

Original Article

Knowledge, attitude, and practice towards COVID-19 among Libyan people- a web-based cross-sectional study

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Abstract

Background: Successful plans in disaster and epidemics management depend on the feedback response and the assessment of knowledge, attitudes, and practices among the target population. This study aims to assess the knowledge, attitude, and practice towards COVID-19 among Libyan people.

Methods: A cross-sectional web-based survey designed to assess the knowledge, attitude, and practice towards COVID-19 among the Libyan people from 13-20 October 2020. A self-administered questionnaire was recruited to collect the data of 287 participants. SPSS version 16.0 was used to analyze the data using univariate and multivariable regression data analyses.

Results: More than half of respondents were males (53.7%), married (61.3%), aged less than 45 years old, highly educated (46.3%), employed (44.6%), urban resident (79.8%), experience good or very good health (71.1%) and earned more than USD 200 monthly (84.3%). The participants showed a high rate of good knowledge (81.0%), attitude (71.1%), and practice (83.7%) towards COVID-19, respectively. Regression analysis showed that married ($P=0.056$), female ($P=0.037$), living in the urban regions ($P<0.001$) with good income of more than USD 200 ($P=0.001$) were significantly associated with upper knowledge score. Females ($P=0.040$) were more significantly associated with positive attitude scores than males. Regarding practice score, married ($P=0.001$), females ($P=0.059$) had better practice, but poor-rated health status ($P=0.018$) was significantly associated with the weak practice.

Conclusion: The distinction of urban regions with good knowledge, optimistic attitudes, and acceptable practices towards COVID-19 determines the government's action compass towards more interest in supporting males, unhealthy, and those living in the rural areas with accurate and timely knowledge.

Keywords: COVID-19, Knowledge, Attitude, Practice, Public, Preventive Measures, Web-based, Libya

Background

Libya is an Arabic, North African oil country and among the upper-middle-income economies [1,2]. The desert lands that make up more than ninety percent of the country's area, the scarcity of fresh, natural water, and the absence of rivers pushed about 85.0% of the population to live in an area less than 10.0% near the sea's coast mainly in three historic known regions including "Tripolitania in the west, Cyrenaica in the east, and Fezzan in the south" [2,3]. The distinctive geographical location linking Europe and Africa, the long coast overlooking the Mediterranean Sea, and the rich natural resources made Libya a target for many greedy people [2,4]. Since 2001, Libya has been

in a state of security, political and economic instability. The internal conflicts resulted in the squandering of oil wealth, the destruction of the infrastructure, and the shortage of professional workforce, including human resources for health [2]. In early 2020, Libya topped the list of the world countries (after Afghanistan) as the second-highest country in the prevalence of violence against health care workers and health institutions [5].

Libyan health system

Both public and private sectors have engaged in providing healthcare services in Libya. Nevertheless, the Ministry of Health (MoH) is directly responsible for all financing, resource allocation, planning, organizing, evaluation, and monitoring operations, in addition to inspecting and supervising national and international bodies, including general and specialized

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hospitals, research, and training institutions [6]. The Ministry of Health provides free-of-charge health services to citizens at primary, secondary, and tertiary levels. Primary health care services included 728 primary health care units, 571 primary health care centers, and 56 dispensaries scattered in Libyan cities, districts, and villages. However, half of them became out of service at the end of 2019. The secondary health services were distributed among 32 rural hospitals, 23 general hospitals, 31 teaching hospitals, and 11 specialized hospitals. At the tertiary level, Libyans receive advanced health services in five medical centers for tertiary care in addition to specialized and teaching hospitals [5].

Current situation of COVID 19

Although Libya was among the last countries to be invaded by the novel human coronavirus (SARS-COV-2), it was not prepared to face the crisis as is the case in most countries of the world [7]. The first case of COVID-19 disease was officially announced on the twenty-fourth of March 2020 [8]. The prevalence rate of COVID-19 infection has steadily increased since the beginning of August 2020. Up to 31st March 2021, the total reported cases in Libya was 158,957, with 2,667 deaths and 9,143 active cases [9]. In light of the worldwide worsening of the COVID-19 crisis and the upcoming new waves of the pandemic [10], the assessment of public knowledge, attitude, and practice toward the COVID-19 emerge as a vital issue when planning to face the crisis.

Since 11th March 2020, when the World Health Organization (WHO) reported that COVID-19 is a global pandemic [11], several studies [12-25] have been conducted to test the knowledge, attitude, and practice (KAP) toward the COVID-19 pandemic among different societies. Most of the previous studies found good knowledge, various attitudes, and acceptable practice among the surveyed populations. At the local level, two independent studies conducted by Hweissa NAB, et al. [26] and Elshwekh H, et al. [27] found that 79.9% and 89.3% of the surveyed Libyan healthcare workers have adequate knowledge about the COVID-19, respectively. Elhadi M, et al. [28] surveyed 3,669 medical and non-medical students from fifteen universities in Libya. The authors found that 71.8% had adequate knowledge accompanied by a positive attitude and professional behavior towards COVID-19. The present study aimed to assess the KAP towards COVID-19 among the Libyan people.

Methods

Study Design and Sample

A cross-sectional study designed to assess the knowledge, attitude, and practice towards COVID-19 among the Libyan people. A web-based and self-administered questionnaire was recruited to collect the data from 13-20 October 2020. The Google Docs Forms were used to create a link to the survey. The Google link was sent to Libyan people via Twitter and WhatsApp groups. This study is part of a large project with researchers' participation from Anbar and Diyala Universities in Iraq, Bezmialem Vakif University in Turkey, the Misrata University in Libya. Briefly, the sampling technique and data collection process have been reported in detail previously [12,13].

Inclusion and exclusion criteria

All Libyan people, 18 years of age or over, understand the questionnaire's content and willing to participate are included in the study. However, the study excluded the Libyan people from outside Libya, unwilling to participate, and those aged < 18.

Sample size

According to the World Bank (WB) data for 2019, the total number of Libyan people estimated to be 6,777,452 [29]. The sample size calculator arrived at 267 participants, using a margin of error of $\pm 6\%$, a confidence level of 95%, a 50% response distribution, and 6,777,452 people [30]. Non-response correction = 10%. Thus, the total sample size was 294.

Study tool

A semi-structured questionnaire was developed and tried by the authors earlier [12,13]. Considering adherence to the Centers for Disease Control and Prevention (CDC) guidelines [31], The questionnaire was written in the English language, and then it was translated into the Arabic language. Twenty respondents (not included in the study) were recruited to test pilot the study tool. Content validation was performed with a content validity rate [32,33]. "The first page of the online questionnaire contained an assurance of the freedom to participate or withdraw and that all information and opinions submitted would be anonymous and confidential". The questionnaire contains four main sections. The first section contained information about the participants' social and demographic characteristics, including age, gender, marital status, education, employment, place of residency, income level, and self-rated health status. The second section of the questionnaire was designed to assess participants' knowledge of COVID-19. This section contained 20 items focusing on the transmission of the Coronavirus, the clinical symptoms that appear on the infected person, the treatment protocol, and the groups most vulnerable to infection, in addition to information on isolation and prevention strategies control of the epidemic. In the third section of the questionnaire, there were 11 items to evaluate participants' attitudes towards COVID-19, using a five-point Likert scale to determine the level of participants' agreement ranging from "1" 'Strongly disagree' to "5" 'Strongly agree'. The fourth section of the questionnaire has six questions recruited to evaluate respondents' practices and behaviors toward COVID-19.

Independent variables

For sociodemographic variables, gender was coded as one for females and zero for males. The age variable was reported in six groups: "18-24", "25-34", "35-44", "45-54", "55-64", and ">64" years old. Moreover, the age was categorized into two categories coded zero for less than 45 years and coded one for 45 years and above. Marital status was captured as binary, and a value of one was used for married and zero for otherwise. Education was categorized and coded into zero (high academic) for college/university degree, postgraduate degree, and one (low educated) for high school or below. Work status categorized and the value of zero given to employed and value of one given to unemployed. Place of residency coded as zero for rural and one for urban. Monthly income (Libyan Dinar, LYD 1 = USD 0.221) was divided into four categories: <USD 200, USD 200

to <400, USD 400 to 1000, and more than USD1000. The self-rated health status was reported in a scale ranging from "very bad" to "very good," a scale ranged from "1" to "5". Moreover, the self-rated health status was categorized into poor health (very bad, bad, moderate) and good health (good and very good).

Dependent variables

Three options (true or false, with an additional option 'I do not know') were made for the participants to express their opinion on the elements of knowledge. The correct answer was awarded one score, while the incorrect or uncertain answers (I do not know) were given a score of zero. The overall knowledge score ranged from zero to 20, with higher scores indicating better knowledge of COVID-19. Items were evaluated for internal reliability using Cronbach's alpha. Cronbach's alpha coefficient was 0.75, indicating internal reliability.

Likert scale was recruited to calculate the respondents' answers on the questions related to attitude toward COVID-19: "1=strongly disagree, 2=disagree, 3=undecided, 4=agree, and 5=strongly agree". Scores were calculated by averaging respondents' answers to the eleven statements. Total scores ranged from eleven to 55, with high scores indicating positive attitudes. The Likert scales were assessed for internal reliability, using Cronbach's alpha. Cronbach's alpha coefficient was 0.81, indicating internal reliability. The options "yes" or "no" allowed respondents to rank their practice toward COVID-19 infection. Each answer that reflected good practice was given one score, and a score of zero was given for answers that reflected bad practice. The total score ranged from zero to six, with high scores indicating better practices.

Statistical analysis

Univariate analysis was recruited to tabulate the frequency of social and demographic statistics. An independent sample t-test and one-way analysis of variance (ANOVA) were used to assess differences in mean values for KAP scores. The overall mean differences were estimated using a Bartlett test [34]. A multivariable linear regression analysis was performed to identify factors related to knowledge, attitudes, and practice. All analyses were conducted using SPSS version 16.

Results

Demographic information

A total of 294 participants completed the questionnaire. After excluding seven respondents who reported age less than 18, the final sample consisted of 287 participants. As shown in table 1; of the total sample, 154 (53.7%) were men. Most of the sample, 203 respondents (70.7%), were in the age group less than 45 years old. Of the participants, 176 were married (61.3%), and 111 (38.7%) were unmarried (single, widow, divorce). More than half of the sample, 154 (53.7%), had a low education level compared to 133 (45.3%) who had a college or university degree. Respondents were grouped according to monthly income, with 116 (40.4%) in the USD 200-399 group, 87 (30.3%) in the USD 400-1000 group and 45 (15.7%) in the <USD200 group, and 39 (13.6%) in the >USD1000 group. In terms of work status, 128 (44.6%) were employed, 159 (55.4%) were unemployed. Most of the respondents were urban residents (229, 79.8%). Most of the respondents perceived their

health good (116, 40.4%) and very good (88, 30.7%), respectively.

KAP scores by social and demographic characteristics

As shown in Table 2, the mean COVID-19 knowledge score was 16.20 (SD = 2.28, range: 9–20), and the overall accuracy rate for the knowledge test was 81.00% (16.20 /20 * 100). The mean attitude score for COVID-19 was 39.09 (SD = 3.68, range: 11-55), indicating (71.1%) positive attitudes. The mean score for practices for COVID-19 was 5.02 (SD = 1.20, range: 0–6), indicating (83.7%) acceptable practices. Table 3 presents the mean of KAP scores towards COVID-19 by different social and demographic characteristics in Libya. Knowledge scores significantly differed across gender, marital status, residence places, education level, income status, and health status. Gender and employment are shown as influential factors in Attitude scores. Gender, marital status, and health status are the influential factors in Practice scores ($P < 0.05$). Regression analysis showed that female gender ($P = 0.037$), marital status of being married ($P = 0.056$), with a monthly income of USD 200 and more ($P = 0.001$) and living in an urban area ($P = 0.000$) were significantly associated with upper knowledge score. Female gender ($P = 0.040$) was the only variable that significantly associated with a positive attitude. Regarding practice score, married ($P = 0.001$) and female ($P = 0.059$) people had better practice, but poor-rated health statuses significantly associated with weak practice ($P = 0.018$) (Table 4).

Table 1 Social and demographic characteristics of the study participants (n=287)

Variables	Category	Number (%)
Gender	Female	133 (46.3)
	Male	154 (53.7)
Age group	45 years and more	84 (29.3)
	< 45 years	203 (70.7)
Marital status	Married	176 (61.3)
	Single	111 (38.7)
Education	Low education	154 (53.7)
	High education	133 (46.3)
Area Residence	Urban	229 (79.8)
	Rural	58 (20.2)
Employment status	Unemployed	159 (55.4)
	Employed	128 (44.6)
Level of income	<USD 200	45 (15.7)
	USD200-399	116 (40.4)
	USD400-1000	87 (30.3)
	>USD1000	39 (13.6)
Self-rated health status	Very bad	7 (2.4)
	Bad	29 (10.1)
	Moderate	47 (16.4)
	Good	116 (40.4)
	Very good	88 (30.7)

In table 5, similar findings to those reported in earlier studies among Iraqi people and the Syrian people resident in Turkey [12,13] where most (90.0%) of the respondents had accurate knowledge related to "washing hands, wearing medical masks, avoiding touching their eyes, nose, and mouth with the

unwashed hand", "clinical symptoms and its importance", "spread through cough and sneeze by infected people", "elderly people, people with chronic diseases in higher risk" and "the importance of healthy food and drinking water and isolation". About seventy percent of them have sufficient knowledge about antibiotics' effectiveness; however, forty percent do not have accurate knowledge about children affected by COVID-19 compared to Iraqi and Syrian people [12,13].

In table 6, respondents agreed more than ninety percent to "maintaining a reasonable distance" and "washing hands" to protect individuals and society from coronavirus. More than eighty (81.9%) percent reported that they believe in staying at home as an effective preventive measure. Half of the respondents thought that coronavirus would be successfully controlled, and 44.3% agreed that it was not late when the lockdown was implicated at the beginning of the epidemic.

More than seventy percent of them thought the Libyan government's strict measures were enough to win the battle against coronavirus. Most of the participants (81.5%) thought that complying with the National Centre for Disease Control instructions will prevent coronavirus spread. About 80.3% thought that the announced number related to infected and dead persons due to coronavirus are actual (Table 6).

In Table 7, more than eighty percent of participants did not attend a social event involving many people; however, 31.4% were in a crowded place. Most of the surveyed people (82.6%) still engage in some social behavior such as shaking hands or kissing people. However, about ninety percent think seriously about social distancing, but still, seven percent not interested in washing hands after going to a public place or after blowing their nose, coughing, or sneezing, and 13.2% were not interested in washing things from outside the home.

Table 2 Number of questions, range, scores, and levels of knowledge, attitude, and practice (n=287)

Variables	Number of questions	Range of score	Total scores (mean \pm SD)	Accuracy rate (%)
Knowledge	20	9-20	16.20 \pm 2.28	81.0
Attitude	11	11-55	39.09 \pm 3.68	71.1
Practice	6	0-6	5.02 \pm 1.20	83.7

Table 3 Comparison of social and demographic characteristics and mean KAP score (n=287)

Variables		Total		Knowledge			Attitude			Practice		
		n	%	Mean	SD	P	Mean	SD	P	Mean	SD	P
Gender	Female	133	46.3	16.7	2.1	0.001	39.6	3.7	0.040	5.2	1.2	0.081
	Male	154	53.7	15.8	2.4		38.7	3.6		4.9	1.2	
Age group	\geq 45 years	84	29.3	16.3	2.4	0.586	39.4	4.5	0.336	5.1	1.2	0.358
	< 45 years	203	70.7	16.1	2.2		39.0	3.3		5.0	1.2	
Marital status	Married	176	61.3	16.5	2.1	0.002	38.9	3.3	0.189	5.2	1.1	0.001
	Single	111	38.7	15.7	2.5		39.5	4.2		4.7	1.3	
Education level	Low education	154	53.7	15.8	2.5	0.005	39.3	3.4	0.275	5.1	1.2	0.535
	High education	133	46.3	16.6	1.9		38.8	3.3		5.0	1.3	
Residency	Urban	229	79.8	16.7	1.8	0.000	39.2	3.7	0.199	5.1	1.1	0.271
	Rural	58	20.2	14.0	2.8		38.5	3.7		4.9	1.4	
Employment	Unemployed	159	55.4	16.0	2.1	0.160	38.7	3.8	0.030	5.0	1.2	0.710
	Employed	128	44.6	16.4	2.4		39.6	3.4		5.0	1.2	
Level of income	< the USD200	45	15.7	15.2	2.6	0.001	38.0	3.9	0.103	4.9	1.4	0.389
	USD200-399	116	40.4	16.1	2.3		39.4	4.0		5.1	1.1	
	USD400-1000	87	30.3	16.3	2.1		39.4	3.1		4.8	1.3	
	>USD1000	39	13.6	17.3	1.6		38.6	3.3		5.2	0.9	
Self-rated health status	Very bad	7	2.4	18.6	0.5	0.009	38.5	4.1	0.584	5.0	1.0	0.081
	Bad	29	10.1	15.7	2.4		38.6	4.3		5.5	0.8	
	Moderate	47	16.4	15.7	2.9		39.7	4.3		5.2	0.9	
	Good	116	40.4	16.1	1.9		39.2	3.3		4.9	1.2	
	Very good	88	30.7	15.6	2.2		39.1	3.4		4.9	1.4	

Discussion

To our knowledge, this study is the first national study to explore the knowledge, attitude, and practice of the Libyans towards the Novel Coronavirus in 2020. Likewise to our earlier two studies conducted among the Iraqi and Syrian people resident in Turkey [12,13], the Libyans scored 81.0% correct rate of knowledge about the COVID-19 pandemic. The findings of this study are similar to previous study conducted in

neighboring Arabic and north African country such as Sudan (78.2%) [14], and higher than rates reported in Egypt (70.2%) [15] and some other African countries such as Northern Nigeria (65.4%) [16], however, Libyans rated knowledge lower than other countries such as China (90.0%) [17], Cameroon (84.19%) [18], Saudi Arabi (81.6%) [19], Malaysia (80.5%) [20].

Table 4 Regression results of KAP-related factors for COVID-19 (n=287)

Variable	B	SE	Beta	t	P-value	95% CI lower-Upper	Tolerance	VIF
Knowledge (Durbin-Watson= 1.827)								
USD 200 and more (vs <USD 200 years)	0.435	0.129	0.170	3.304	0.001	(0.172,0.678)	0.970	1.031
Married (VS single)	0.447	0.242	0.095	1.851	0.056	(0.028,0.923)	0.959	1.042
Female (VS Male)	0.429	0.238	0.094	1.801	0.037	(0.040,0.898)	0.942	1.061
Urban (VS Rural)	2.388	0.300	0.421	7.957	0.000	(1.798,2.978)	0.917	1.091
Attitude (Durbin-Watson= 1.734)								
Female(VS Male)	0.896	0.434	0.122	2.067	0.040	(0.043,1.750)	0.995	1.000
Practice (Durbin-Watson= 1.689)								
Married (VS single)	0.465	0.142	0.189	3.266	0.001	(0.185,0.745)	0.987	1.013
Female (VS Male)	0.234	0.140	0.097	1.676	0.059	(0.041,0.510)	0.977	1.024
Poor-rated health (vs. Good -rated health)	-0.361	0.152	-0.137	-2.371	0.018	(-0.661,0.061)	0.989	1.012

Like other studies conducted in China [21], India [22], and Bangladesh [23], the higher rates of knowledge correlated with a higher level of education among the respondents. Young people and especially the female gender, are often the group that uses more social media, which increases their motivation to get more news and information about the COVID-19 pandemic than the males and older people. Moreover, the linear regression analysis showed that knowledge was affected by a high percentage of respondents in urban areas. Similar findings were seen in India [22], Ethiopia [24], Syrian residents in Turkey and Iraq [12,13]. More than 90% of Libyans resident in urban centers and cities, where universities and educational centers abound, and therefore knowledge rates about COVID-19 increase among highly educated and urban residents. The lowest average for Libyan salaries is 580 LYD (Equivalent to USD 128.5).

In this study, Libyan people who have a monthly income of USD 200 or more are significantly associated with good knowledge. Studies from Malaysia [20], Bangladesh [23], Iraq [12] found that good knowledge about COVID-19 significantly related to having a job with a fixed salary. The global economic situation is witnessing a steady deterioration as the Corona pandemic continues. The adverse effects of the pandemic went beyond the health status to include the psychological, social, and economic condition of the population in general [35]. Countries that suffer from an unstable political and economic situation, whose citizens are subject to restrictions on access to information. Most Libyans agreed that leaving a social distance (96.9%), washing hands (97.6%), and staying at home (80.9%) are the best ways to control the pandemic. Similar findings recorded in China [21], Bangladesh [23], Iraq [12].

Inline to previous studies [19, 22, 25], the Libyans expressed an optimistic attitude towards the COVID-19 pandemic: more than half (50.6%) of them believed that the pandemic would be successfully controlled, and more than seventy percent have confidence in the Libyan government's measures to win the battle against the virus. Furthermore, 81.5% of the participants stressed the importance of adhering to the National Center for Disease Control instructions to prevent the spread of the

Coronavirus. Most of the participants in this study agreed that the complete lockdown was an effective measure to prevent the spread of the Coronavirus, but it harmed the family's economic situation. Libyan women showed more commitment to protection standards from the Coronavirus, with more responsibility than men. Similar to earlier studies in Iraq [12] and Spain [36] finding of this study showed that females were significantly ($P=0.040$) associated with a positive attitude to COVID-19 than the males. Libyans responded positively to the social situation resulting from the epidemic, and most of them (82.6%) did not engage in any social events and social behavior, such as shaking hands or kissing. Moreover, public awareness improved, leading to more interest in practicing social distancing and washing hands or things brought from outside the home. The media may have a positive role in raising awareness among citizens, and the accumulation of information among the population due to the length of the pandemic and the data collected one year after the invasion of disease. Findings of the regression analysis showed that married ($P= 0.001$) and female gender sex ($P= 0.059$) were significantly more likely to practice protective measures against the spread of the coronavirus than their counterparts. However, those who ranked their health as poor ($P=0.018$) were less likely to practice protective measures against the spread of the coronavirus than their counterparts.

Likewise, Brooks DJ and Saad L [37] account for the higher mortality rate among males than females due to the indifference of men. A previous study conducted by Galasso et al. [38] found that most women believe that coronavirus is a serious health problem. Therefore it is necessary to closely identify the pandemic, listen to instructions, adhere to safety procedures, and comply with policies. Unlike some earlier studies [12, 19], the results of this study found no significant difference among the Libyans in various age groups in terms of commitment to health prevention measures. However, some published reports from the World Health Organization [39] suggested that young people are less likely to be infected with the Coronavirus than the older age group.

Conclusion

In conclusion, Libyan citizens showed a good level of knowledge, attitudes, and practices towards COVID-19 compared to some neighboring countries at the Arabic and African levels. The most prominent determinants of KAP towards COVID-19 were social, demographic, and economic variables such as gender, marital status, residence, income, and

self-perceived health status. As the battle against the Corona pandemic continues, researchers expect that the results of this study and similar studies will enhance the Libyan government's ability and the National Center for Disease Control to adopt effective policies to control the spread of COVID-19 among citizens and immigrants of other nationalities.

Table 5 Correct responses to knowledge statements regarding COVID-19 (n=313)

No.	Statement	N (%)
1	Corona is a viral disease that spreads from person to person at a distance of up to two meters (6 feet)	220(76.7)
2	Corona spreads through respiratory droplets that occur when infected people cough and sneeze.	284(99.0)
3	Corona infection may occur by touching or kissing the contaminated surfaces or objects and then touching the mouth, nose, or possibly the eyes.	262(91.3)
4	Eating or touching wild animals can lead to infection with the Coronavirus.	144(50.2)
5	People infected with COVID-19 cannot transmit the virus to others when a fever is not present.	204(71.1)
6	The main clinical symptoms of COVID-19 are fever, fatigue, dry cough, myalgia, and shortness of breath.	276(96.2)
7	Unlike the common cold, congestion, runny nose, and sneezing are less common in people infected with COVID-19.	189(65.9)
8	Antibiotics are effective in treating COVID-19.	202(70.4)
9	Currently, there is no effective cure for COVID-19, but early symptomatic and supportive treatment can help most patients recover from the diseases.	254(88.5)
10	The elderly and people who suffer from serious chronic diseases such as heart or lung disease and diabetes have a doubled risk of developing serious complications from developing a COVID-19.	281(97.9)
11	Pregnant women are more susceptible to infections than non-pregnant women.	201(70.0)
12	Children are less likely to be infected with COVID-19 than adults.	177(61.7)
13	Children or young people do not need to take protective measures against COVID-19 transmission.	259(90.2)
14	people must wash their hands with soap and water or use a hand sanitizer containing at least 60% alcohol for at least 20 seconds. After being in a public place, after nose-blowing, coughing, or sneezing.	270(94.1)
15	As a precaution, people should avoid touching their eyes, nose, and mouth with unwashed hands.	272(94.8)
16	Wearing medical masks is very important to prevent corona infection.	269(93.7)
17	People should only wear a mask if they are infected with the virus or care for someone with suspected COVID-19 infection.	194(67.6)
18	Healthy food and drinking water strengthen the body's immunity and resistance against COVID-19.	271(94.4)
19	Isolation and treatment of people infected with the COVID-19 are effective ways to reduce the virus's spread.	282(98.3)
20	People being in contact with someone infected with COVID-19 should be immediately quarantined, in an appropriate location, for a general observation period of 14 days.	252(87.8)

Table 6 Responses to attitudinal statements regarding COVID-19 (n=313)

No.	Statements	Strongly agree	Agree	Do not know	Disagree	Strongly disagree
1	Maintaining a reasonable distance from others is very important to avoid the spread of coronavirus.	134(46.7)	144(50.2)	6(2.1)	0 (0)	3(1.0)
2	Hand washing is necessary to protect individuals and society from the coronavirus.	148(51.6)	132(46.0)	4(1.4)	0 (0)	3(1.0)
3	Staying at home is an effective preventive measure to protect individuals and society from coronavirus exposure.	76 (26.5)	159(54.4)	15(5.2)	33(11.5)	4(1.4)
4	I think the Corona epidemic can be successfully controlled.	26(9.1)	119(41.5)	86(30.5)	46(16.0)	10(3.5)
5	The strict measures taken by the Libya government are sufficient to win the battle against coronavirus.	40(13.9)	163(56.8)	53(18.5)	24(8.4)	7(2.4)
6	Complying with the National Safety Committee of the Ministry of Health instructions will prevent the spread of corona.	67(23.3)	167(58.2)	40(13.9)	12(4.2)	1(0.3)
7	The complete lockdown was an effective measure to prevent the spread of coronavirus, but it negatively affected the family's economic situation.	112(39.0)	146(50.9)	10(3.5)	18(6.3)	1(0.3)
8	I think the figures that announced the number of infected people and the number of deaths due to coronavirus are exaggerated.	15(5.2)	41(14.3)	105(36.6)	89(31.0)	37(12.9)
9	I still think that Corona Virus is a hoax, and there is no need to take precautions.	3(1.0)	3(1.0)	30(10.5)	111(38.7)	140(48.8)
10	I have a growing concern about the second peak of coronavirus cases	28(9.8)	129(44.9)	81(28.2)	43(15.0)	6(2.1)
11	When the lockdown introduced at the beginning of the epidemic, I felt it was implemented too late	30(10.5)	97(33.8)	57(19.9)	96(33.4)	7(2.4)

Table 7 Responses to practice statements regarding COVID-19 (n=313)

No.	Statement	Yes (%)	No (%)
1	Have you recently attended a social event (such as a wedding party, funeral parlor, etc.) involving many people?	50(17.4)	237(82.6)
2	Have you recently been in a crowded place?	90(31.4)	197(68.6)
3	Have you recently avoided shaking hands or kissing or any social behavior that calls for meeting and closeness?	50(17.4)	237(82.6)
4	Have you seriously thought about practicing social distancing and leaving a distance when talking to people?	254 (88.5)	33(11.5)
5	Recently, have you become more interested in washing your hands with soap and water frequently, for at least 20 seconds, especially after going to a public place or after blowing your nose, coughing, or sneezing?	266(92.7)	21(7.3)
6	Recently, have you become more interested in washing things that you bring from outside the home, including fruits and vegetables?	249(86.8)	38(13.2)

Abbreviation

COVID-19: Coronavirus; SARS coronavirus or SARS-CoV: Severe Acute Respiratory Syndrome; CDC: Centers for Disease Control and Prevention; WB: World Bank; MoH: Ministry of Health; KAP: Knowledge, Attitude, Practice; LYD: Libyan Dinar; USD: United State Dollar; M: Mean; SD: Standard Deviation; ANOVA: One-Way Analysis of Variance

Declaration

Acknowledgment

We want to thank Mr. Anmar Shukur Mahmood for his outstanding efforts in helping to prepare the questionnaires and the necessary links and distribution through the social networking sites. We also extend our thanks to all respondents to the survey during the Coronavirus pandemic.

Funding

The authors received no financial support for their research, authorship, and/or publication of this article.

Availability of data and materials

Data will be available by emailing drsaadalezzi@gmail.com.

Authors' contributions

Saad Ahmed Ali Jadoo (SAAJ) is the principal investigator of this manuscript (Original manuscript) who designed the study and coordinated all aspects of the research, including the study design, analysis, and interpretation of data, drafting the work, writing the manuscript, and reviewed and approved the manuscript. SAAJ, OMD, MZ, MAA, PT, MAMA, and SMY contributed to the study concept, design, writing, reviewing, editing, and approving the manuscript in its final form. All authors have read and approved the final manuscript.

Ethics approval and consent to participate

We conducted the research following the Declaration of Helsinki, and the protocol was approved by the Ethics Committee of the Scientific Issues and Postgraduate Studies Unit (PSU), College of Medicine, University of Anbar (Ref: SR/368 at 19-July-2020); the Ethics Committee of the College of Medicine, Diyala University (Ref: 1250 at 15-July-2020); National Cancer Institute, Misrata, Libya (Ref: 0000 at 91-August-2020). Moreover, web-based informed consent was obtained from each participant after explaining the study objectives and the guarantee of secrecy.

Consent for publication

Not applicable

Competing interest

The authors declare that they have no competing interests.

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Article Info

Received: 10 January 2021

Accepted: 31 March 2021

Published: 16 April 2021

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