

Lessons to be Learned: The Knowledge, Attitudes, and Practices of Turkish People towards the COVID-19 Pandemic

Abstract

Background: The world experienced the greatest pandemic of the 21st century with the emergence of a new and readily transmissible the coronavirus disease. Understanding knowledge, attitudes, and practices (KAP) of the public towards the pandemic is an essential part of developing effective preventive strategies. **Aim:** The objective of this study was to investigate the knowledge, attitudes, and practices (KAP) concerning the coronavirus (COVID-19) among population in Istanbul. **Methods:** This is a cross-sectional and multi-stage, stratified random sampling based on multi-center population of Istanbul. A total of 5,414 persons were contacted and 4361 participants (80.5%) gave consent. The data were analyzed using descriptive and multiple regression analyses. **Results:** There were significant differences between low education and high educational level with respect to age groups, gender, occupation, income, residence, number of rooms and family members ($P < 0.001$). Responses concerning knowledge of COVID-19 indicated that subjects with high education level were significantly higher regarding knowledge of the signs and symptoms of COVID-19 and methods of detecting COVID-19 respectively. Majority of the participants consider COVID-19 risk is higher than AIDS or Cancer (75.8% of low education vs. 67.2% of high education level ($P < 0.001$)). Multivariate stepwise regression analysis revealed that monthly income status ($P < 0.001$), appropriate method of detecting COVID-19 ($P < 0.001$), occupational status ($P < 0.001$), medical mask prevent against COVID-19 ($P < 0.001$), eating or contacting wild animals ($P < 0.001$), isolation and treatment of people reduce risk ($P < 0.001$), isolation 14 days ($P < 0.001$), avoid going to crowded places such as train-metro, bus, restaurants and shopping ($P = 0.003$), COVID-19 spreads via-respiratory droplets ($P = 0.004$), afraid of travel ($P = 0.026$) were significantly associated with COVID-19 knowledge. **Conclusions:** The current study results revealed that the educational level and occupation especially sedentary are correlated positively with knowledge, attitude and practices. This finding is not surprising since higher education levels and professional status are associated with good KAP in most epidemic diseases including COVID-19. Nevertheless, the recent experience with COVID-19 has provided lessons on strategy and policy making.

Keywords: COVID-19, Istanbul, KAP study, pandemic, public health, surveys

Introduction

The world experienced the greatest pandemic of the 21st century with the emergence of a new and readily transmissible disease, the coronavirus, first detected on December 12th, 2019 in Wuhan, China^[1] It is a viral disease caused by Severe Acute Respiratory Syndrome Corona virus 2 (SARS-CoV-2).^[1-4] The main clinical symptoms of COVID-19 include fever, dry cough and shortness of breath or difficulty breathing.^[1-6] The World Health Organization (WHO)^[2,6] declared COVID-19 to be a pandemic on March 11th, 2020^[2,7] since then, the virus has spread to more than 210 countries and territories.

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Evidence reveals that the virus is spread primarily among people who are in close contact with one another through respiratory droplets, coughs or sneezes. Some unprecedented measures have been adopted to control the COVID-19 transmission in most countries.^[7-13] The fight against COVID-19 is still continuing worldwide with over 130 million infected people and nearly 2,9 million deaths.^[6] The COVID-19 risk is greater amongst elders, children, transplant recipients taking immunosuppressive drugs, and patients with the presence of comorbidities like lung diseases, cardiovascular diseases, hypertension, diabetes mellitus, and cancer.^[1,4,12]

Moreover, the social and economic impact of the outbreak is noticeable.

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Indeed, COVID-19 has become an economic burden and psycho-social problem.^[8,13-16] Accordingly, the rapid growth of the COVID-19 world-wide calls for rapid assessments of the population's perceptions by using the KAP surveys.^[8,13,14,17] The findings obtained from KAP surveys will play an essential role in determining effective preventive strategies for public health against the pandemic. The objective of this study was to conduct the KAP survey concerning COVID-19 amongst the general adult population of Istanbul, Turkey's largest city.

Methods

This study was conducted in Istanbul, a transcontinental city located in Eurasia. This is a cross-sectional multi-center based survey among the Istanbul urban and rural residential population Istanbul consist 16 million people (50.1% males and 49.9% females) and 4 million migrant foreigners. Around 70% of the population considered more than 20 years old. Sample size formula ($\text{Sample Size } n = N * [Z^2 * p * (1-p)/e^2] / [N - 1 + (Z^2 * p * (1-p)/e^2)]$) and calculation is based on the following parameters: margin error = 1.75%, $Z = \text{confidence level} = 99\%$ (Istanbul population included only 12 million as Turkish citizens), sample proportion likely to be considered $P = 50\%$. Finally, computed sample size needed to be 5,414 subjects.

A pilot study conducted on 180 individuals was approached to check the reliability of the questionnaire. Based on the results of the pilot study, modifications have been applied to adjust the questionnaire based on the Turkish context. The questionnaire reliability was assessed by calculating the Cronbach's alpha's coefficients, which were acceptable for the three dimensions of the questionnaire (knowledge: Cronbach's alpha = 0.76, attitude: Cronbach's alpha = 0.81 and practices: Cronbach's alpha = 0.79).

The KAP study questionnaire based on geographical districts allocation of mapping i.e., stratification by urban and rural and by East, West, North, South and Central residential location of Istanbul and each residential location assigned equal proportional 1083 subjects. A multi-stage a total of 5,414 persons were approached during March to June, 2020, and 4,361 (80.5%) completed the questionnaire. Also, participants response rate were obtained for each site obtained as follows: Central (86.4%), East (76.1%), North (75.2%), South (76.6%) and West (88.3%), respectively.

The COVID-19 knowledge questionnaire was developed by the authors. The questionnaire consists a total of 44 questions divided into four sections including socio-demographic information of participants, knowledge of COVID-19, attitudes towards COVID-19 and practices of precautionary measures in response to COVID-19. The education level was categorized as low education (primary, secondary and high school) and high education level (2 years university, university degree, MSc and PhD degree). The questionnaire

was designed on a true/false option basis. A correct answer was assigned 1 point, and false was assigned 0 points. The questionnaire was filled by the participants and all participants provided verbal informed consent prior to the collection of data with the knowledge they could refuse to answer any question, withdraw from the survey at any point, and that all data would remain confidential. The Cronbach's alpha coefficient of the instrument was 0.85 in the present study.

Data were analyzed using the Statistical Package for Social Sciences (SPSS, version # 25) software. Student-t test was used to determine the significance of differences between mean values of two continuous variables. Chi-square analysis was performed to determine the significance of differences between two or more of categorical proportions. Multivariate stepwise regression analysis was performed to assess the relationship between dependent and independent variables and to adjust for potential confounders and orders the importance of contributing factors (determinants) for the knowledge and practice of COVID-19. All statistical tests were two-sided and $P < 0.05$ was considered statistically significant.

Results

Table 1 presents the socio-demographic characteristics of the subjects surveyed concerning the term 'COVID-19 by educational level. There was a significant difference between low education and high educational level with respect to age groups, gender, occupational status, monthly income, place of residence, number of rooms and family members ($P < 0.001$). Internet was the main source of knowledge (81.1% of low education vs. 90.5% of high educational level, $P < 0.001$), followed by media (58.0% of low education vs. 59.0% of high educational level, $P = 0.050$).

Table 2 gives the respondent's knowledge of COVID-19 signs and symptoms by educational level among the studied subjects. Responses concerning knowledge of COVID-19 indicated that participants who have high education level demonstrated significantly better knowledge at all items compared to those who have low education level ($P < 0.001$). There were statistically significant differences between low education (8.7 ± 2.3) compared to high educational level (9.1 ± 12) ($P < 0.001$) regarding knowledge of COVID-19 signs and symptoms. The majority of the participants consider antibody tests, then computed tomography, and blood analysis as the best methods of detecting COVID-19 ($P < 0.001$), respectively.

Table 3 presents the attitude, behavior and practices of subjects towards COVID-19 by educational level. Majority of the respondents were afraid to travel due to COVID-19 ($P < 0.001$). Majority responded washing hands against COVID-19 risk ($P = 0.002$), Most of the respondents believe that parents are responsible for

Table 1: Socio-demographic characteristics of subjects surveyed concerning COVID-19 by educational level

Variables	Low Education n=1,891 n (%)	High Education n=2,470 n (%)	Total n=4,361 n (%)	P, Significance
Age group				
<30	482 (25.5)	1062 (43.0)	1544 (35.4)	
30-39	571 (30.2)	569 (23.2)	1140 (26.1)	
40-49	530 (28.0)	493 (20.0)	1023 (23.8)	P<0.001
50-59	195 (10.3)	236 (9.6)	431 (9.9)	
≥60	113 (6.0)	110 (4.5)	223 (5.1)	
Gender				
Males	1289 (68.2)	1490 (60.5)	2779 (63.7)	P<0.001
Females	602 (31.8)	980 (39.7)	1582 (36.3)	
Occupational status				
Sedentary	86 (4.6)	860 (34.8)	946 (21.7)	
Businessman	116 (6.1)	134 (5.4)	250 (5.7)	
Manual Labor	335 (17.7)	55 (2.2)	390 (8.9)	
Student	149 (7.9)	587 (23.8)	736 (16.9)	
House Wife	223 (11.8)	139 (5.6)	362 (8.3)	P<0.001
Police or/Military	116 (6.1)	34 (1.4)	150 (3.4)	
Unskilled	78 (4.1)	135 (5.5)	213 (4.9)	
Administrative/Clerical	670 (35.4)	467 (18.9)	1137 (26.1)	
Retired/Not working	118 (6.2)	59 (2.4)	177 (4.1)	
Monthly income status				
Low	930 (49.2)	848 (34.3)	1778 (40.8)	
Middle	636 (33.6)	745 (30.2)	1381 (31.7)	
High	268 (14.2)	710 (28.7)	978 (22.4)	P<0.001
Very High	57 (4.6)	167 (6.8)	224 (5.1)	
Place of residence				
Urban	1663 (87.9)	2274 (92.1)	3937 (90.3)	P<0.001
Semi-Urban	2282 (12.1)	196 (7.9)	424 (9.7)	
Number of rooms				
≤3 rooms	1241 (67.3)	1353 (55.3)	2594 (60.5)	P<0.001
3 rooms	602 (32.7)	1092 (44.7)	1694 (39.5)	
Number of family members				
≤5 peoples	583 (30.8)	1126 (45.6)	1709 (39.2)	P<0.001
5 peoples	1308 (69.2)	1344 (54.4)	2652 (60.8)	

teaching and guiding their children ($P < 0.004$). Further, majority of participants consider COVID-19 risk is higher than AIDS or Cancer (75.8% of low education vs. 67.2% of high education level; $P < 0.001$). Further, majority (90%) demonstrated confidence in Turkey's ability to overcome the COVID-19 pandemic. Furthermore, most respondents were satisfied with the preventive measures taken by the health authorities (87.5% of low education vs. 84.4% high educational level $P = 0.003$).

Table 4 presents multiple regression analysis to predict COVID-19 recognition and knowledge. As can be seen from the table main predictor items were: monthly income status ($P < 0.001$), appropriate method of detecting COVID-19 ($P < 0.001$), occupational status ($P < 0.001$), medical mask prevent against COVID-19 ($P < 0.001$), COVID-19 can be contracted by contact with or eating wild animals ($P < 0.001$), isolation and treatment of people reduce risk ($P < 0.001$), individuals should

avoid crowded places such as train, metro, bus stations, restaurants and shopping malls ($P = 0.003$), COVID-19 spreads via respiratory droplets ($P = 0.004$), afraid of travel due to COVID-19 ($P = 0.026$) were significantly associated with COVID-19 knowledge after adjusting for age and gender.

Table 5 shows multiple regression analysis to determine preventive practices against COVID-19. As can be seen from the table main preventive practices were: wearing a mask when leaving home ($P < 0.001$), seeking medical advice on COVID-19 from the health authorities ($P < 0.001$), avoiding interacting with travelers ($P < 0.001$), believing in herbal medicine use as a treatment and prevention against COVID-19 ($P < 0.001$), keeping physical distance prevent against COVID-19 risk ($P = 0.002$), washing hands against COVID-19 risk ($P = 0.002$), avoid interaction with people coming from epidemic area of COVID-19 ($P = 0.010$), avoiding going to crowded places ($P = 0.016$) were

Table 2: General knowledge of signs and symptoms regarding COVID-19 by educational level among studied subjects

Items	Low education n=1,891 Yes n (%)	High education n=2,470 Yes n (%)	Total n=4,361 Yes n (%)	P
Knowledge of Signs and Symptoms				
1. The clinical symptoms of COVID-19 are fever, fatigue and dry cough.	1526 (80.7)	2363 (95.7)	3889 (89.2)	0.001
2. Do you think that a cold, a runny nose, and sneezing are less common among infected with COVID-19?	1082 (57.2)	1963 (79.5)	3045 (69.8)	0.001
3. Do you agree that there is no effective treatment/vaccine for COVID-19	1710 (90.4)	2307 (93.4)	4017 (92.1)	0.001
4. The elderly, people with chronic illnesses, diabetes, hypertension and obese, could be at risk.	1452 (76.8)	2000 (81.0)	3452 (79.2)	0.001
5. COVID-19 can be contracted by contact with or eating wild animals	1203 (63.6)	1323 (53.6)	2526 (57.9)	0.001
6. Do you think that people with COVID-2019 cannot pass on others	586 (31.7)	503 (20.4)	1089 (25.0)	0.001
7. Do you agree that COVID-19 can spread via respiratory droplets from infected individuals?	1651 (87.3)	2325 (94.1)	3976 (91.2)	0.001
8. Wearing medical masks can prevent against COVID-19	1721 (91.0)	2144 (86.8)	3865 (88.6)	0.001
9. Do you think that children do not need to take action against COVID-19	688 (36.4)	546 (22.1)	1234 (28.3)	0.001
10. Do you think that individuals should avoid crowded places such as train, metro and bus stations to prevent infection by COVID-19?	1742 (94.6)	2345 (74.9)	4087 (93.7)	0.001
11. The best treatment for individuals infected with COVID-19 is isolation	1732 (91.6)	2345 (94.9)	4077 (93.5)	0.001
12. the COVID-19 isolation period is considered strictly 14 days.	1750 (92.5)	2352 (95.2)	4102 (94.1)	0.001
COVID-19 Knowledge Score	Mean±SD	Mean±SD	Mean±SD	P
Total score for COVID-19 knowledge	8.7±2.3	9.1±12	9.0±1.4	0.002
Appropriate methods for detecting COVID-19				
1. Computed tomography	1354 (71.6)	1924 (77.9)	3278 (75.2)	0.001
3. Blood Analysis	1499 (79.3)	1676 (67.9)	3175 (72.9)	0.013
6. Antibody test	1365 (72.2)	2068 (83.7)	3433 (78.7)	0.001

significantly associated with COVID-19 practice after adjusting for age and gender.

Discussion

The management and prevention of COVID-19 have become major public health problems, and studies of the knowledge and attitudes related to COVID-19 among the public are crucial for providing better insight about the disease and the development of preventive strategies for planning and health promotion programs^[17] To the best of our knowledge, this is the first KAP survey of the disease conducted amongst the Turkish population, and the findings provide new insight into how the Turkish population perceive and are coping with the COVID-19. Hand cleaning with soap and sanitizer, and mouth and nose coverage with masks are indispensable^[8,12] and the present study showed that the majority of participants practiced washing their both hands with soap after returning from crowded places. Indeed, the overwhelming majority report avoiding crowded places and wearing masks when going out, and these findings are consistent with the findings of a recent survey in China.^[14]

It should be noted that most of the COVID-19 pandemic guidelines in Turkey are based on the Centre for Disease Control (CDC)^[3,18] and WHO^[2,6] In the current survey, where almost 90% of the population reported wearing medical masks and gloves when leaving home, greater

control should be brought about by this behavior on the incidence of infections from COVID-19, which is consistent with the previous reported studies.^[14,19,20] Difficulties faced in the efforts to stop the progression of this pandemic in other parts of the world has been a combination of several factors including lack of testing, economic fears, lack of interruption of social motility due to travel to touristic destinations and fear of social instability.^[10,14-16]

According to the present study, knowledge age groups, marital status, occupation and economic status results are consistent with the Pakistani survey.^[5] Results of knowledge outcome of our study are consistent with study in China where residence place, age groups, marital status, education and occupation significantly differed with the educational level.^[14] The Study conducted in Ethiopia indicated that age, marital status, educational level, residence, monthly income, knowledge, gender, and attitude were factors significantly associated with practice.^[12] Those studies are confirmative with the current study conducted in Turkey.

Recently, in India,^[19] a total of 1574 participants took part in a KAP study, 61% of whom reported knowing details of the COVID-19, 89% reported knowing the ways in which the corona virus was transmitted, 40% felt that COVID-19 is a serious disease, 87%, reported following advice and washing hands with soap and water regularly, 73% reported regularly wearing masks, and 87% reported maintaining social distancing. These findings

Table 3: Attitude, behaviors and practices concerning COVID-19 by educational level

Items	Low education n=1,891 Yes n (%)	High education n=2,470 Yes n (%)	Total n=4,361 Yes n (%)	P, significance
Attitude and Behaviors				
1. Do you believe that COVID-19 will finally be successfully controlled?	1658 (87.7)	2191 (88.7)	3849 (88.3)	0.297
2. Are you afraid to Travel due to COVID-19?	1652 (87.4)	2117 (85.7)	3769 (86.4)	0.117
3. Are you afraid of contacting people affected with COVID-19?	1644 (86.9)	2037 (82.5)	3681 (84.4)	0.001
4. Do you feel that parents are responsible for teaching and guiding their children?	1705 (90.2)	2289 (92.7)	3994 (91.6)	0.004
5. Are you satisfied with the preventive measures taken by the health authorities?	1655 (87.5)	2084 (84.4)	3739 (85.7)	0.003
6. Will you report to the medical authorities if symptoms related to COVID-19 are found in the community?	1711 (90.5)	2271 (91.9)	3982 (91.3)	0.050
7. Do you think that risk of COVID-19 is higher than AIDS or Cancer?	1434 (75.8)	1661 (67.2)	3095 (71.0)	0.001
8. Do you have a full trust that Turkey is able to overcome the pandemic of the COVID-19?	1715 (90.7)	2255 (91.3)	3970 (91.0)	0.488
Practices				
1. Recently, when you left home, did you wear medical masks and gloves to prevent against COVID-19?	1720 (91.0)	2184 (88.4)	3904 (89.5)	0.007
2. People should wash their both hands by soap after coming from crowded places.	1741 (92.1)	2339 (94.7)	4080 (93.6)	0.001
3. Do you think that eye, nose and mouth can be affected by the COVID-19?	1771 (93.7)	2365 (95.7)	4136 (94.8)	0.002
4. Are you taking advice from health professionals about the COVID-19?	903 (47.8)	1272 (51.5)	2175 (49.9)	0.015
5. Do you think that Turkey needs extensive and frequent health education programs on the COVID-19?	1548 (81.9)	2087 (84.5)	3635 (83.4)	0.022
6. Do you avoid interacting with travelers coming from affected areas?	1696 (89.7)	2299 (93.1)	3995 (91.6)	0.001
7. Do you read and obey official public guidelines and announcements produced in your country about COVID-19?	1660 (87.8)	2282 (92.4)	3942 (90.4)	0.001
8. People should strictly avoid going to crowded places such as shopping malls and endemic effected places to prevent the infection by COVID-19.	1772 (93.7)	2386 (96.6)	4158 (95.3)	0.001
9. Do you consider keeping a physical distance as isolation?	1738 (91.9)	2330 (94.5)	4068 (93.3)	0.002
10. Do you believe in herbal medicine and treatment of COVID-19 with honey, lemon, mint, selenium, Black seed oil, anise seeds, cinnamon and ground cloves?	1081 (57.2)	1322 (53.5)	2403 (55.1)	0.017

Table 4: Multivariate stepwise regression analysis to predict knowledge of COVID-19 (n=4,361)

Independent Variable	Regression coefficient	Standard Error	t-test	P, Significance
Monthly income status	0.109	0.008	14.483	<0.001
Appropriate method of detecting COVID-19 is antibody test	-0.114	0.017	-6.856	<0.001
Occupation status	-0.015	0.008	-6.405	<0.001
Medical mask prevent against COVID-19	0.096	0.021	4.518	<0.001
Eating or contacting wild animals is risk for COVID-19	0.056	0.014	3.891	<0.001
Isolation and treatment of people reduce the spread of COVID-19	-0.117	0.031	-3.767	<0.001
Avoid using crowded transportation such as train, metro, and buses	-0.094	0.031	-2.983	0.003
COVID-19 spreads via respiratory droplets	-0.072	0.025	2.888	0.004
Afraid of travel due to COVID-19	0.045	0.020	2.226	0.026

are consistent with the results of our study in Istanbul. In a similar study in Philippines^[20] 89.5% of respondents identified coughing and sneezing as transmitting the virus, and hand washing was identified by 82.2% as a preventive measure against the virus. But, in both these studies, the importance of social distancing and avoiding crowds were identified by only 32.4% and 40.6%, respectively, which

is notably different from the KAP survey results obtained in Turkey.

As the biggest emerging pandemic of the 21st century, the COVID-19 has raised a great deal of concern and fear among governments, travelers, economists, and the general public, as well as within the medical community.^[13-16,21-23] Recently, a study conducted in Istanbul revealed a high

Table 5: Multivariate stepwise regression analysis to determine preventive practices against COVID-19 (n=4,361)

Independent Variable	Regression coefficient	Standard Error	t-test	P, Significance
Always wear a mask when leaving home	0.150	0.027	5.585	<0.001
Seeking medical advice on COVID from the health authorities	-0.059	0.015	-3.872	<0.001
Consider COVID-19 is high alert and threat disease to avoid interacts with travellers	-0.103	0.029	-3.601	<0.001
Herbal medicine use as treatment prevent against COVID-19	0.051	0.015	3.353	<0.001
Keeping physical distance prevents against COVID-19 risk	-0.095	0.030	-3.170	0.002
Regularly wash hand and face with soap against COVID-19 risk	-0.105	0.034	-3.080	0.002
Avoid interaction with people coming from epidemic area of COVID-19	-0.103	0.040	-2.574	0.010
Avoid going to crowded places such as cafes, restaurants and shopping malls	-0.072	0.030	-2.409	0.016

level of fatigue, stress and fear among the Turkish population due to COVID-19.^[22]

The CDC^[3,18] and WHO^[2,6] have urged all member states to view this latest outbreak as an opportunity to review the practices of institutions and laboratories working in response to such pandemic viruses. Accordingly, the health authorities of Turkey acted to protect the community and travelers at airports coming from affected areas. The public believed that media coverage of COVID-19 was fair, balanced and responsible in Turkish population. The large majority of participants in the present research agreed that COVID-19 will finally be successfully controlled in Turkey (90.0%), and this is similar to the national confidence observed in studies conducted in China.^[14] As part of this process, the Ministry of Health and High Commission Scientific Council in Turkey is providing health education programs through all TV channels, and these are likely to be crucial for encouraging positive attitudes and sustaining safe practices in Turkey. Unfortunately, still, there are many unknowns about COVID-19 pathology, vaccine development, and potential treatments, and our understanding of the disease continues to evolve.^[10]

The magnitude and size of the pandemic in Turkey have the lowest percentage of deaths (2,6%) despite about over 30% of the population are considered at high risk. The number of Cumulative cases is 4 million and total number of deaths over 34,200 peoples. All adults aged over 65 and those with underlying health conditions such as diabetes, stroke, cardiovascular disease, coronary heart disease, chronic respiratory disease, hypertension, cancer, obesity and smoking are all associated with an increased risk of death. It is well established that COVID-19 spread are directly linked with population knowledge, attitude and practices towards disease^[6] It is worth to report^[6] that comparison of some selected countries total confirmed deaths per million people in Turkey is lower than, USA, UK, Brazil, Russia, Spain, Italy, India, France, Iran and Germany, but it is higher than Denmark, Norway, Finland, Greece, Malaysia and Australia deaths according to the WHO situation report.^[6] Overall, the majority of the studies reported a good level of knowledge, optimistic attitude, and a good level of practice about COVID-19.^[5,8,12,13,17,19-22]

This study has some limitations. Firstly, the design of current study is a cross-sectional, which does not allow us to derive any cause-effect relation. Secondly, the KAP survey specifically did not target particular types of participant and so may not have provided the clearest responses or depictions of problems. Thirdly, assessment of knowledge, attitudes and practices towards COVID-19 may be inadequate. However, the strength of this study is that it involved a very large sample conducted in a critical period during the outbreak of the COVID-19 in Turkey, where such studies are greatly underrepresented in the literature.

Conclusions

The current study results revealed that the educational level and occupation especially sedentary are correlated positively with knowledge, attitude and practices. This finding is not surprising since higher education levels and professional status are associated with good KAP in most epidemic diseases including COVID-19. This finding indicates that preventive public health campaigns should prioritize targeting the population with low educational level. To increase good KAP of COVID-19 among the less educated population proper communication channels and strategies should be chosen considering the preferences and educational levels of this group. Nevertheless, the recent experience with COVID-19 has provided lessons on strategy and policy making. Large outbreaks of COVID-19 are being addressed across the world, but the fight is far from over.

Ethics committee approval

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MA, EM, CCB are organized study, collected data, wrote the first draft of the article, and contributed to the interpretation of the data and writing, revised critically and approved final version of manuscript. All authors approved the final version.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

MeSH terms: Adult, COVID-19, Turkey/epidemiology, Coronavirus Infections/epidemiology, Coronavirus Infections/prevention & control, Cross-Sectional Studies, Educational Status, Male, Female, Health Knowledge, Attitudes, Practice, Humans, Stepwise regression models, Masks, Occupations, Pandemics/prevention & control, SARS-CoV-2, Surveys and Questionnaires.

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Conflicts of interest

There are no conflicts of interest.

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