126 (44.1%)	155 (54.2%)	5 (1.7%)	235 (82.2%)	47 (16.4%)	4 (1.4%)
	< 60	N (%)	19 (33.3%)	36 (63.2%)	2 (3.5%)	49 (86%)	5 (8.8%)	3 (5.3%)
Educational Level	Basic	N (%)	3 (30%)	3 (30%)	4 (40%)	6 (60%)	2 (20%)	2 (20%)
	Intermediate	N (%)	45 (46.9%)	45 (46.9%)	6 (6.3%)	76 (79.2%)	18 (18.8%)	2 (2.1%)
	Advanced	N (%)	523 (49.2%)	535 (50.4%)	4 (0.4%)	950 (89.5%)	97 (9.1%)	15 (1.4%)
Region	Middle	N (%)	415 (48.3%)	437 (50.8%)	8 (0.9%)	751 (87.3%)	100 (11.6%)	9 (1%)
	Eastern	N (%)	47 (54%)	39 (44.8%)	1 (1.1%)	82 (94.3%)	3 (3.4%)	2 (2.3%)
	Western	N (%)	46 (44.7%)	55 (53.4%)	2 (1.9%)	96 (93.2%)	5 (4.9%)	2 (1.9%)
	Northern	N (%)	31 (58.5%)	21 (39.6%)	1 (1.9%)	45 (84.9%)	5 (9.4%)	3 (5.7%)
	Southern	N (%)	32 (49.2%)	31 (47.7%)	2 (3.1%)	58 (89.2%)	4 (6.2%)	3 (4.6%)
Nature of City	Large Crowded	N (%)	433 (49.3%)	436 (49.6%)	10 (1.1%)	780 (88.7%)	86 (9.8%)	13 (1.5%)
	Mid-Sized Uncrowded	N (%)	107 (46.3%)	120 (51.9%)	4 (1.7%)	204 (88.3%)	23 (10%)	4 (1.7%)
	Small Village	N (%)	31 (95.4%)	27 (46.6%)	0 (0%)	48 (82.8%)	8 (13.8%)	2 (3.4%)

As shown in Table 3, more than half of the respondents reported that they were committed to wearing masks and gloves, and to avoiding facial contact when leaving their homes, with a higher percentage among non-Saudi (68%), females (82.80%), single participants (75.30%), people with intermediate education (67.70%), and those living in a large crowded city (70.30%). There were

statistically significant differences in the commitment to wearing masks and gloves and to avoiding facial contact when leaving home by gender, identity, marital status, and living region, with a P-value of <0.05 for all. Similar results were obtained when participants were asked about their commitment to the rules of home isolation, and social distancing since the largest proportion (40%-

74.50%) reported that they were always committed to such rules. Such commitment was noted to be higher among non-Saudis (74.20%), females (73.80%), highly educated people (65.10%), and those living in the western region (72.80%) (Fig. 3). Simple educational level participants showed the lowest levels of commitment to these rules at 20%,

followed by 4.6% of those who live in the southern region. The current study results showed that there is a statistically significant ($P < 0.05$) association between commitment to the rules of home isolation and social distancing and age, gender, identity, and educational level.

Table 3: The association between characteristics of participants and the commitment of home isolation and social distancing

		Committed Wearing Masks, Gloves & Avoid Face Contact			Committed to Rules of Home Staying & Social Distancing			
		Yes Always	Sometimes	Mostly No	Always	Frequently	Sometimes	Never
		Identity	Saudi	152 (57.4%)	65 (24.5%)	48 (18.1%)	150 (56.6%)	92 (34.7%)
	Non-Saudi	221 (68%)	86 (26.5%)	18 (5.5%)	241 (74.2%)	75 (23.1%)	7 (2.2%)	2 (0.6%)
Gender	Male	492 (59.7%)	235 (28.5%)	97 (11.8%)	489 (59.3%)	281 (34.1%)	50 (6.1%)	4 (0.5%)
	Female	285 (82.8%)	47 (13.7%)	12 (3.5%)	254 (73.8%)	80 (23.3%)	7 (2%)	3 (0.9%)
Social Status	Single	189 (75.3%)	43 (17.1%)	19 (7.6%)	187 (74.5%)	54 (21.5%)	9 (3.6%)	1 (0.4%)
	Married no Kids	34 (58.6%)	18 (31%)	6 (10.3%)	29 (50%)	25 (43.1%)	4 (6.9%)	0 (0%)
	Married with Kids	554 (64.5%)	221 (25.7%)	84 (9.8%)	527 (61.4%)	282 (32.8%)	44 (5.1%)	6 (0.7%)
Age	> 20	31 (72.1%)	10 (23.3%)	2 (4.7%)	30 (69.8%)	12 (27.9%)	1 (2.3%)	0 (0%)
	20-29	149 (74.5%)	35 (17.5%)	16 (8%)	135 (67.5%)	51 (25.5%)	12 (6%)	2 (1%)
	30-39	183 (62.7%)	83 (28.4%)	26 (8.9%)	180 (61.6%)	96 (32.9%)	16 (5.5%)	0 (0%)
	40-49	196 (67.6%)	62 (21.4%)	32 (11%)	192 (66.2%)	87 (30%)	11 (3.8%)	0 (0%)
	50-59	181 (63.3%)	75 (26.2%)	30 (10.5%)	172 (60.1%)	95 (33.2%)	16 (5.6%)	3 (1%)
	< 60	37 (64.9%)	17 (29.8%)	3 (5.3%)	34 (59.6%)	20 (35.1%)	1 (1.8%)	2 (3.5%)
Educational Level	Basic	4 (40%)	3 (30%)	3 (30%)	4 (40%)	4 (40%)	0 (0%)	2 (20%)
	Intermediate	65 (67.7%)	24 (25%)	7 (7.3%)	48 (50%)	37 (38.5%)	9 (9.4%)	2 (2.1%)
	Advanced	708 (66.7%)	255 (24%)	99 (9.3%)	691 (65.1%)	320 (30.1%)	48 (4.5%)	3 (0.3%)
Region	Middle	579 (67.3%)	208 (24.2%)	73 (8.5%)	548 (63.7%)	265 (30.8%)	44 (5.1%)	3 (0.3%)
	Eastern	58 (66.7%)	24 (27.6%)	5 (5.7%)	54 (62.1%)	31 (35.6%)	2 (2.3%)	0 (0%)
	Western	76 (73.8%)	19 (18.4%)	8 (7.8%)	75 (72.8%)	23 (22.3%)	4 (3.9%)	1 (1%)
	Northern	27 (50.9%)	13 (24.5%)	13 (24.5%)	33 (62.3%)	15 (28.3%)	5 (9.4%)	0 (0%)
	Southern	37 (56.9%)	18 (27.7%)	10 (15.4%)	33 (50.8%)	27 (41.5%)	2 (3.1%)	3 (4.6%)
Nature of City	Large Crowded	618 (70.3%)	200 (22.8%)	61 (6.9%)	595 (67.7%)	246 (28%)	33 (3.8%)	5 (0.6%)
	Mid-Sized Uncrowded	132 (57.1%)	64 (27.7%)	35 (15.2%)	115 (49.8%)	93 (40.3%)	21 (9.1%)	2 (0.9%)
	Small Village	27 (46.6%)	18 (31%)	13 (22.4%)	33 (56.9%)	22 (37.9%)	3 (5.2%)	0 (0%)

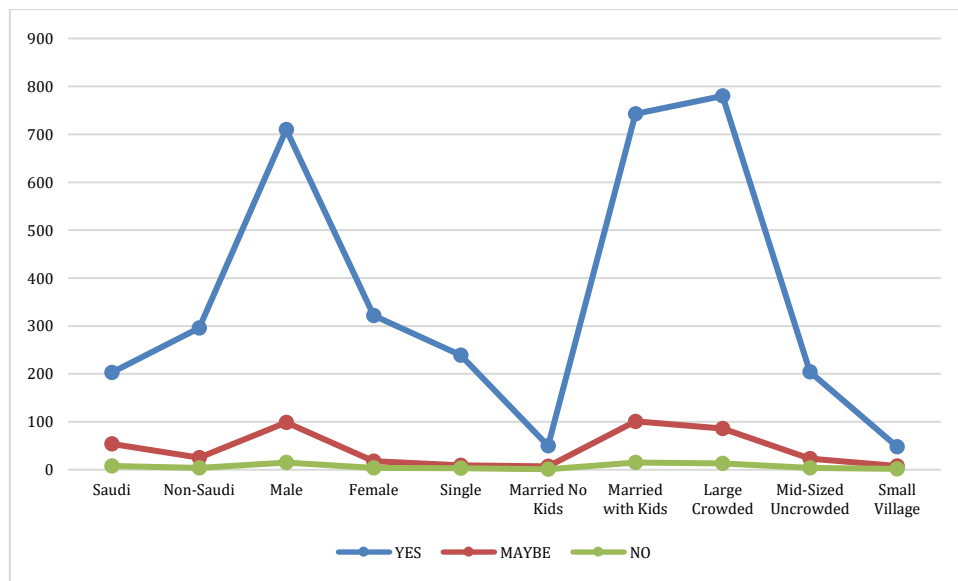


Fig. 3: Participants' commitment to home isolation and social distancing

When participants were asked about their opinion regarding the safety measures that were taken by the government of Saudi Arabia to combat the coronavirus pandemic, most of the participants, particularly non-Saudis, females, and young participants (<20 years) scored these measures as exceptional and outstanding at 85.20%, 83.40%, and 86%, respectively (Fig. 4). More than half (54.30%) of the Saudi participants believe that a low level of awareness in the non-Saudi workers, with no commitment to home isolation and social distancing,

is the most significant factor for coronavirus outbreak in Saudi Arabia. Whereas 48% of the non-Saudi and 44.80% of advanced education participants perceived the underestimating of the consequences of the coronavirus outbreak and non-compliance with home isolation and social distancing as the main factor. Overall, these two previously mentioned risk factors were the most highly scored by the participants according to their different sociodemographic factors. Data are shown in Table 4.

Table 4: The association between characteristics of participants and the opinion of safety governmental measures and the significant factors of COPVID-19 outbreak

		Opinion on the Safety Measures Taken by Government of Saudi Arabia			Most Significant Factor of Coronavirus Outbreak in Saudi Arabia				
		Exceptional	Natural	Exaggerated	Culture	Low Awareness	Underestimation Consequences	Unnecessary Precautions	Other Reasons
Identity	Saudi	N 199 (%) (75.1%)	48 (18.1%)	18 (6.8%)	31 (11.7%)	144 (54.3%)	63 (23.8%)	8 (3%)	19 (7.2%)
	Non-Saudi	N 277 (%) (85.2%)	44 (13.5%)	4 (1.2%)	39 (12%)	81 (24.9%)	156 (48%)	23 (7.1%)	26 (8%)
Gender	Male	N 643 (%) (78%)	149 (18.1%)	32 (3.9%)	92 (11.2%)	373 (45.3%)	272 (33%)	34 (4.1%)	53 (6.4%)
	Female	N 287 (%) (83.4%)	52 (15.1%)	5 (1.5%)	49 (14.2%)	154 (44.8%)	119 (34.6%)	8 (2.3%)	14 (4.1%)
Social Status	Single	N 195 (%) (77.7%)	51 (20.3%)	5 (2%)	43 (17.1%)	103 (41%)	85 (33.9%)	6 (2.4%)	14 (5.6%)
	Married No Kids	N 47 (%) (81%)	8 (13.8%)	3 (5.2%)	5 (8.6%)	29 (50%)	16 (27.6%)	2 (3.4%)	6 (10.3%)
	Married with Kids	N 688 (%) (80.1%)	142 (16.5%)	29 (3.4%)	93 (10.8%)	395 (46%)	290 (33.8%)	34 (4%)	47 (5.5%)
Age	> 20	N 37 (%) (86%)	5 (11.6%)	1 (2.3%)	6 (14%)	18 (41.9%)	19 (44.2%)	0 (0%)	0 (0%)
	20-29	N 152 (%) (76%)	42 (21%)	6 (3%)	36 (18%)	94 (47%)	55 (27.5%)	8 (4%)	7 (3.5%)
	30-39	N 226 (%) (77.4%)	60 (20.5%)	6 (2.1%)	32 (11%)	139 (47.6%)	96 (32.9%)	6 (2.1%)	19 (6.5%)
	40-49	N 240 (%) (82.8%)	42 (14.5%)	8 (2.8%)	32 (11%)	111 (38.3)	113 (39%)	12 (4.1%)	22 (7.6%)
	50-59	N 224 (%) (78.3%)	47 (16.4%)	15 (5.2%)	30 (10.5%)	141 (49.3%)	92 (32.2%)	8 (2.8%)	15 (5.2%)
Educational Level	< 60	N 51 (%) (89.5%)	5 (8.8%)	1 (1.8%)	5 (8.8%)	24 (42.1%)	16 (28.1%)	8 (14%)	4 (7%)
	Basic	N 8 (%) (80%)	2 (20%)	0 (0%)	3 (30%)	4 (40%)	1 (10%)	2 (20%)	0 (0%)
	Intermediate	N 67 (%) (69.8%)	24 (25%)	5 (5.2%)	11 (11.5%)	47 (49%)	28 (29.2%)	3 (3.1%)	7 (7.3%)
Region	Advanced	N 855 (%) (80.5%)	175 (16.5%)	32 (3%)	127 (12%)	476 (44.8%)	362 (34.1%)	37 (3.5%)	60 (5.6%)
	Middle	N 677 (%) (78.7%)	158 (18.4%)	25 (2.9%)	103 (12%)	385 (44.8%)	296 (34.4%)	31 (3.6%)	45 (5.2%)
	Eastern	N 69 (%) (79.3%)	13 (14.9%)	5 (5.7%)	14 (16.1%)	36 (41.4%)	29 (33.3%)	3 (3.4%)	5 (5.7%)
	Western	N 87 (%) (84.5%)	14 (13.6%)	2 (1.9%)	12 (11.7%)	49 (47.6%)	29 (28.2%)	5 (4.9%)	8 (7.8%)
	Northern	N 45 (%) (84.9%)	5 (9.4%)	3 (5.7%)	5 (9.4%)	26 (49.1%)	15 (28.3%)	0 (0%)	7 (13.2%)
Nature of City	Southern	N 52 (%) (80%)	11 (16.9%)	2 (3.1%)	7 (10.8%)	31 (47.7%)	22 (33.8%)	3 (4.6%)	2 (3.1%)
	Large	N 706 (%) (80.3%)	148 (16.8%)	25 (2.8%)	107 (12.2%)	373 (42.4%)	316 (35.9%)	40 (4.6%)	43 (4.9%)
	Crowded	N 175 (%) (75.8%)	46 (19.9%)	10 (4.3%)	21 (9.1%)	131 (56.7%)	58 (25.1%)	1 (0.4%)	20 (8.7%)
	Uncrowded	N 49 (%) (84.5%)	7 (12.1%)	2 (3.4%)	13 (22.4%)	23 (39.7%)	17 (29.3%)	1 (1.7%)	4 (6.9%)
	Small Village	N 49 (%) (84.5%)	7 (12.1%)	2 (3.4%)	13 (22.4%)	23 (39.7%)	17 (29.3%)	1 (1.7%)	4 (6.9%)

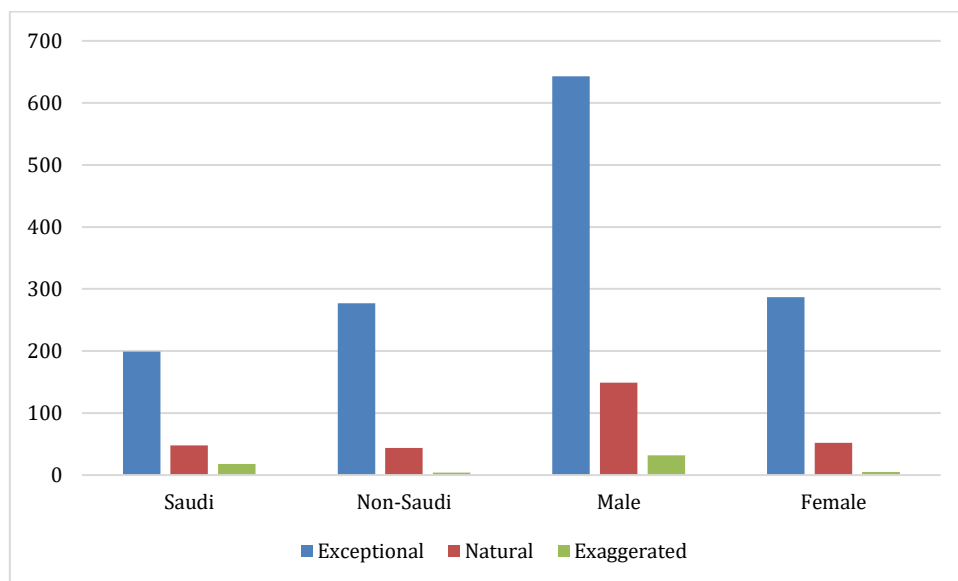


Fig. 4: Opinion of participants regarding safety measures taken by the Saudi government to combat the epidemic

Participants have engaged effectively with the open-ended question and have provided further suggestions on more measures, decisions, and recommendations that they believe should be taken to combat the COVID-19 outbreak for reduction and elimination. The following items are some of the most valuable suggestions provided by participants:

1. Issuing a complete ban to influence people to stay home and reduce the outbreak.
2. Increasing the awareness of COVID-19 outbreak in multiple languages among less-educated workers.
3. Adopting the theory of herd immunity that imposes safety control by wearing masks and gloves and using sterilization methods.
4. Avoiding places where the virus is commonly present.
5. Enforcing the regulations against the violators for not adhering to the precautionary measures of the outbreak, including illegal gatherings, not observing social distancing, and not wearing protective masks.
6. Raising the awareness of the importance of healthy nutrition and hygienic behaviors.
7. Supporting scientific research and studies to enhance the level of knowledge and finding on the COVID-19 pandemic.
8. Changing lifestyle patterns to reduce contact and direct communication during the pandemics.
9. Enhancing the capacity of hospitals and healthcare centers.
10. Increasing the number of daily checks of COVID-19 cases for precautionary purposes.

4. Discussion

The outbreak of COVID-19, and its spread globally and being declared a pandemic, has stressed the health systems of many countries and has forced decision-makers to act very quickly to minimize the impact of the disease to avoid collapse. Worldwide, countries and territories, including Saudi Arabia, have enforced lockdowns of varying degrees, and mostly, only essential businesses have been allowed to remain open. Public knowledge and awareness of COVID-19 are essential in suppressing its pandemic status. In this study, we aimed to assess the awareness and behavior towards the home isolation and social distancing during the lockdown in Saudi Arabia. The results of the current study revealed that overall the participants were mostly aware of the disease and mostly believed in home isolation and social distancing, were committed to personal protective measures and the rules of home isolation and social distancing. They also see the safety measures taken by the government as exceptional and outstanding, and that underestimating the consequences of coronavirus and non-compliance with home isolation and social distancing as the main factor for coronavirus outbreak.

When a new pandemic starts, the emphasis of research and action within the medical and public health communities is primarily directed towards the identification of the cause, clinical presentation, diagnosis, and treatment (WHO, 2020a). Few studies will report the effectiveness of preventive measures and the population's psycho-behavioral directions. To the best of our knowledge, data regarding lockdown and population awareness, attitude, and belief in it is scarce in Saudi Arabia and globally due to the recency of the outbreak.

In China, a study addressing the knowledge and attitude toward COVID-19 among healthcare workers found that social media was the main source of COVID-19 information, and this is in line with our findings among the Saudi participants (Huynh et al., 2020). As demonstrated, these findings showed that the Saudi population is more likely to get their knowledge on COVID-19 from social media sources. This is a particularly important issue for the government of Saudi Arabia because it is imperative to consider and provide a variety of channels to deliver updated knowledge and learning materials about this epidemic.

The WHO (World Health Organization) indicated that there is a priority for research focusing on actions that can save lives, including optimizing the use of protective equipment and other infection prevention and control measures in both health care facilities and community settings to protect health care workers and the community from the transmission of the virus while creating a safe working environment (WHO, 2020b). In a multinational cross-sectional study which included participants from Jordan, Saudi Arabia, and Kuwait, that addressed knowledge and practices towards COVID-19, it was found that participants were still embracing misconceptions regarding COVID-19, leading to an insufficient practice of protective measures against infection (Naser et al., 2020). In contrast to this finding, our results showed that participants, especially females and non-Saudi residents, were mostly highly committed to personal protective measures. In their study, Naser et al. (2020) found that only 50% of participants declared that they wore masks when leaving home. However, it should be noted that the authors explained that the low rate of mask adherence might be attributed to the fact that almost 85% of the studied population was extremely cautious and avoided crowded places (Naser et al., 2020).

Several previously published studies correlated educational levels with the knowledge and awareness about outbreaks (Alqahtani et al., 2015; Holakouie-Naieni et al., 2015). The current study showed a significant positive association between educational level and knowledge about COVID-19, protective measures, and lockdown adherence. This is also in line with a study from China conducted during the COVID-19 pandemic (Zhong et al., 2020). This study's findings suggest that health-related information contents and forms about the pandemic

could not be understandable and or even acceptable to the less educated individuals (Lin et al., 2011). Consequently, healthcare authorities and policymakers must provide targeted health education programs to raise awareness, and these programs need to be tailored specifically to those with lower education levels.

Respiratory infectious diseases, including COVID-19, are recurring events that result in high costs on both the individuals and society, and the behavioral response of the community plays a vital role in limiting their spread. Moran and Del Valle (2016) have qualitatively and qualitatively combined the results from 85 publications to assess the global relationship between gender and health-protective behavioral responses (Moran and Del Valle, 2016). They found that females in the general population are almost 50% more likely than males to adopt/practice non-pharmaceutical health-protective behaviors, and this in line with our findings. Such association between gender and behavior might be due to the fact that women perceive themselves as more susceptible than men do. In contrast, no gender differences were found in one Australian study for intentions to wear a mask (Barr et al., 2008).

Bish and Michie (2010) showed that being older, female, and more educated is associated with a higher likelihood of adopting the protective behaviors during a pandemic. This is also in line with our study, except for age, where younger participants in our case were more adopting than older ones. The pattern of findings for age is not straightforward. In agreement with our results, during the 2009 swine flu pandemic, people aged 18–24 were more likely to follow recommended behaviors. Additionally, during the SARS outbreak, a cross-sectional study of adolescents in China found that younger adolescents were more likely to report mask-wearing (Wong and Tang, 2005). Therefore, despite the balance of evidence showing that increasing age is associated with a greater chance of carrying out behaviors, some results are inconclusive.

Saudi Arabia was among the first countries to implement early and exceptional precautionary measures to prevent COVID-19 introduction into the kingdom and in alleviating/counteracting its impact upon arrival when it arrives. Saudi Arabia has imposed several extreme measures on freedom of movement, social and religious gatherings, and travel, even before the first COVID-19 case (Algaissi et al., 2020). Such measures were seen as exceptional and outstanding by most of the current study participants.

5. Conclusion

The results of the current study revealed that the majority of the population in Saudi Arabia believes that home isolation and social distancing is necessary and warranted for the COVID-19 blockade and that non-compliance to them is one of the main

factors for the disease outbreak. Most of the participants were committed to home isolation, social distancing, and personal protective measures, including wearing masks, gloves and avoiding face contact while outside. However, there is still a significant non-negligible portion of the population who were not committed. This highlights the need for more education and awareness programs with a special concentration on the Saudi population. This could be executed through the media (including social media), as it is a highly cited source of information for the Saudi population, according to the current study results.

Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

References

- Algaissi AA, Alharbi NK, Hassanain M, and Hashem AM (2020). Preparedness and response to COVID-19 in Saudi Arabia: Building on MERS experience. *Journal of Infection and Public Health*, 13(6): 834-838.
<https://doi.org/10.1016/j.jiph.2020.04.016>
PMid:32451260 PMCID:PMC7211706
- Alqahtani AS, Wiley KE, Willaby HW, BinDhim NF, Tashani M, Heywood AE, and Rashid H (2015). Australian Hajj pilgrims' knowledge, attitude and perception about Ebola, November 2014 to February 2015. *Euro Surveillance*, 20(12): 21072.
<https://doi.org/10.2807/1560-7917.ES2015.20.12.21072>
PMid:25846489
- ARABNEWS (2020). COVID-19: Malls, retail shops announce closure. Available online at:
<https://www.arabnews.com/node/1643031/corporate-news>
- Barr M, Raphael B, Taylor M, Stevens G, Jorm L, Giffin M, and Lujic S (2008). Pandemic influenza in Australia: Using telephone surveys to measure perceptions of threat and willingness to comply. *BMC Infectious Diseases*, 8: 117.
<https://doi.org/10.1186/1471-2334-8-117>
PMid:18793441 PMCID:PMC2556339
- Bish A and Michie S (2010). Demographic and attitudinal determinants of protective behaviours during a pandemic: A review. *British Journal of Health Psychology*, 15(4): 797-824.
<https://doi.org/10.1348/135910710X485826>
PMid:20109274 PMCID:PMC7185452
- Bogoch II, Watts A, Thomas-Bachli A, Huber C, Kraemer MU, and Khan K (2020). Pneumonia of unknown aetiology in Wuhan, China: Potential for international spread via commercial air travel. *Journal of Travel Medicine*, 27(2): taaa008.
<https://doi.org/10.1093/jtm/taaa008>
PMid:31943059 PMCID:PMC7107534
- CBC (2020). Closed stores, grounded airlines as COVID-19 limits business. *CBC News*, Toronto, Canada.
- Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, and Yu T (2020). Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: A descriptive study. *The Lancet*, 395(10223): 507-513.
[https://doi.org/10.1016/S0140-6736\(20\)30211-7](https://doi.org/10.1016/S0140-6736(20)30211-7)
- Cheng ZJ and Shan J (2020). Novel coronavirus: Where we are and what we know. *Infection*, 48: 155-163.
<https://doi.org/10.1007/s15010-020-01401-y>
PMid:32072569 PMCID:PMC7095345

- Hawryluck L, Gold WL, Robinson S, Pogorski S, Galea S, and Styra R (2004). SARS control and psychological effects of quarantine, Toronto, Canada. *Emerging Infectious Diseases*, 10(7): 1206-1212.
<https://doi.org/10.3201/eid1007.030703>
PMid:15324539 PMCID:PMC3323345
- Holakouie-Naieni K, Ahmadvand A, Owais RAZA et al. (2015). Assessing the knowledge, attitudes, and practices of students regarding ebola virus disease outbreak. *Iranian Journal of Public Health*, 44(12): 1670-1676.
PMid:26811818 PMCID:PMC4724740
- Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, and Cheng Z (2020). Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *The Lancet*, 395(10223): 497-506. [https://doi.org/10.1016/S0140-6736\(20\)30183-5](https://doi.org/10.1016/S0140-6736(20)30183-5)
- Huynh G, Nguyen TNH, Vo KN, and Pham LA (2020). Knowledge and attitude toward COVID-19 among healthcare workers at District 2 Hospital, Ho Chi Minh City. *Asian Pacific Journal of Tropical Medicine*, 13(6): 260-265.
<https://doi.org/10.4103/1995-7645.280396>
- Lau H, Khosrawipour V, Kocbach P, Mikolajczyk A, Schubert J, Bania J, and Khosrawipour T (2020). The positive impact of lockdown in Wuhan on containing the COVID-19 outbreak in China. *Journal of Travel Medicine*, 27(3): taaa037.
<https://doi.org/10.1093/jtm/taaa037>
PMid:32181488 PMCID:PMC7184469
- Lin Y, Huang L, Nie S, Liu Z, Yu H, Yan W, and Xu Y (2011). Knowledge, attitudes and practices (KAP) related to the pandemic (H1N1) 2009 among Chinese general population: A telephone survey. *BMC Infectious Diseases*, 11: 128.
<https://doi.org/10.1186/1471-2334-11-128>
PMid:21575222 PMCID:PMC3112099
- Mack A, Choffnes ER, Sparling PF, Hamburg MA, and Lemon SM (2007). *Ethical and legal considerations in mitigating pandemic disease: Workshop summary*. National Academies Press, Washington, USA.
- Mahmud I and Al-Mohaimed A (2020). COVID-19: Utilizing local experience to suggest optimal global strategies to prevent and control the pandemic. *International Journal of Health Sciences*, 14(3): 1-3.
- Maragakis L (2020). *Coronavirus, social and physical distancing and self-quarantine*. Johns Hopkins Medicine, Baltimore, Maryland, USA.
- Moran KR and Del Valle SY (2016). A meta-analysis of the association between gender and protective behaviors in response to respiratory epidemics and pandemics. *PloS One*, 11(10): e0164541.
<https://doi.org/10.1371/journal.pone.0164541>
PMid:27768704 PMCID:PMC5074573
- Musinguzi G and Asamoah BO (2020). The science of social distancing and total lock down: does it work? Whom does it Benefit? *Electronic Journal of General Medicine*, 17(6): 1-3.
<https://doi.org/10.29333/ejgm/7895>
- Naser AY, Dahmash EZ, Alwafi H, Alsairafi ZK, Al Rajeh AM, Alhartani YJ, and Alyami HS (2020). Knowledge and practices towards COVID-19 during its outbreak: A multinational cross-sectional study. medRxiv, ID: ppmedrxiv-20063560.
<https://doi.org/10.1101/2020.04.13.20063560>
- Suppawattaya P, Yiemphat P, and Yasri P (2020). Effects of social distancing, self-quarantine and self-isolation during the COVID-19 pandemic on people's well-being, and how to cope with it. *International Journal of Science and Healthcare Research*, 5(2): 12-20.
- WHO (2020a). *Coronavirus disease (COVID-19) pandemic*. World Health Organization, Geneva, Switzerland.
- WHO (2020b). *COVID 19 public health emergency of international concern (PHEIC): Global research and innovation forum: Towards a research roadmap*. World Health Organization, Geneva, Switzerland.
- Wong CY and Tang CSK (2005). Practice of habitual and volitional health behaviors to prevent severe acute respiratory syndrome among Chinese adolescents in Hong Kong. *Journal of Adolescent Health*, 36(3): 193-200.
<https://doi.org/10.1016/j.jadohealth.2004.02.024>
PMid:15737774 PMCID:PMC7129542
- Wu JT, Leung K, and Leung GM (2020). Nowcasting and forecasting the potential domestic and international spread of the 2019-nCoV outbreak originating in Wuhan, China: A modelling study. *The Lancet*, 395(10225): 689-697.
[https://doi.org/10.1016/S0140-6736\(20\)30260-9](https://doi.org/10.1016/S0140-6736(20)30260-9)
- Zhong BL, Luo W, Li HM, Zhang QQ, Liu XG, Li WT., and Li Y (2020). Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: A quick online cross-sectional survey. *International Journal of Biological Sciences*, 16(10): 1745-1752.
<https://doi.org/10.7150/ijbs.45221>
PMid:32226294 PMCID:PMC7098034