

Public knowledge, attitudes, and practice about COVID-19 pandemic

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Abstract

COVID-19 is a newly discovered global pandemic that affected almost all countries, including Jordan. Knowledge, attitude and practices are fundamental to suppress the spread of the virus. This study aimed to examine knowledge, attitude and practices about COVID-19 in Jordan. A cross-sectional design was used to recruit a convenience sample of public from Jordan. An online instrument used to assess knowledge, attitude and practices about COVID-19, and was developed by the research team. The data were collected online through social media networks in Jordan. The data were collected during May 2020. 2470 participants participated and completed the study questionnaire. Results indicated good knowledge, practice, and attitude, about COVID-19 among the public in Jordan. Linear regression showed that female, aged 40 years or more, married, with Bachelor degree or higher, employed, and participants believe that Jordan will control COVID-19 had higher knowledge compared to their counterparts. Besides, linear regression showed that female, living in Amman city, with high knowledge about COVID-19, and believing that Jordan will control COVID-19 had higher practice compared to their counterparts. Knowledge, attitude and practices levels regarding COVID-19 among Jordanian population during the pandemic were high. However, health authorities and government have to implement and maintain educational programs to enhance the Jordanian population's awareness regarding COVID-19 and

to prevent its spread specially among male, aged less than 40 years, unmarried, with less than Bachelor degree, unemployed, and for participants believe that Jordan will not control COVID-19.

Introduction

The novel corona virus is an enveloped positive single-strand RNA virus, has three glycoproteins E, M and S, with S protein ejecting from the viral envelope resembling solar corona that's where the name derived from.¹ Also this virus known as 2019-nCoV or COVID-19; it is a global health infection.² It was first recognized in China, December 2019 and emerged to almost every country.³ By February 15, 2020 the epidemic ongoing virus has reached 26 countries, resulting in 51,854 infections and 1669 deaths.⁴ The virus can be transmitted before even symptoms appear with an average of about 6 days.⁵ The propagation of this virus has resulted in thousands of deaths and has affected people all around the world with various symptoms.⁶ The virus infects mammals and was first transmitted from animals to humans in Wuhan on the Huanan seafood market.² The pathological aspects of COVID-19 are still under study. Health experts have found that it resembles those of SARS and MRSA but appears to be more infectious and sever than SARS and MRSA.⁵ The clinical course of COVID-19 has shown asymptomatic illness in some patients at early stages, other patients developed mild fever, cough, myalgia, dyspnea, arthralgia, chest pain, runny nose and generalized weakness.⁷ In later stages the primary outcomes where severe acute respiratory distress while the secondary was death during the ICU period as a result of organ dysfunction, hemorrhage and septic shock.⁸ Intensive treatment, close monitoring and mechanical ventilation are required for those with complicated severe illnesses, some may still experience hypoxemia and increased breathing work even when oxygen is delivered through face mask reservoir bag.⁹ Morbidity rate increases with age and patient with serious underlying medical conditions like hypertension, diabetes, cancer and coronary heart disease are associated with a higher risk of severe morbidity and mortality rate of COVID-19.¹⁰ Public knowledge and awareness about COVID-19 are fundamental to suppress the spread of the virus. According to a study held in Jordan, Kuwait, Saudi Arabia targeting only unemployed, students and people with low level of education, the knowledge of middle east countries about prevention and control the transmission of the disease is low as some participants

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Ethics approval and consent to participate: The Ethical approval to conduct the study was obtained from the Institutional Review Board (IRB) at the American University of Madaba. The study protocol approval number is H20004. A consent form was available to all participants at the beginning of the questionnaire and includes information about the purpose, objectives of the study.

Informed consent: Written informed consent was obtained from a legally authorized representative(s) for anonymized patient information to be published in this article.

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reported that it is not necessary for young adults and children to wear masks, and the highest knowledge score has found in Jordan.^{11,12} The variation in mortality rates between countries could be explained by the application of health measures including, social distancing, using masks, the lockdown of work organizations, shopping malls and airports, cancelling flights, traffic limits, avoid hand shaking and kissing at meetings, avoid surfaces touched by others such as tables, avoid direct contact with confirmed cases, avoid touching mouth or eyes, washing hands for no less than 20 sec-

onds, avoid sharing cups, test for COVID-19 if feel any symptoms.³ On 11 March 2020, WHO Director-General characterized COVID-19 as a pandemic. On 20 March 2020 the prime minister of Jordan had imposed a mandatory curfew from 6pm until 10am, people who breached the curfew were arrested and subjected to a fine of about 100-500JD. On 13 April Jordan suspended all coming and departing flights, screening of passengers and quarantine for coming travelers, Jordan also started distance learning, provided medication service for patients. Up to date statistics for 6th June 2020 Jordan had recorded 784 cases (125 actives, 9 deceased and 571 recovered).¹³ This virus has disrupted the economy and restricted daily life of countries worldwide.¹⁴ There was a scarcity of studies that have been conducted to evaluate knowledge, attitude and practices about COVID-19 in Jordan. Therefore, study aimed to examine knowledge, attitude and practices about COVID-19 in Jordan. Furthermore, the difference in knowledge, attitude and practices about COVID-19 based on selected demographical characteristics was assessed.

Materials and Methods

Ethical considerations

The Ethical approval to conduct the study was obtained from the Institutional Review Board (IRB) at the American University of Madaba. The study protocol approval number is H20004. A consent form was available to all participants at the beginning of the questionnaire and includes information about the purpose, objectives of the study. The participants were assured that their participation was confidential. A code number was provided for each participant to protect their confidentiality during data collection and analysis. Data were maintained in a secured computer to keep it private and confidential. The participants weren't asked to fill their names in the online survey during the data collection.

Study design

A cross-sectional design was used to assess knowledge, attitude and practices about COVID-19 among Jordanian population.

Sample

A convenient sampling technique was utilized to recruit a convenience sample of the public from Jordan; individuals had access to the social media such as Facebook and what's were invited to participated in the study. Researchers for this study sent the

link to their social network through WhatsApp, and Facebook page that include the link and invitation to participate through Google forms. For the purpose of increase visibility for the link by potential participants in Jordan; a paid service to Facebook was done, which made the link available for higher number of individuals. The target population was all public in Jordan, while the accessible population was public who have social media and able to complete the survey online. The inclusion criteria are: persons who aged 18 years or above, can read and write Arabic or English language. Potential participants were asked about their age initially, only participants with 18 years old and above were able to proceed in completing the questionnaire.

Instrument

An online instrument that was developed by the research team was used online and built using Google forms. The instrument consists of two parts. The first part of the study is the demographical details which are age, gender, marital status, city, education level, and employment status. The second part of the instrument is the questions that assess an individual's knowledge, attitudes, and practice related to COVID-19. It was developed based on previous literature review and it was initially in the English language. It consists of 22 questions. The first 15 questions assess participants' knowledge about COVID-19 with three options true, false, and I don't know; the answers were recoded to be true answer, false answer, and I don't know; this followed by recoded true answer to 1 and both false and I don't know the answer to zero. The mean score for each 15 items was calculated (with possible score ranged from 0 to 1) and then a total mean score for knowledge was calculated with possible scores

ranged from 0 to 15. The next six questions assess participants practice towered COVID-19 (questions 16-21) with three options; always (coded 2), sometimes (coded 1) and never (coded 0) and question 16 has revised coded. A mean score for each item were calculated with a possible score ranged from 0 to 2, and then a total mean score for the practice was calculated with a possible score range from 0 to 12.

Data collection procedure

The data were collected online though social media networks, mainly Facebook, and WhatsApp. The online survey was built using Google forms. The research team developed the questionnaire through the google forms. The online link for the questionnaire distributed through social media such as Facebook and WhatsApp. The data collection lasted for one month; during May 2020.

Data analysis

Data were analyzed using the Statistical Package for Social Science (SPSS) version 23 (IBM Corp., Armonk, NY, USA). Descriptive statistics including frequency mean (M), and standard deviation (SD) were utilized to describe the sample characteristics. Data for the outcome variables were normally distributed as indicated by the level of skewness. No missing data were detected in the analysis. Independent sample t-test was used to examine differences in COVID-19 knowledge, attitudes, and practices scores based on demographical details. In addition, multiple-linear regression was used to examine each knowledge and practice possible predictors. Significance level was set at $P < 0.05$.

Table 1. Sample characteristics; mean (M); standard deviation (SD) and percent (%) for the participants in the current study, Jordan, May 2020 (N=2470).

Factor	Categories	Total N. (%)
Gender	Male	782 (31.7)
	Female	1688 (68.3)
Age (By Year)	18-39	1879 (76.8)
	40 and above	573 (23.2)
City	Amman	1699 (68.8)
	Other	771 (31.2)
Marital status	Married	1487 (60.2)
	Unmarried	983 (39.9)
Education level	Associate degree or below	363 (14.7)
	Bachelor degree or higher	2107 (85.3)
Employment status	Employed	1028 (41.6)
	Unemployed	1442 (58.4)

Results

Demographical details

A total of 2470 individuals completed the study questionnaire. However, 34 refused to participate. As shown in Table 1; the majority of participants were female (N=1688, 68.3%), between 18 and 39 years old (N=1879, 76.6%), living in Amman city (N=1699, 68.6%), married (1487, 60.2%), had a bachelor's degree or higher (N=2107, 85.3%), and 1442 (58.4%) were unemployed.

Knowledge practice and attitude about COVID-19

As shown in Table 2 the total mean

score for the knowledge questions was 12.04 out of 15 indicating high knowledge related to COVID-19. Examining the mean score for each knowledge questions showed that the majority were above 0.8 out of 1 except four questions. The questions that showed mean scores lower than 0.8 were; "Not all persons with COVID-2019 will develop to severe cases. Only those who are elderly, have chronic illnesses, and are obese are more likely to be severe cases" with a mean score of 0.79, and "Ordinary residents can wear general medical masks to prevent the infection by the COVID-19 virus" with a mean score of 0.78, and "Unlike the common cold, stuffy nose, runny nose, and sneezing are less common in persons infected with the COVID-19

virus" with a mean score of 0.73, and the least mean score for the question "It is not necessary for children and young adults to take measures to prevent the infection by the COVID-19 virus" with a mean score of 0.06. Examining the total mean score for COVID-19 practice-related questions showed that the total mean score for the six questions was 9.37 out of 12, indicating good practice as shown in Table 2. Examining the mean score for each practice questions showed that the majority were above 1.6 out of 2 except one question; "In recent days, have you gone to any crowded place" with a mean score of 0.13. The last question was a general asked respondent about their attitude towered their confidence that the country they reside in

Table 2. Descriptive statistics for knowledge, practice, and attitude items toward COVID-19 in Jordan, May 2020 (N=2470).

No. Knowledge	True answer			Mean (SD)	
	N (%)	False answer, N (%)	Don't know, N (%)		
1 The main symptoms of COVID-19 are fever, fatigue, dry cough, and myalgia.	2354 (95.3)	52 (2.1)	64 (2.6)	0.95 (0.21)	
2 Unlike the common cold, stuffy nose, runny nose, and sneezing are less common in persons infected with the COVID-19 virus	1798 (72.8)	369 (14.9)	303 (12.3)	0.73 (0.44)	
3 There currently is no effective cure for COVID-2019, but early symptomatic and supportive treatment can help most patients recover from the infection	2299 (93.1)	62 (2.5)	109 (4.4)	0.93 (0.25)	
4 Not all persons with COVID-2019 will develop to severe cases. Only those who are elderly, have chronic illnesses, and are obese are more likely to be severe cases.	1962 (79.4)	385 (15.6)	123 (5.0)	0.79 (0.40)	
5 Eating or contacting wild animals would result in the infection by the COVID-19 virus.	1287 (52.1)	547 (22.1)	636 (25.7)	0.52 (0.50)	
6 Persons with COVID-2019 cannot infect the virus to others when a fever is not present	2077 (84.1)	207 (8.4)	186 (7.5)	0.84 (0.36)	
7 The COVID-19 virus spreads via respiratory droplets of infected individuals	2215 (89.7)	92 (3.7)	163 (6.6)	0.90 (0.30)	
8 Ordinary residents can wear general medical masks to prevent the infection by the COVID-19 virus.	1933 (78.3)	378 (15.3)	159 (6.4)	0.78 (0.41)	
9 It is not necessary for children and young adults to take measures to prevent the infection by the COVID-19 virus.	137 (5.5)	2260(91.5)	73 (3.0)	0.06 (0.22)	
10 To prevent the infection by COVID-19, individuals should avoid going to crowded places such as train stations and avoid taking public transportations.	2387 (96.6)	46 (1.9)	37 (1.5)	0.97 (0.18)	
11 Isolation and treatment of people who are infected with the COVID-19 virus are effective ways to reduce the spread of the virus.	2398 (97.1)	27 (1.1)	45 (1.8)	0.97 (0.16)	
12 People who have contact with someone infected with the COVID-19 virus should be immediately isolated in a proper place. In general, the observation period is two weeks	2382 (96.4)	39 (1.6)	49 (2.0)	0.96 (1.8)	
13 COVID-19 vaccine is available in markets	2457 (87.3)	98 (4.0)	215 (8.7)	0.87 (0.33)	
14 Patients with underlying chronic diseases are at a higher risk of COVID- 19 infection and death	2152 (87.1)	154 (6.2)	164 (6.6)	0.87 (0.33)	
15 COVID-19 could be fatal	2216 (89.7)	96 (3.9)	158 (6.4)	0.90 (0.3)	
Total Knowledge				12.04 (1.82)	
Practice		Always	Sometimes	Never	
16 In recent days, have you gone to any crowded place?	2139 (86.6)	331 (13.4)	0	0.13 (0.34)	
17 In recent days, you kept at least one meter between yourself and any other person?	16101 (64.8)	756 (30.6)	113 (4.6)	1.60 (0.57)	
18 In recent days, have you worn a mask when leaving home?	2037 (82.5)	406 (16.4)	27 (1.1)	1.81 (0.41)	
19 In recent days, have clean your fruits and vegetables with soap and water?	2309 (93.5)	135 (5.5)	26 (1.1)	1.92 (0.30)	
20 If you felt the need to cough or sneeze, you cover your mouth and nose	2336 (94.6)	106 (4.3)	28 (1.1)	1.93 (0.290)	
21 If you felt COVID19 symptoms, you will report to health care provider	2414 (97.7)	20 (0.8)	36 (1.5)	1.96 (0.25)	
Total Practice				9.37 (1.18)	
Attitude		Yes N (%)	No N (%)		
22 Do you have confidence that the country you reside in can win the battle against the COVID-19	233 (9)	2247(91)			

M: Mean, N: Number, SD=standard deviation.

(Jordan) can win the battle against the COVID-19 virus; with two options, yes and No. The majority of respondent 2247 (91%) answer yes. The results are indicated in Table 2

Differences in knowledge and practice based on demographics

An independent sample t-test was used to examine differences in total mean score for each knowledge and practice towered COVID-19 based on their demographical details and their attitude towered the Jordan can control COVID-19. As shown in Table 3 there were significant differences in knowledge total mean score based on participants' gender, age, marital status, education level, employment status, and country control. The results indicated that female had significant $t(2468)=-3.26$, $p=0.001$ higher knowledge mean score ($M=12.12$, $SD=1.70$) compared to male ($M=11.87$, $SD=2.03$); participants' with age group from 40 and above years old had significant $t(2468)=-6.82$, $p=0.001$ higher knowledge mean score ($M=12.49$, $SD=1.51$) compared to participants aged 18-39 years old ($M=11.90$, $SD=1.88$). In addition, non-married had significant $t(2468)=-8.88$, $p=0.001$ higher knowledge mean score ($M=12.44$, $SD=1.57$) compared to married ($M=11.78$, $SD=1.92$); participants' with bachelor degree and above had significant $t(2468)=-7.04$, $p=0.001$ higher knowledge mean score ($M=12.15$, $SD=1.75$) compared to participants' with associate degree or below ($M=11.42$, $SD=2.05$). Furthermore, employed participants' had significant $t(2468)=7.28$, $p=0.001$ higher knowledge mean score ($M=12.35$, $SD=1.56$) compared to unemployed ($M=11.82$, $SD=1.96$); and participants' believe that Jordan will control

COVID-19 has significant $t(2468)=-9.26$, $p=0.001$ higher knowledge mean score ($M=12.15$, $SD=1.60$) compared to those believe the contradictory ($M=10.98$, $SD=1.23$). As shown in Table 3 there were significant differences in practice total mean score based on participants' gender, age, city, education level, employment status, and country control. The results indicated that female had significant $t(2468)=-5.09$, $p=0.001$ higher practice mean score ($M=9.45$, $SD=1.46$) compared to male ($M=9.19$, $SD=1.46$); participants' with age group from 40 and above years old ($M=9.48$, $SD=1.09$) had significant $t(2468)=-2.66$, $p=0.005$ higher practice mean score compared to participants aged 18-39 years old ($M=9.33$, $SD=1.22$). Also, participants' living in Amman city had significant $t(2468)=1.96$, $p=0.049$ higher practice mean score ($M=9.40$, $SD=1.12$) compared to those living outside Amman city ($M=9.30$, $SD=1.28$); participants' had bachelor degree and above had significant $t(2468)=-3.02$, $p=0.002$ higher practice mean score ($M=9.40$, $SD=1.15$) compared to participants' with an associate degree or below ($M=9.19$, $SD=1.29$); employed participants' had significant $t(2468)=2.24$, $p=0.025$ higher practice mean score ($M=9.43$, $SD=1.10$) compared to unemployed ($M=9.32$, $SD=1.23$); and participants' believe that Jordan will control COVID-19 had significant $t(2468)=-8.36$, $p=0.001$ higher practice mean score ($M=9.43$, $SD=1.06$) compared to those believe the contradictory ($M=8.74$, $SD=1.93$).

Predictors for each knowledge and practice about COVID-19

Multiple-linear regression was used to

identify the significant predictors of knowledge. To determine knowledge predictors; demographical details as well as the country control question were included as possible predictors. The full model was significant $F(7,2462)=34.05$, $p=0.001$, and as a whole explained 8.6% of the variance in knowledge. As shown in Table 4, gender $t(2462)=3.32$, $P=0.001$, age $t(2462)=2.40$, $P=0.01$, marital status $t(2462)=3.96$, $P=0.001$, education level $t(2462)=5.31$, $P=0.001$, employment status $t(2462)=-3.63$, $P=0.001$, and country control $t(2462)=9.26$, $P=0.001$ were the significant predictors. This indicated that female, aged 40 years or more, married, with Bachelor degree or higher, employed, and participants believe that Jordan will control COVID-19 had higher knowledge compared to their counterparts. Multiple-linear regression was used to identify the significant predictors of practice. Demographical details, knowledge and country control were included as possible predictors for practice. The full model was significant $F(8, 2461)=26.01$, $p=0.001$, and as a whole explained 7.8% of the variance in practice. As shown in Table 5, gender $t(2462)=4.52$, $P=0.001$, city $t(2462)=-2.08$, $P=0.03$, knowledge $t(2462)=9.27$, $P=0.001$, and country control $t(2462)=6.45$, $P=0.001$ were the significant predictors. This indicated that female, living in Amman city, with high knowledge about COVID-19, and believe that Jordan will control COVID-19 had higher practice compared to their counterparts. In addition, linear regression to predict Practice showed that female, living in Amman city, with high knowledge about COVID-19, and believe that Jordan will control COVID-19 had higher practice compared to their counterparts.

Table 3. Independent t-test to examine the differences in Knowledge and practice about COVID -19 in Jordan based on demographics (N=2470), May 2020.

Demographics	Categories	Knowledge			Practice		
		Mean (SD)	t(2468)	P value	Mean (SD)	t(2468)	P value
Gender	Male	11.87 (2.03)	-3.26	0.001	9.19 (1.46)	-5.09	0.001
	Female	12.12 (1.70)			9.45 (1.46)		
Age (by year)	18-39	11.90 (1.88)	-6.82	0.001	9.33 (1.20)	-2.66	0.005
	40 and above	12.49 (1.51)			9.48 (1.09)		
City	Amman	12.03 (1.82)	-0.51	0.610	9.40 (1.12)	1.96	0.049
	Other Cities	12.07 (1.81)			9.30 (1.28)		
Marital status	Married	11.78 (1.92)	-8.88	0.001	9.33 (1.23)	-1.76	0.078
	Unmarried	12.44 (1.57)			9.42 (1.08)		
Education level	Associate degree or below	11.42 (2.05)	-7.04	0.001	9.19 (1.29)	-3.02	0.002
	Bachelor's degree or higher	12.15 (1.75)			9.40 (1.15)		
Employment status	Employed	12.35 (1.56)	7.28	0.001	9.43 (1.10)	2.24	0.025
	Unemployed	11.82 (1.96)			9.32 (1.23)		
Country control	No	10.98 (1.23)	-9.26	0.001	8.74 (1.93)	-8.36	0.001
	Yes	12.15 (1.60)			9.43 (1.06)		

M: Mean, SD=standard deviation. Significance was set at $P<0.05$.

Discussion

In this cross-sectional study, we presented an insight into the knowledge, attitude and practice measures of the Jordanian population towards COVID-19 pandemic. To the best of our knowledge, this is the first study in its kind implemented to examine knowledge, attitude and practices about COVID-19 pandemic and investigate the difference in knowledge, attitude and practices about COVID-19 pandemic based on selected demographical characteristics in Jordan. The study resulted that the overall knowledge about the COVID-19 pandemic was high among the participants. These results are consistent with other a Chinese, Malaysian and Saudi Arabia studies reported that high levels of knowledge among the study group despite being conducted during the COVID-19 pandemic.^{4,15-17} In addition, the high level of knowledge of COVID-19 pandemic among Jordanian population is reflected in controlled COVID-19 pandemic status and with a number of total COVID-19 pandemic, total cases 1,071 and total deaths (9 cases) discovered in Jordan from 15 February until 24 June 2020,¹³ which is considered a very good pandemic level in comparison with other Middle Eastern countries and other countries in the world. Only 5.5% of participants were found had knowledge about “It is not necessary for

children and young adults to take measures to prevent the infection by the COVID-19 virus”. This result is similar to Azlan *et al.*¹⁵ which indicated that 3.7% have knowledge about “children and young adults to take measures to prevent the infection by the COVID-19 virus”. This could be related to false information were distributed by different social media in Jordan that children don't be infected by COVID-19, particularly, for persons had taken Mycobacterium Tuberculosis vaccine during the childhood period. The study showed that female participants, aged above 40 years, educated and married associated with higher knowledge level toward COVID-19. This is study is consistent with the study by Al-Hanawi *et al.*¹⁷ showed that male gender, age-group of 16-29 years, and education of secondary or lower were significantly associated with lower knowledge level toward COVID-19 in Malaysia. Several factors influence the level of medical knowledge. For example, according to the study Assaf *et al.*¹⁸ among the Jordanian society, the transmission of medical knowledge is primarily acquired by the family, friends and the social media platforms. Indeed, the high level of knowledge is a result of the high traffic on the social media platforms which has dramatically increased during the lockdown period in Jordan that lasted for more than two months from 18 March until 29 May 2020

with lockdown time 16 hours from 6 pm – 10 am. And then from 30 May until this moment lockdown time 6 hours from 12 am – 6 am. The study also reported a high rate of optimism that Jordan can control the spread of COVID -19 on its territories. The optimistic attitude of the Jordanian residents could be related to the unprecedented COVID-19 control measures. This result is congruent with another study in Saudi Arabia by Al-Hanawi *et al.*¹⁷ which found that the Saudi population have a high level of knowledge, optimistic attitudes and good practices towards COVID -19 pandemic as a result of governmental enormous effort to prevent COVID -19 pandemic through social media and strict lockdown which includes all sectors such as tourism, restaurants, shopping malls, industries, transportation, religious centers, universities and schools, with keeping open only groceries stores, and hospitals. In the current study, the Jordanian population showed a positive practice towards the ongoing COVID-19 pandemic to prevent spread. The majority of participants reported that they were adherent with preventive measure toward COVID -19 pandemic such as, washing hand frequently, avoidance of hand shaking, wearing a mask and gloves, social distancing (at least 1.5 meters between individuals), cleaning fruits and vegetables and preventive techniques during coughing and

Table 4. Multiple-linear regression to identify the predictors for Knowledge about COVID-19 in Jordan, May 2020 (N=2470).

Variables	Unstandardized β	t(2462)	P value	95% CI lower-upper	Part square%
Gender	0.255	3.32	0.001	0.10-0.40	0.41
Age	0.045	2.40	0.016	0.04-0.44	0.21
City	0.003	0.03	0.970	-0.14-0.15	0.001
Marital status	0.369	3.96	0.001	0.18-0.55	0.57
Education level	0.540	5.31	0.001	0.34-0.73	1.04
Employment status	-2.90	-3.63	0.001	-0.44-.13	0.49
Country control	1.135	9.26	0.001	0.89-1.37	3.16
Constant	8.087	20.15	0.001	7.30-8.87	

β , coefficient; CI, confidence interval. Significance was set at $P < 0.05$.

Table 5. Multiple-linear regression to determine the significant predictors for COVID-19 practice in Jordan, May 2020 (N=2470).

Variables	Unstandardized β	t	P value	95% CI lower-upper	Part square%
Gender	0.227	4.52	0.001	0.128-0.325	0.77
Age	0.128	1.91	0.055	-0.003-0.258	0.136
City	-0.104	-2.08	0.037	-0.201-0.006	0.16
Marital status	-0.94	-1.55	0.121	-0.214-0.025	0.096
Education level	0.080	1.19	0.232	-0.251-0.211	0.052
Employment status	-0.077	-1.48	0.138	-0.180-0.025	0.09
Knowledge	0.122	9.27	0.001	0.096-0.148	3.24
Country control	0.525	6.45	0.001	0.366-0.685	1.562
Constant	6.60	23.35	0.001	6.048-7.157	

Abbreviations: β , coefficient; CI, confidence interval. Significance was set at $P < 0.05$.

sneezing. Except one item only, in which most of participants (87%) reported having gone to crowded places. These results are inconsistent with Chinese study by Zhong *et al.*⁴ that found the avoid going to mass attendance. This could be attributed to the WHO and CDC rolling updated on COVID-19 especially after being declared as a pandemic by the WHO.^{9,10} The impact of social and different media by the local government that raised awareness towards the COVID-19 pandemic, additionally the fear of the consequences of the disease as have been seen in some countries experiencing during the rapid and ongoing COVID-19 pandemic. The study showed that female, living in Amman city, with high knowledge about COVID-19, and believe that Jordan will control COVID-19 had higher practice compared to their counterparts toward COVID-19. This study is consistent with study by Assaf *et al.*¹⁸ which found that men have less knowledge also have less practice toward COVID-19 than women in Saudi Arabia. The Jordanian government, Crises Management Centers (CMC) and health authorities have taken proactive preventive measures to stop the spread of the COVID-19 pandemic by applying full lockdown starting from the first week of cases emergence. These strict measures were able to help flattening the pandemic curve by keeping the number of cases below the anticipated. These measures in different countries are associated by the residents' optimism that the country will be able to prevent COVID-19 spread. For example, a similar different study reported that individual's adherence to control measures is affected by their knowledge, attitudes, and practices towards COVID-19 pandemic in China.^{4,15}

Limitations

This is the first study to examine the knowledge, attitude and the practice towards COVID-19 pandemic among Jordanian population. However, it is important to highlight that this online survey had limitations, the first, due to the very limited time for developing the questionnaire with simple questions only during the rapid COVID-19 pandemic. The research team utilized quick assessment of knowledge, attitudes and practices towards COVID-19 pandemic, which should be developed through a structured interview, direct observation or focus group discussion methods and developed as multi-dimensional measures. Second, the minor focus on the specific group such as elderly population, vulnerable groups and the individuals who don't have capability to use social media who are more likely to have less knowl-

edge, negative attitudes, and inappropriate preventive practices towards COVID-19 pandemic.

Recommendations

The health authorities and the government have to pay more efforts in increase awareness and educating the people about COVID-19 pandemic on different social media through mobile messages and television. Moreover, providing awareness about the COVID-19 pandemic in large Jordanian population may help in rectifying some false information regarding the knowledge, practice or attitudes towards the COVID-19 pandemic. Moreover, the study results should be cautiously considered within the cultural context of Jordanian population, as the tradition, beliefs and culture may be different from other countries. Finally, replicating the study with different the method to confirm study results is required.

Conclusions

The knowledge regarding COVID-19 among Jordanian population during the pandemic was high, attitudes were good and the practices were mainly appropriate. Health education about COVID-19 should be directed more toward males, aged less than 40 years, less than bachelor education, unmarried and unemployed. Measures and the efforts that were implemented by the Jordanian government during this pandemic may had positive impact on public knowledge, practice, and attitude toward COVID-19 in Jordan. However, further follow-up assessment and research for these factors and COVID-19 impact are highly recommended, as the COVID-19 pandemic in Jordan and worldwide is changing.

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