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RESEARCH ARTICLE

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COVID-19 and Moroccan nursing students: A multicentre cross-sectional survey on their related knowledge, attitudes and practices

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Abstract

Aim: To assess knowledge, attitudes and practices of Moroccan nursing students towards COVID-19.

Design: Cross-sectional study.

Method: Data were collected using an online questionnaire consisted of demographic characteristics and 24 items about COVID-19-related knowledge, attitudes and practices.

Results: A total of 1,216 nursing students participated in this study. About 82% of the participants reported that the COVID-19 virus spreads via respiratory droplets of infected individuals. The most clinical symptoms of COVID-19 correctly identified by participants were fever (97.6%), dry cough (92.4%), dyspnoea (82%) and fatigue (74.9%). More than 56.6% of the participants were afraid of being affected by COVID-19. Almost all participants reported that they avoid crowded places frequently. About 93.4% of the participants declared frequently wearing face mask when leaving home, and 85.5% maintained social distancing frequently. However, only 47.4% reported that they frequently washed their hands. About 51% stated that coronavirus outbreak has considerably changed their daily routines.

KEYWORDS
attitudes, COVID-19, Knowledge, nursing students, practices

1 | INTRODUCTION

Coronavirus disease 2019 (COVID-19), the infectious disease caused by the newly discovered coronavirus called SARS-CoV-2 (World Health Organization [WHO], 2020), was firstly detected in December 2019 in Wuhan, China. The World Health Organization (WHO) declared the COVID-19 outbreak as a public health emergency of international concern on 30 January 2020 (WHO, 2020).

Like many countries, the battle against the coronavirus is continuing in Morocco. Since the start of the outbreak, Morocco has adopted

many public health measures for stopping and controlling this disease (Ait Addi et al., 2020), including isolation of confirmed and suspected cases, suspension of flights to and from Morocco, travel restrictions, confinement, closure of public spaces and all schools, and wearing of the mask. Gradual deconfinement was being implemented as of 11 June 2020, and a few weeks later, the number of cases and deaths increased.

Healthcare professionals including nurses play a key role in the fight against COVID-19. They provide care for patients suffering from this highly transmittable pathogen. Good knowledge and appropriate practices about COVID-19 among healthcare professionals are necessary to protect themselves and for successful disease control and prevention (Hoe Gan et al., 2020). Moreover, the educational needs of nurses can be revealed through an evaluation of their current knowledge, attitudes and practices.

During the current COVID-19 pandemic crisis, hospitals need more assistance than ever to manage the influx of COVID-19 patients, and bringing additional skilled nurses into the workforce may support and enhance health system response to this disease. Many countries allowed nursing students and retired nurses to join the front lines in the fight against COVID-19. If the situation required it, Moroccan nursing students may be asked to participate in healthcare services and do their parts during this COVID-19 pandemic.

Many studies have been conducted around the world on knowledge, attitudes and practices (KAP) about COVID-19 among general public and health service providers (Azlan et al., 2020; Kalet et al., 2020). However, data from nursing students are extremely scarce. The aim of this study was to evaluate knowledge, attitudes and practices towards COVID-19 among Moroccan nursing students. To the best of our knowledge, this is one of the first KAP studies among nursing students in the ongoing COVID-19 pandemic.

2 | THE STUDY

2.1 | Design

This was a descriptive cross-sectional study conducted during the COVID-19 pandemic period, between 20 April 2020–30 April 2020.

2.2 | Participants

The study was conducted in seven nursing schools in Morocco. The participants were nursing students who met the inclusion criteria of this study. The inclusion criteria consist of students regularly matriculated into these schools at the time of the survey, regardless of their year of study.

2.3 | Data collection

Data were collected using an online questionnaire created in google forms. The link of the questionnaire was sent to participants through WhatsApp groups and other social media (Facebook). To reach as many respondents as possible, a snowball sampling technique was used. The development of the questionnaire was based on a review of literature and questionnaires used in other similar studies and WHO guidelines (Abdelhafiz et al., 2020; Chen et al., 2020; Gaffar et al., 2019). The questionnaire started with a short paragraph describing the purpose of the study and indicating participants that all data are collected anonymously. The questionnaire was divided into four main sections: The first section included demographic and general information (e.g. age, sex, first source of information about COVID-19, specific training on COVID-19). The second section comprised of 6 items assessing knowledge about COVID-19 including transmission routes, incubation period, cause of the COVID-19, clinical symptoms, high-risk groups and complications. The third section included 8 items on attitudes towards COVID-19 such as fear, agreement with the pandemic control, confidence to win the battle against COVID-19, acceptance of quarantine and acceptance of caring for patients with COVID-19. The fourth section included 10 items on practices relevant to COVID-19 such as hand washing, hydro-alcoholic solution use, avoidance of shaking hands, use of bent elbow when coughing or sneezing, maintaining social distancing, wearing a mask and avoidance of crowded places. The reproducibility and validity of this questionnaire have been assessed in a pilot study.

2.4 | Data analysis

Data analysis was performed using SPSS software, version 20. The results were presented as frequencies and percentages.

2.5 | Ethical considerations

The study protocol was approved by the Research Ethics Committee. Participation in this study was voluntary and was not compensated. Electronic informed consent was obtained from all participants.

3 | RESULTS

3.1 | Demographic and general information of participants

A total of 1,216 nursing students completed the questionnaire. Table 1 presents demographic and general information of the participants. The majority of the participants (95.6%) were in the 18- to 23-year age group, and 77.4% of them were female. The first source of information about COVID-19 was social networks for 67.9% of the participants, followed by television for 12.3%, health workers for 7.9% and family for 5.1%. Almost 60% of the participants had received specific training on COVID-19.

TABLE 1 Demographic and general information of the participants

Characteristics / information (n = 1,216)	Distribution n (%)
Gender	
Male	275 (22.6)
Female	941 (77.4)
Age (years)	
18–23	1,162 (95.6)
24–27	46 (3.8)
>27	8 (0.7)
Where did you first learn about COVID–19?	
Social networks	826 (67.9)
Television	150 (12.3)
Family	62 (5.1)
Friends or neighbours	52 (4.3)
Health workers in the health facility	96 (7.9)
Radio	6 (0.5)
Others	24 (2.0)
Did you receive any specific training on COVID–19?	
Yes	727 (59.7)
No	490 (40.3)

3.2 | Knowledge about COVID-19

Table 2 presents the details of knowledge about COVID-19 among our participants. Of the respondents, 82.3%, 69.2% and 68.2% stated that COVID-19 spreads through droplets from the nose or mouth of infected person, touching infected surfaces and touching infected objects, respectively. The majority of participants (94.8%) correctly reported the incubation period of COVID-19 (up to 14 days). Almost the totality of participants (99.3%) knew that COVID-19 is caused by a virus. The most clinical symptoms of COVID-19 correctly identified by participants were fever (97.6%), dry cough (84.3%), dyspnoea (82%) and fatigue (74.9%). However, rhinorrhoea and nausea were only mentioned by 9.9% and 15.6% of the respondents, respectively. Of the participants, 83.2% and 90.0% knew that elderly people and patients with chronic disease (e.g. chronic obstructive pulmonary disease) are at higher risk of developing a severe COVID-19, respectively. However, only 20.5% of the participants included obese people in high-risk groups of COVID-19. Of the participants, 93.7% and 87.7% recognized that no vaccine and no specific treatment for COVID-19 are available currently, respectively. About half of the participants (51.6%) stated that supportive care is the therapy option that is available currently.

3.3 | Attitudes towards COVID-19

Table 3 shows the answers provided by participants about attitudes towards COVID-19. More than half of the participants (56.6%) were afraid of being affected by COVID-19. The majority of participants (84.8%) felt that COVID-19 pandemic will successfully be controlled. About 90% of the participants agreed that Morocco would be able to win the battle against this disease. The majority of participants (96.2%) stated that social distancing is essential for preventing the spread of COVID-19. The majority of participants (92.8%) agreed to be on quarantine and isolate themselves if they had symptoms of COVID-19. Almost 60% of the participants would like to practice physical activities outside their homes during the confinement period. A high proportion of participants (81.8%) agreed to participate in caring for patients with COVID-19, if the situation required it. More than 66% of the participants stated that if they have symptoms of COVID-19 they will speak with their doctors first.

3.4 | Practices towards COVID-19

Table 4 presents practices towards COVID-19 among the participants of this study. Almost all participants (98.4%) reported that they avoid crowded places such as market and grocery store frequently, and 93.8% of them avoid visiting their family and their neighbours in this pandemic period. Only, forty-seven (47.4%) of the participants reported that they frequently wash their hands. Less than half of the participants (47.9%) stated that they frequently use alcohol-based sanitizer during this coronavirus pandemic. About 93.4% of participants declared frequently wearing face mask when leaving home. The majority of the participants (85.5%) maintained social distance of at least one metre from other people frequently, and approximately 90% avoided shaking hands and kissing when giving greetings. Of the participants, 72% avoided touching their eyes, noses and mouths with unwashed hands frequently. About nine in ten participants (90.2%) used their bent elbow when coughing or sneezing frequently. Nearly half of the participants (51.1%) stated that coronavirus outbreak has considerably changed their daily routines.

4 | DISCUSSION

The purpose of our study was to assess the knowledge, attitudes and practices of nursing students during the COVID-19 epidemic. The main findings of the study showed that most of the participants had a good knowledge and attitudes towards COVID-19, and an acceptable level of practices towards COVID-19.

The first source of information about COVID-19 was social networks for 67.9% of the participants of this study. Similar results were reported in a recent study conducted among Egyptian public. The Egyptian's study illustrated that the main source of information about COVID-19 was through social networks 66.9% (Abdelhafiz et al., 2020). It is known that young people, such as our participants, tend to use social media more frequently. According to the last report of "We Are Social" (Global Socially-Led Creative Agency, 2018), there were about 16 million active users in Morocco, in January 2018.

TABLE 2 Knowledge of participants about COVID-19

Knowledge about COVID−19 (n = 1,216)		Distribution n (%)
COVID−19 spreads by?		
Droplets from the nose or mouth of infected person		1,001 (82.3)
Touching infected surfaces		841 (69.2)
Touching infected objects		829 (68.2)
Incubation period for the COVID−19 last?		
less than 4 days		30 (2.5)
less than 7 days		33 (2.7)
up to 14 days		1,153 (94.8)
Cause of the COVID−19 is a		
Virus		1,208 (99.3)
Bacterium		3 (0.2)
Parasite		2 (0.0)
Main clinical symptoms of the COVID−19 include	**Yes**	**No**
Fever	1,187 (97.6)	29 (2.4)
Dry cough	1,025 (84.3)	191 (15.7)
Dyspnoea	998 (82.0)	218 (18.0)
Sore throat	654 (53.7)	562 (46.3)
Muscle aches	531 (43.6)	685 (56.4)
Shortness of breath	484 (39.8)	732 (60.2)
Headache	426 (35.0)	790 (65.0)
Fatigue	911 (74.9)	305 (25.1)
Vomiting	365 (30.0)	851 (70.0)
Pharyngitis	177 (14.5)	1,039 (85.5)
Rhinorrhoea	120 (9.9)	1,096 (90.1)
Chest pain	583 (47.3)	633 (52.7)
Diarrhoea	561 (45.5)	655 (54.5)
Nausea	190 (15.6)	1,026 (84.4)
Groups with higher risk of developing a severe COVID−19		
Elderly people	1,012 (83.2)	204 (16.8)
People with chronic disease (e.g. chronic obstructive pulmonary disease)	1,094 (90.0)	122 (10.0)
Obese people	249 (20.5)	967 (79.5)
Is there a vaccine, drug or treatment for COVID−19?		
Vaccine	77 (6.3)	1,139 (93.7)
Specific treatment	160 (12.3)	1,056 (87.7)
Supportive care	628 (51.6)	588 (48.4)

According to WHO, the incubation period of COVID-19 virus can be up to 14 days. In our study, the majority (94.8%) of the participants correctly identified the incubation period of this new virus. However, a recent study among Spanish medicine and nursing students indicated that only 38.6% of the participants had correctly answered this question (Cervera-Gasch et al., 2020). In another KAP study among Jordanian dentists, the percentage of correct answer about incubation period was 36.1%.

The main clinical symptoms of COVID-19 were correctly mentioned by the majority of participants of this study. Similarly, many other studies conducted among the general public (Clements et al., 2020; Geldsetzer et al., 2020; Zhong et al., 2020) and healthcare workers (Bhagavathula et al., 2020; Escalera-Antezana et al., 2020; Kamate et al., 2020) showed a good knowledge about the clinical symptoms of COVID-19 in their participants. However, the study conducted among Spanish medicine and nursing students indicated that only 54.5% of the participants correctly answered the question about main symptoms (Cervera-Gasch et al., 2020). The majority of our participants indicated that elderly people and patients with chronic disease (e.g. chronic obstructive pulmonary disease) are at

TABLE 3 Attitudes of participants towards COVID-19

Attitudes towards COVID−19 (n = 1,216)	Distribution n (%)	
	Yes	No
Are you afraid of getting infected by COVID−19?	688 (56.6)	528 (43.4)
Do you agree that COVID−19 will successfully be controlled?	1,031 (84.8)	185 (15.2)
Do you agree that Morocco would be able to win the battle against the COVID−19?	1,098 (90.2)	118 (9.7)
Social distancing is essential for preventing the spread of COVID−19?	1,170 (96.2)	46 (3.8)
If you have symptoms of COVID−19, do you agree to be on quarantine / isolate yourself?	1,128 (92.7)	88 (7.2)
Do you like to do physical activities outside home during this confinement period?	491 (40.3)	725 (59.7)
Do you agree to participate in caring for patients with COVID−19, if the situation required it? (n = 1,209)	989 (81.8)	220 (18.2)
If you have symptoms of COVID−19, what will you do?		***n* (%)**
Talking with your doctor first		808 (66.4)
Talking with a family member or friend first		109 (9.0)
Looking first for the information by yourself		465 (38.3)

TABLE 4 Practices of participants towards COVID-19

Practices towards COVID−19 (n = 1,216)	Distribution n (%)	
	Sometimes	Frequently
Do you avoid going to crowded places (e.g. markets, grocery stores)? (n = 1,186)	20 (1.7)	1,166 (98.4)
Do you avoid visiting your family and neighbours? (n = 1,191)	74 (6.2)	1,117 (93.8)
Do you practice proper hand hygiene by washing your hands frequently?	640 (52.8)	576 (47.4)
Do you use alcohol-based sanitizer frequently?	633 (52.2)	583 (47.9)
Do you wear a face mask when leaving your home?	80 (6.6)	1,130 (93.4)
Do you maintain a social distance (at least one metre) from other people?	177 (14.6)	1,039 (85.5)
Do you avoid shaking hands and kissing when giving greetings?	115 (9.5)	1,101 (90.5)
Do you avoid touching your eye, nose and mouth with unwashed hands?	340 (28.0)	876 (72.0)
Do you use your bent elbow when coughing or sneezing?	118 (9.7)	1,098 (90.2)
How much has COVID−19 changed your daily routine?		***n* (%)**
Considerably		621 (51.1)
Moderately		409 (33.6)
Slightly		150 (12.3)
Not at all		36 (3.0)

high risk of developing a severe COVID-19. These results are similar to the findings from other studies evaluating the knowledge of high-risk groups for severe COVID-19 (Bhagavathula et al., 2020; Huynh et al., 2020; Salman et al., 2020). Overall, the fact that almost 60% of the participants of this study had received a specific training on COVID-19 might have significantly improved their knowledge about this new disease.

More than half of our participants were afraid of being infected by this new coronavirus. Our findings are consistent with the most studies on this subject (Roy et al., 2020; Salman et al., 2020; Zhang & Ma, 2020). Salman et al. reported that more than 72% of the respondents were afraid of acquiring COVID-19 (Salman et al., 2020). Chen et al. indicated that 92.6% of the participants declared that this COVID-19 outbreak was scary (Chen et al., 2020). The fear of being infected with COVID-19 reported by the most studies may be explained by the fact that the COVID-19 is a highly contagious disease, the lack of any specific treatment of COVID-19 and the large number of deaths occurred across the world.

The large majority of participants in the current study held positive attitudes towards overcoming COVID-19. We found that most participants believed that COVID-19 pandemic will successfully be controlled, as well as they agreed that Morocco would be able to win the battle against the COVID-19 virus. Similar optimistic attitude was also documented in previous studies in China (Zhong et al., 2020) and Malaysia (Azlan et al., 2020). The positive attitude shown in the present study could be attributed to the adequate prevention and control policies implemented by the Moroccan government since the first days of this COVID-19 pandemic (Ait Addi et al., 2020).

Most of the participants (92.8%) of this study agreed to be on quarantine/isolate themselves in case of apparition of COVID-19 symptoms, and 96.2% confirmed that social distancing is essential to prevent the spread of this disease. Similarly, in a study by Roy et al., 96% of the participants agreed to quarantine/ isolate themselves if they had fever and cough and 98% participants believed social distancing is a measure to prevent and control of COVID-19 (Roy et al., 2020). In contrast, a KAP study conducted among Australian healthcare workers during an influenza pandemic indicated that only 45% of the respondents intended to comply with quarantine measures (Seale et al., 2009).

In our study, the majority of our participants (81.8%) stated that they can participate in providing care to patients with COVID-19. In line with our study, high percentage (74.2%) of medical and nursing students in the Spanish study agreed to caring for COVID-19 patients if the situation required it (Cervera-Gasch et al., 2020). Another study conducted among medical staff at a psychiatric hospitals in China reported that 77.17% of the participants expressed a willingness to care for psychiatric patients with COVID-19 disease (Shi et al., 2020). This attitude was also reported in a Canadian study investigating willingness of nursing students to volunteer during the avian flu pandemic (Yonge et al., 2010).

Regarding prevention practices, the vast majority of participants in this study avoided crowded places, such as markets and grocery stores during COVID-19 pandemic. Similar results were reported in an earlier study, among Chinese residents, in which the vast majority of participants (96.4%) had not visited any crowded places during the confinement period (Zhong et al., 2020). Similarly, a recent study among the Malaysian public showed that 83.4% of participants avoided going to crowded places such as weddings (Azlan et al., 2020). In our study, the majority of participants avoid visiting their families and their neighbours in this pandemic period. Similarly, 92.5% of the participants in an Iranian study stated that they cancelled or postponed meetings with friends and eating out because of COVID-19 (Taghrir et al., 2020). This may be explained by the fact that COVID-19 is a highly contagious infection and has infected a large population across the world.

Evidence from the literature showed that hand hygiene is one of the most important measures to prevent and control infectious disease including COVID-19 (Cheng et al., 2020; Jefferson et al., 2009; Paludan-Müller et al., 2020). In this study, only 47.4% of the participants reported that they frequently wash their hands. In contrast to our findings, an Indian study on medical students reported that 96.7% washed their hands more often than usual during the ongoing coronavirus pandemic (Taghrir et al., 2020). In addition, the WHO's guidelines recommend the frequent use of alcohol-based sanitizer and considered this practice one of the most effective preventative measures in the community to prevent the spread of the new coronavirus (WHO, 2020). While some studies on COVID-19 have confirmed the high frequent use of sanitizers among their responders (Azlan et al., 2020; Roy et al., 2020), in the current study, only less than half of the participants stated that they frequently use alcohol-based sanitizer. This might be due to the shortage of hand sanitation products observed in the first weeks of the pandemic, as a result of huge demand. There are many reports across the world describing the great surge in demand of alcohol-based sanitizers leading to severe shortage in their supply (Berardi et al., 2020). The cost of the alcohol-based sanitizer may also play a role in participants' access to these products. A recent Kenyan study on COVID-19 reported that the expensive price was a significant barrier for 53% of the participants to use hand sanitizers (Austrian et al., 2020).

As preventative measures to limit the spread of COVID-19, the Ministry of Health of Morocco requires wearing face mask when outside the home. In the current study, 93.4% of the participants declared wearing face mask outside the home. However, the inappropriate practice observed in the remaining participants may be explained partially by the message spread by the Ministry of Health of Morocco. At the beginning of the COVID-19 pandemic, the Ministry of Health of Morocco stated that incorrect use of face masks may increase the rate of transmission. Furthermore, the Ministry of Health of Morocco further advised that face masks should only be used by people showing symptoms of COVID-19. Mask shortages were observed at the beginning of the COVID-19 pandemic in many countries (Wu et al., 2020), including Morocco. This may also explain the behaviour of some participants of this study towards wearing face mask. Many previously published studies indicate a high percentage of warring face mask outside home during the current COVID-19 pandemic (Chen et al., 2020; Kumar et al., 2020; Zhong et al., 2020). For instance, a study conducted by Kumar et al., among Pakistan healthcare workers, reported that 93.9% of the participants wear a mask in public places to protect themselves against COVID-19 (Kumar et al., 2020). Also, another study in China indicated that almost all participants (98%) wore face masks when going out during this COVID-19 pandemic (Zhong et al., 2020). However, wore face mask was less common in other studies; for example, in study by Azlan et al. only 51.2% of the participants wore a face mask when going out in public (Azlan et al., 2020).

Most participants of this study reported taking many other precautions such as maintaining safe distance of a minimum of one metre from other people (85.5%), avoiding shaking hands (90.5%) and avoiding touching eye, nose and mouth with unwashed hands (72%), such as positive practices towards COVID-19 were also shown in many other previous KAP studies (Kebede et al., 2020; Zhang & Ma, 2020; Zhong et al., 2020).

It was noteworthy that more than half of the respondents (51.1%) of this study reported that COVID-19 changed their daily routine considerably, while an Australian study conducted among staff and students of the University indicated that most participants (75.9%) had not made any lifestyle changes during the 2009 H1N1 pandemic (Van et al., 2010). Our finding may be attributed to the severity of the current COVID-19 pandemic.

The strengths of the current study include, first, to the best of our knowledge this is the first study assessing knowledge, attitudes and practices towards COVID-19 among nursing students in Morocco. Second, this study is a multicentre study including a large sample of nursing students. Third, this study was conducted

on the early stage of the COVID-19 outbreak in our country. However, this study has some limitations. First, students had access to online correct COVID-19 information resources, which may have influenced their responses to COVID-19 knowledge. Second, participating in this survey required Internet access; therefore, participants without Internet access were not able to complete our questionnaire.

5 | CONCLUSION

The results of this study showed that most of the nursing students participated in this study had a good level of knowledge, very positive attitudes and an acceptable level of practices towards COVID-19. Sensitization and education campaigns are needed to improve their preventative practices, such as hand hygiene and wearing face mask. In addition, it may be of importance to incorporate competences into curricula to improve knowledge, attitudes and practices of future health professionals and to prepare them for emergencies and outbreaks.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHOR CONTRIBUTIONS

FN, JM, BS, BR, KM: Conception or design of the study. FN, OA, EN, NM, AW, BR, KM: Acquisition of data. FN, KR, KM: Analysis and interpretation of data. FN, KM: Draft of the manuscript. KK, NC, JM, BS, KM: Revision of the manuscript for important intellectual content. All authors: Interpretation of the results, review of the article and approval of the final manuscript.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available, from the corresponding author, upon reasonable request.

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