

Knowledge, Attitudes and Practices (KAP) towards pandemic COVID-19 among Syrians

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Research article

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Abstract

Background Effective COVID-19 pandemic management requires adequate understanding of factors that influence behavioral changes. This study aims to assess knowledge, attitudes and practices towards COVID-19 among Syrians in a post-conflict context.

Method This study is based on a web-based survey, conducted on Syrians of 16 years and above. It contains questions on knowledge, attitudes and practices (KAP) with respect to COVID-19. Participants' demographic characteristics are recorded and analyzed. The study is conducted during the global outbreak of COVID-19.

Results Among the 706 participants, more than 85% of respondents are aware of the main symptoms of COVID-19 infection and 56.2% know that the virus can be transmitted from ill to healthy persons even without fever symptoms. The overall achieved knowledge score towards the disease is about 60% while attitudes and practices score higher at 63.5% and 73.75%, respectively. The results from multiple linear regression indicate that lower knowledge scores are significantly associated with lower education level ($P<0.05$), whereas poor preventive practices are common among male, young and unemployed participants with significance levels of $P<0.01$, $P=.000$, $P<0.01$, respectively.

Conclusion The findings of this study suggest that Syrians demonstrate modest knowledge, attitudes and practices towards COVID-19 at the time of its global outbreak. Efforts should be directed towards raising Syrians awareness of the disease to improve their practices in the current COVID-19 pandemic, as well as for future epidemics.

Background

Since the discovery of the novel coronavirus disease 2019 (abbreviated as COVID-19) in China in December 2019, the disease has spread quickly across the globe. Despite the lockdown measures adopted by the Chinese authorities, virus positive cases were reported in many other countries. In response to this serious situation, the World Health Organization declared COVID-19 as a pandemic (1). Despite its strong foothold in the region, particularly in Lebanon, Jordan, and Iran, the spread of COVID-19 in Syria was late. The first COVID-19 laboratory-confirmed case was reported on 22 March (2), with the first fatality reported a week later (3). The disease has spread quickly, and by July 0, 2020, there were 328 laboratory-confirmed cases and 10 deaths. Case counts come only from data provided by the Syrian Ministry of Health, because COVID-19 tests are centrally carried out by the Public Health Laboratory in Damascus.

There are some concerns and suspicions on the accurateness and validity of these figures. This is partially due to limited testing capacity of COVID-19 owing to limited resources and sanctions imposed on Syria (4). Syrian health authorities used purchased and gift kits to conduct approximately one hundred tests daily in Damascus (5) that reached around 2.700 tests as of May 8 (6). Moreover, many cases are probably not reported because they have not been formally diagnosed. In addition, only people who show

clear symptoms or have contact with confirmed cases or deaths are tested, whereas asymptomatic people are not at all tested.

Given the speed with which COVID-19 overtakes even at the most sophisticated health systems in many developed countries, COVID-19 is expected to be of a great challenge to the Syrian war-torn health system. The World Health Organization warned that Syria is at high risk of a major outbreak because of its fragile health system aggravated by the lack of sufficient equipment (7) and the absence of adequate health care workers. In 2018, the Syrian government spent less than one percent of its total government expenditure on health (9), which is among the lowest in the region. The UN reports stated that around 70% of the Syrian health workers had left the country as migrants or refugees (8). The number of beds is disproportionately distributed between cities and among private and government hospitals with an average number of population of 699 per bed (9). The total number of intensive care unit (ICU) beds is approximately 650 in hospitals all over Syria (excluding the city of Idlib) (8). Although private hospitals provide relatively better healthcare services compared to public hospitals, they suffer of similar shortages and problems as government hospitals. Consequently, Syria does not have adequate infrastructure or personnel to hospitalize high numbers of infected people.

The Syrian government has imposed similar measures to those adopted by other countries to stem the spread of the disease. That is, on March 24, a curfew was declared from 6 pm to 6 am, in addition to the closure of shops, markets, parks, and public transport. Classes at schools and universities were curtailed, travel between cities was banned, and all incoming and outgoing flights were also suspended. In addition, lockdown was imposed on areas where confirmed or suspected infections or deaths were reported. On May 26, the government decided to gradually loosen curfew restrictions in order to bring people back to work and salvage the economy.

Summary of the Existing Literature

Good knowledge, attitudes and practices (KAP) among the public are essential for successful control and outbreak prevention of pandemics. Particularly, the literature on severe acute respiratory syndrome (SARS) in 2003 ascertained that personal knowledge and perceptions play important role in subsequent behavior change (10, 11, 12). High-perceived threat of the disease led to higher rate of positive behavior change (13, 14). Similarly, KAP factors also influenced both self- and community protective behavior in an anticipated H5N1 epidemic (15), Swine Flu (16, 17), and H1N1 (20, 21), and COVID-19 (22, 23, 24).

In order to introduce effective control measures against pandemics, it is vitally important to investigate public knowledge about the disease and their commitment to these control measures. This study, conducted in the Syrian territories, aims to assess the public understanding towards COVID-19, and investigate their attitudes and practices during COVID-19 quarantine. In Syria, there is no published study of public knowledge, attitude, and behavior regarding any pandemic disease neither before nor after the crisis.

Aims

This paper aims at investigating the knowledge, attitudes and practices of Syrians towards COVID-19 pandemic in a post-conflict context. While the Syrian health authorities aim their control measures will curtail the spread of the pandemic, their effectiveness will depend on the individual and societal awareness and practices. Understanding how Syrians perceive the disease and their attitudes and practices towards it helps the Syrian health authorities formulate suitable measures to counter COVID-19 spread. It is interesting to find out how similar measures can be perceived differently in different contexts; particularly in the Syrian special case where underdeveloped health system associates conflict.

Materials And Methods

Design and Settings

To measure the KAP towards COVID-19 of Syrians, a web-based questionnaire was prepared and used for data collection from 5 April to 9 April, during the second week after the lockdown of the Syrian territories. The questionnaire was posted on social media platforms (Facebook and WhatsApp). Privacy of the original post was set as “public” to enable more people to participate in the questionnaire.

Participants

Persons who were aged 16 years or more, agreed to participate in the study. Although the target participants were local Syrian citizens, Syrians who reside outside Syria were also eligible for this survey. However, the latter answers were excluded because this study focuses only on people reside in Syria.

Questionnaire

The questionnaire was based on a similar questionnaire on COVID-19 (22) and other questionnaires on H1N1 (17, 18), and Severe Acute Respiratory Syndrome, SARS (19) as well as concepts theories of health behaviors (25). The questionnaire takes about 5 minutes to complete. This questionnaire collected basic demographic data on age, gender, education level, employment status, and residents above 60 or younger than 16 in the house. Questions on knowledge aimed to assess general knowledge on clinical presentations of COVID-19 and the severity of the disease (Q1-Q6). These questions were answered as on a yes/no basis with an additional “maybe” option. Questions on attitudes (A1-A4) were about the agreement with the measures adopted to prevent the spread of the pandemic COVID-19 and the confidence in winning the battle against COVID-19. Questions on practices were used to assess the individuals’ compliance and behaviors during the quarantine (P1-P8). A summary of questions assessed are shown in Table 1.

Table 1 Summary of Questions for Knowledge, Attitudes and Practices towards Pandemic COVID-19.

Questions

Knowledge

Q1. The main clinical symptoms of COVID-19 are fever, fatigue, dry cough, and myalgia (85.1%)

Q2. Symptoms of COVID-19 are similar to the common symptoms of flu (55.2%)

Q3. COVID-19 infection causes severe symptoms in all patients (22.7%)

Q4. Persons with COVID-2019 can infect the virus to others when a fever is not present (56.2%)

Q5. COVID-19 infection causes serious disease (44.6%)

Q6. Although there is no proven cure for Corona disease, the available treatments lead to recovery (35.3%)

Attitudes

Do you think school closure is an effective way for preventing the spread of the disease? (91.5%)

Do you think curfew is effective way of preventing the spread of the disease? (78.2%)

Do you think that COVID-19 will spread widely in Syria? (15.4%)

Do you think that COVID-19 will be successfully controlled? (60.1%)

Practices during quarantine

Avoidance behavior

P1. Avoid crowded places (92.5%)

P2. Avoid travel by taxi (80%)

P3. Avoid shaking hands (82%)

Personal Habits Practice

P4. Practice better hygiene than before (90.8%)

P5. Use disinfectants (ethanol) (73.5%)

P6. Wear facemask (27.9%)

P7. Wash hands more often (95.8%)

P8. Have a balanced diet (47.9%)

Statistical Analysis

The calculation of the required sample size was done by assuming confidence level of 99%, and a confidence interval of 5, suggests the need for 666 participants. To determine the scores for each

individual question, responses were recorded as 0 for an undesired response and 1 for a desired response. Frequencies of the desired answers of knowledge, practice and attitudes were computed. Independent sample *t* test and one-way analysis of variance (ANOVA) test of significance were used to examine the relation between the demographic characteristics and the means of knowledge, attitudes and practice. In multiple linear regression, significant demographic variables were used as independent variables to identify factors associated with poor knowledge. The same method was used to identify factors associated with poor attitudes and practices. Unstandardized regression coefficients β were shown to quantify the association between variables and poor KAP scores. A Pearson correlation test was used to evaluate the possible association between knowledge and attitudes, knowledge and practices, and practices and attitudes. All statistical analysis were performed using IBM SPSS 24for Windows, with level of significance set at 5%.

Results

A total number of 825 participants completed the survey questionnaire. After excluding 119 respondents who live outside Syria, the final sample consisted of 706 participants. Among the final sample, 444 (62.9%) were female, 405 (57.4%) aged between 16-29 years, 642 (90.9 %) were either at higher education level or above, 316 (44.8%) were employed in private or public occupations and 516 (73.1%) had residents in their houses aged above 60 and/ or younger than 6 years. Demographic characteristics are shown in Table 2.

This study shows that the Syrians' Basic knowledge of COVID-19 is moderate. The correct answer rates of the 6 questions on the COVID-19 knowledge questions ranged between 22.7-85% (Table 1). The mean knowledge score was 3.54 (SD: 1.207, range: 0-6) suggesting an overall 59% (3.54/6*100) correct rate on this knowledge test. Knowledge scores significantly differed across age groups ($P<0.05$), education levels ($P=0.001$), and occupations ($P<0.05$) (Table 2). Knowledge regarding COVID-19 symptoms was the highest (85.1%), whereas perception of the severity of COVID-19 was the lowest (22.7%). Having a child under 16 or aged persons above 60 did not make a statistical difference in the COVID-19 knowledge. Furthermore, no statistical difference was found between genders with regard to Knowledge scores (Table 2).

Table 2 Demographic characteristics of participants and the score of COVID-19 knowledge by demographic variables

Characteristics		Number of participants (%)	Knowledge score (mean ± standard deviation)	P value
Gender	Male	262(37.1)	3.46±1.251	>0.05
	Female	444(62.9)	3.59±1.179	
Age-group (years)	16-29	405(57.4)	3.43±1.166	<0.05
	30-49	204(28.9)	3.71±1.294	
	50+	97(13.7)	3.62±1.150	
Education	Elementary School	3(0.4)	2.00±1.732	0.001
	High school	61(8.6)	3.08±1.269	
	Degree	642(90.9)	3.59±1.187	
Occupation	Unemployed	62 (8.8)	3.54±1.363	<0.05
	student	253(35.8)	3.39±1.106	
	Free lancer	75(10.6)	3.76±1.250	
	Employed	316(44.8)	3.62±1.232	
Residents above 60 or younger than 16 in the house	No	190(26.9)	3.52±1.120	>0.05
	Yes	516(73.1)	3.55±1.238	
Knowledge of COVID-19 score		706 (100)	3.54 ±1.207	

For the attitudes, the majority of respondents believed that school closure and curfew were effective at controlling the spread of COVID-19; scores were 91.5% and 78.2%, respectively (Table 1). Only 15.4% of the respondents expected the pandemic to spread in Syria, whereas about 60% had confidence that COVID-19 will eventually controlled. Attitude scores were significantly different between males and females ($P<0.05$) (Table 3).

In addition, the mean practice score was 5.90 (SD: 1.529, range from 0-8). The highest practice score was 75% (6/8*100) in participants aged over 50 years. Practice scores varied significantly across gender ($P<0.05$), age groups ($P=0.01$), education levels ($P=0.015$), occupations ($P<0.05$), and according to knowledge score ($P=0.000$) (Table 4). More than 90% of participants avoided crowded places and practiced better hygiene after than before the quarantine, whereas only 27.9% of participants wore facemask during the quarantine (Table 1).

Table 3. Attitudes towards COVID-19 by demographic variables

Characteristics		Number of participants (%)	Practice score (mean ± standard deviation)	P value
Gender	Male	262(37.1)	2.54±.878	<0.05
	Female	444(62.9)	2.40±.778	
Age-group (years)	16-29	405(57.4)	2.49±.779	>0.05
	30-49	204(28.9)	2.40±.851	
	50+	97(13.7)	2.40±.909	
Education	Elementary School	3(0.4)	2.33±.577	>0.05
	High school	61(8.6)	2.38±.933	
	Degree	642(90.9)	2.46±.809	
Occupation	Unemployed	62 (8.8)	2.29±.876	>0.05
	Student	253(35.8)	2.48±.769	
	Free lancer	75(10.6)	2.55±.827	
	Employed	316(44.8)	2.44±.843	
Residents above 60 or younger than 16 in the house	No	190(26.9)	2.49±.761	>0.05
	Yes	516(73.1)	2.44±.840	
Attitude score		607(100)	2.45±.818	

Table 4. The score of practices towards COVID-19 by demographic variables

Characteristics		Number of participants (%)	Practice score (mean ± standard deviation)	P value
Gender	Male	262(37.1)	5.75±1.646	<0.05
	Female	444(62.9)	6±1.449	
Age-group (years)	16-29	405(57.4)	5.76±1.557	0.01
	30-49	204(28.9)	6.04±1.491	
	50+	97(13.7)	6.22±1.423	
Education	Elementary School	3(0.4)	5.33±2.309	0.015
	High school	61(8.6)	5.38±1.827	
	Degree	642(90.9)	5.96±1.487	
Occupation	Unemployed	62 (8.8)	5.47±1.771	<0.05
	Student	253(35.8)	5.81±1.552	
	Free lancer	75(10.6)	5.99±1.615	
	Employed	316(44.8)	6.04±1.420	
Residents above 60 or younger than 16 in the house	No	190(26.9)	5.92±1.429	>0.05
	Yes	516(73.1)	5.90±1.565	
Practice score		607(100)	5.90±1.529	

The results from multiple linear regression analysis of variables that score poor on KAP indicators show that the education level of elementary school (β : -1.698, $P<0.05$) is significantly associated with lower knowledge score, whereas females had lower attitude score (vs. males, β : -.143, $P<0.05$). Furthermore, male gender (vs. female, β : -.357, $P<0.01$) aged between 16-29 years (β : -.418, $P=.000$), and unemployed (β : -.657, $P<0.01$) were predictors of poor practice score (Table 5).

Table 5 Results of multiple linear regression on factors associated with poor COVID-19 knowledge, attitude and practice

Variable	Coefficients	Standard error	t	P
Knowledge				
Age (16-29)	-.188-	.114	-1.653-	>0.05
Education (Elementary School)	-1.698-	.695	-2.443-	<0.05
Occupation (Students)	-.125-	.117	-1.063-	>0.05
Attitude				
Gender (female)	-.143-	.064	-2.253-	<0.05
Practices				
Gender (male)	-.357-	.120	-2.972-	<0.01
Age (16-29)	-.418-	.116	-3.589-	.000
Education (elementary school)	-.445-	.881	-.505-	>0.05
Occupation (unemployed)	-.657-	.207	-3.174-	<0.01

There were positive and significant correlation between knowledge-practice, knowledge-attitudes, and attitude-practice. The correlation coefficients were (.198, .204, and .210, respectively. $P < 0.01$) as shown in (Table 6).

Table 6 correlations between scores of knowledge, attitudes and practices towards COVID-19

Variable(s)	Knowledge	Attitudes	Practices
Knowledge	1	--	--
Attitudes	.204**	1	--
Practices	.198**	.210**	1

** . Correlation is significant at the 0.01 level (2-tailed).

Discussion

This study is expected to be the first to examine the KAP towards COVID-19 among Syrians. In this predominantly female and well-educated population, the overall correct rate of around 60% on the knowledge questions, indicating that most respondents have modest knowledge about COVID-19.

The majority of the participants believed that the school closure and curfew were effective at preventing the spread of COVID-19. However, 15.4% of participants believed that the virus would spread in Syria and only 60% had confidence that COVID-19 will eventually be successfully controlled. Despite this, the practices of the Syrian residents were cautious: 92.5% avoided crowded places and shaking hands and

90.8% practiced better hygiene than before the quarantine, like washing hands and using disinfectants. Surprisingly, however, only 27.9% wore facemask when leaving homes. This study also analyses the characteristics of KAP towards COVID-19 and identified some demographic factors associated with KAP; these findings are useful for public health policy-makers and health workers to identify and target people for COVID-19 prevention and health education in the case of future outbreaks.

The finding of a modest knowledge score of COVID-19 of participants although the majority are well educated was unexpected. Their scores are lower than their counterparts in China (16) and in Iran (17) which showed an overall correct rate of 90% among the Chinese and Iranian populations, respectively. However, Syrians score higher in terms of their knowledge towards COVID-19 compared to the population of northern Thailand in the early period of the outbreak (18). In Thailand, 73.4% had poor knowledge towards COVID-19 (18). The finding of a moderate knowledge score probably because Syrian residents have not experienced previous pandemics such as H1N1 or SARS. In addition, this survey was conducted during the very early stages of COVID-19 in Syria when the country was not seriously affected by the outbreak, with the number of laboratory confirmed COVID-19 cases being only 19 (Ministry of Health) the lowest among other countries in the region. This underlines the importance of the Syrian health authorities providing consistent clear updates and information about the emerging virus as well as the need to continuously assess whether their messages are being understood within the community.

Since the World Health Organization (WHO) declaration of the COVID-19 outbreak to be pandemic on March 12, 2020 (20), countries around the world had implemented different measures to prevent further spread of the virus. Many countries had applied school closure as a response to COVID-19 according to UNESCO (21). Other restrictions also included curfews and stay-at-home orders. Similarly, the Syrian government has also closed schools and enforced curfew based on time while allowing some essential businesses to open. The vast majority of Syrians included in this survey believed that these measures were effective against COVID-19.

Furthermore, compared to KAP studies in China and Iran, Syrians under study were less optimistic about the disease control than the Chinese (16) and Iranians (17). The underlying reason could be related to the quality of the Syrian health care system that has been seriously affected by the nine-year war, and further deteriorated due to sanctions (22). Second, efforts to aid the COVID-19 control were limited due to shortages of medical workers and medical materials (23).

Although attitudes towards COVID-19 were unassertive, Syrians took precautions to prevent infection by COVID-19: not going to crowded places and practicing better hygiene with an overall practice score of about 74%. This may be attributed to their doubts on the ability of the health care system to accommodate them if they are infected. However, this score was lower than other practice scores towards COVID-19 among Chinese (16) and Iranians (17). Unfortunately, the present study showed that only approximately 30% wore facemasks when going outside home. This could be primarily attributed to the unavailability of quality facemasks and the surge in their prices which increased by 6 to 10 folds particularly during the time of this survey.

The potentially poor documented practices were associated with younger age males. This is in agreement with the findings of similar COVID-19 studies in China (16) and Iran (17). The finding that women are more likely to practice non-pharmaceutical health behavior (e.g., hand washing) is also consistent with a previous study on SARS pandemic (24). Furthermore, this study is on line with previous evidence that late adolescents were also more likely to engage in risk taking behaviors (25). It is not surprising that unemployment is also associated with poor practices because have less exposure to the COVID-19 virus. Therefore, they are less adherent to health safety measures of keeping social distance and wearing facemasks.

This study provides evidence on the positive and significant correlations between knowledge-attitudes, knowledge-practice, and attitudes- practices among the respondents (Pearson correlation coefficient approximately 0.2). This reaffirms that better knowledge and attitudes associate with better practices. Similar levels of association between these variables were documented in a previous study on H1N1 pandemic (26). Therefore, health authorities should not only focus their efforts on improving health services but also give equal importance to raising people awareness and knowledge towards COVID-19.

Conclusion

In summary, this study provides insights into Syrians' knowledge, attitudes and practices towards COVID-19 during the quarantine in post-conflict context. This is expected to help Syrian health authorities formulate suitable measures to counter the spread of current COVID-19 and develop best practices for future epidemics. Yet, the successfulness and impact of current measures in controlling of COVID-19 are still unclear, and constitute venues for future research.

Limitations in the study include the methodological limitations of internet-based survey. First, people who do not have internet access or Facebook/whatsApp may be missed. Second, the sample population had respondents with higher education level compared to other levels. This may overestimate the overall results, as these groups are probably more knowledgeable and have better practices towards pandemics in general. Third, it could have been more informative to divide the higher education level into undergraduates, graduates and master/Ph.D holders.

The results of this study may not be generalizable to other countries or cities that have experienced previous severe epidemics such as SARS. This study presents a unique reference for pandemic cautious behavioral response in post-conflict context. Nevertheless, it was challenging to finish data collection within a short period (5 days) before lockdown measures were eased off.

Abbreviations

COVID-19: Coronavirus disease 2019.

Declarations

Ethics approval and consent to participate

The present study was approved by the ethics committee at the Faculty of Pharmacy and the Faculty of Pharmacy council at Al-Rasheed International University for Science and Technology. The purpose of this research was explained to all participants and were assured of confidentiality by the researcher. The survey also include an informed consent form, which allows participants to tick to confirm their consent. Completion of this form followed by completion of the survey shows that participant consents to the study. Participation in the study questionnaire is optional and a statement in the introductory section of the questionnaire clearly indicates the voluntary nature of participation, and declaration of anonymity and confidentiality and that the study results will be used for research purposes only.

Consent for Publication

Not applicable

Availability of data and material

The data of this article are attached as a supplement file.

Competing interests

I know of no conflicts of interest associated with this publication, and there has been no significant financial support for this work that could have influenced its outcome.

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