ORIGINAL ARTICLE

KNOWLEDGE AND ATTITUDE OF PHARMACY STUDENTS TOWARDS COVID-19 PANDEMIC AND ITS IMPACT ON THEIR EDUCATION AND LEARNING

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Abstract

Knowledge, attitude and practice of precautionary and preventive measures towards a contagious disease like COVID-19 are vital to control the proliferation of the disease. This study aimed to assess the level of knowledge, attitude, and practice of the students of the college of pharmacy at King Saud University towards COVID-19 and its effect on their learning process. A web-based, cross-sectional questionnaire-oriented survey study was conducted in May 2020. All the students enrolled at the college of pharmacy, King Saud University, Riyadh, were invited to participate in this study. 172 students took part in the study, of which 56.4% were females and 43.6% were males. The mean total knowledge score was 3.16 ± 1.11, ranging from 1 to 5. When answering the knowledge questions, there was no significant difference between male students (3.22 ± 0.98) and female students (3.11 ± 1.21). For the attitude and practice, more males were maintaining a social distance of 1 m from others than females, and it was also observed that more females thought that virtual classes are an effective learning tool than their male counterparts. The results of this study showed that pharmacy students had good knowledge about the COVID-19 pandemic and displayed a positive attitude and good preventive and precautionary practices.

Rezumat

Cunoașterea, atitudinea și practicarea măsurilor de prevenție ale unei infecții precum COVID-19 sunt vitale pentru a controla proliferarea bolii. Scopul acestui studiu a fost de evaluarea cunoștințelor, atitudinii studenților facultății de farmacie de la Universitatea King Saud în pandemia de COVID-19 și efectul asupra procesului lor de învățare. În mai 2020, a fost realizat un studiu *online* de tip sondaj transversal, la care au fost invitați să participe toți studenții înscriși la colegiul de farmacie din Universitatea King Saud, Riad, Arabia Saudită. 172 de studenți au participat la studiu, dintre care 56,4% au fost femei și 43,6% bărbați. Scorul mediu total al cunoștințelor a fost de $3,16 \pm 1,11$, variind de la 1 la 5. Nu a existat nicio diferență semnificativă între studenții de sex masculin ($3,22 \pm 0,98$) și studenții de sex feminin ($3,11 \pm 1,21$) atunci când au răspuns la întrebările legate de cunoștințe. Pentru atitudine și practică, mai mulți bărbați mențin o distanță socială de 1 m față de ceilalți decât femeile și, de asemenea, s-a observat că mai multe femei au considerat că predarea *online* este un instrument eficient de învățare, comparativ cu omologii lor de sex masculin. Rezultatele acestui studiu au arătat că studenții de la farmacie au cunoștințe bune despre pandemia COVID-19 și au manifestat o atitudine pozitivă și bune practici de prevenție.

Keywords: COVID-19, pharmacy, students, attitude, education

Introduction

A global emergency of unprecedented magnitude, the COVID-19 pandemic, has caused millions of infections and deaths and brought enormous damage to the global economy. A novel coronavirus, SARS-CoV-2, initially detected in Wuhan, China, in December 2019, is responsible for causing COVID-19 [6]. On 30th January 2020, the World Health Organization (WHO) declared it a health emergency and, later on 11th March 2020, a global pandemic [32, 33]. SARS-CoV-2 is a contagious virus, spreading among humans mainly by respiratory droplets and possibly aerosol dispersal [14, 15]. The most efficient approach to reduce the transmission of the virus and its morbidity and mortality rate are preventive and precautionary measures like social distancing, hand sanitisation, wearing face masks and quarantining [7, 23].

Most governments have issued guidelines, primarily preventive in nature, to counter the proliferation of COVID-19 by implementing personal hygiene measures like social distancing, use of face mask, contact tracing and mass-screening of asymptomatic cases; restricting public movement and closure of shopping malls, educational institutions, offices, as well as borders and introducing remote working rules [2, 3, 22, 24]. Adherence to these measures is essential if these are to be effective and people's knowledge determines this attitude and practice (KAP) toward COVID-19 [1, 30]. KAP towards viral and infectious diseases particularly immunization is linked with sensitive responses, which can influence both the

spread and regulation of the virus [26, 27]. KAP includes a variety of beliefs about the cause of the diseases, identifying the symptoms, risk factors and means of treatment available and their outcome [29]. The sources of these beliefs are diverse, including previous personal experiences, presumptions regarding similar viral diseases, information from the internet, particularly social media, the information provided by the government and medical sources. The preventive and precautionary behaviours may be driven by these beliefs that differ across varied communities, and ignorance or erroneous medical beliefs are often potentially risky [35]. A significant factor in the spread of infection during pandemics is the perception of risk [5, 11, 28]. A study from the city of Henan in China revealed that higher awareness was connected with a more favourable understanding of COVID-19 preventive practices [35].

Most universities and educational institutions were closed for physical presence as a result of the COVID-19 pandemic and shifted to virtual and distance learning, resulting in new learning experiences for the students. Hence, assessment of the students' new learning practices is also crucial. Students are a significant part of the young community and can serve as an important resource of enhanced health education and awareness not just for themselves, but also in the wider community as they participate in the circulation of correct pandemic related information facilitating the control and prevention of the viral spread [8, 25]. Pharmacy students are vital future healthcare professionals in the community, who can help control the proliferation of viral diseases and the impact of any incidental consequence of a pandemic in the future. Therefore, it is imperative to determine their KAP in regards to the COVID-19 pandemic and the results can be utilized to deliver suggestions for implementing in future initiatives.

Materials and Methods

Study Design and Settings
This questionnaire-based, cross-sectional study was conducted in the first 2 weeks of May 2020 during the partial lockdown in Saudi Arabia. An online universal sampling method was used for data collection. All the students enrolled in the college of pharmacy at King Saud University were invited to participate. A web-based questionnaire was emailed to all the students. Information about the nature of the study were provided as well. They had the right to decline their participation in the study without any penalties. Students who

accepted to participate had to give their consent for the data generated from their entries before starting to answer the questions. The study protocol was approved by the Research and Ethics committee at KSU.

The questionnaire was created based upon information available from the WHO and the American and European Centres for Disease Control (CDC and ECDC, respectively) websites. It was divided into three sections: demographics, KAP and learning process questions and comprised of multiple choice-type questions meant to evaluate the participants' 1) socio-demographic features, 2) knowledge, attitude and practices and 3) learning mechanisms during COVID-19. Demographic variables included gender, age, academic year, current place of residence and nationality. The KAP section was divided into the knowledge section consisting of 5 questions and the attitude and practice section comprising 4 questions. Each question answered correctly in the knowledge section was given one point and a wrong answer/I don't know meant a zero point, based on the information provided by the Ministry of Health, Saudi Arabia. The mean knowledge scores (KSs) of the participants were calculated. The range of the knowledge score was from 1 to 5, with the higher scores indicating an increased level of knowledge about the COVID-19 pandemic. Good knowledge was defined as any score above 50%, while scores below 50% were considered poor.

Statistical Analysis
All the data collected was organized in a Microsoft excel data sheet and then analysed by the Statistical Package for Social Sciences software, version 25.0 (SPSS Inc., Chicago, IL, USA). Categorical variables were expressed as frequencies and percentages. T-test and ANOVA were used to compare mean scores, while Chi-Square test was employed to assess differences in categorical data.

Results and Discussion

A total of 172 pharmacy students took part in the study, of which 56.4% were females and 43.6% males. The mean age of the students was 22.26 ± 2.01 (mean $\pm$ SD), ranging from 17 to 31 years old. All the students who participated were enrolled in the professional PharmD course (1st - 6th year), with the highest number of participants from the 6th year (n = 55; 32%) followed by fourth-year PharmD students (n = 43; 25%).

The details of the demographics of the students are given in Table I.

Variable	Options	n	%
Gender	Female	97	56.4
	Male	75	43.6
Age (years) / Mean ± SD	Age range (17 - 31)	22.26 ± 2.01	-
Nationality	Saudi	166	96.5
	Non-Saudi	6	3.5
Academic Year	1st year	3	1.7
	2nd year	8	4.7
	3rd year	41	23.8
	4th year	43	25
	5th year	22	12.8
	6th year	55	32
City of Residence	Riyadh	136	79.1
	Non-Riyadh	36	20.9
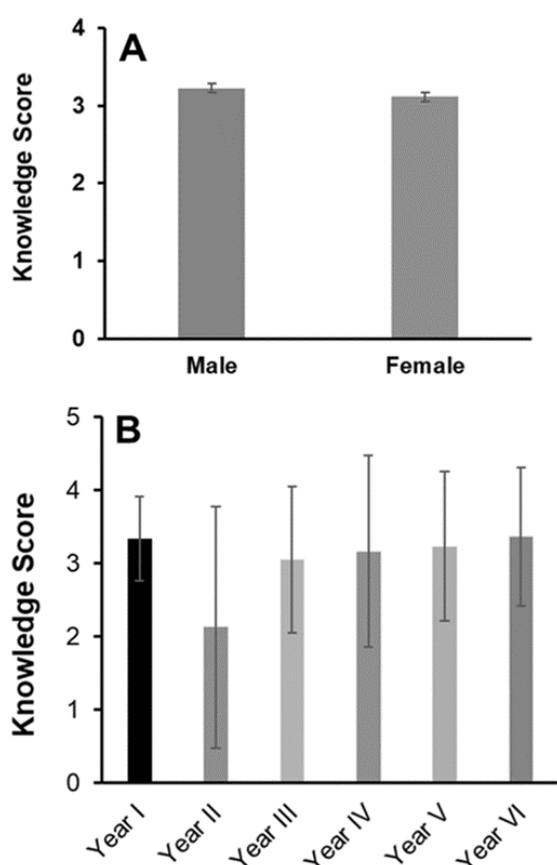
Figure 1.

Knowledge score comparison between (A) males and females and (B) among the academic years I to VI

The results of the knowledge questions are presented in Figure 1. Using the ANOVA test, the mean score of COVID-19 related knowledge was calculated to be 3.16 ± 1.11, ranging from 1 to 5. There was no significant difference among males (3.22 ± 0.98) and females (3.11 ± 1.21) when answering the knowledge questions ($p > 0.05$). Also, no significant difference was observed when comparing the responses according to the academic years III, IV, V and VI, and not taking academic years I and II into consideration since the sample size was very low in these two groups. The majority of the students (79.6%) thought that COVID-19 is transmitted by shaking hands and 71.1% thought that COVID-19 originated from bats. Only 31.4% of the participants thought COVID-19 was the same as SARS (Severe Acute Respiratory Syndrome) virus. Nevertheless, 83.1% of the students were right about the 2 weeks incubation period for COVID-19 and 66.2% were right about the 20 seconds time duration recommended for hand-washing for COVID-19 prevention.

In the attitude and practice section (Figure 2), most of the participants (77.3%) always wore a mask and only 7% shook hands when greeting others. There was no significant difference between males and females for these practices. However, only 43% always used sanitization when shopping at supermarkets, the majority of them being females. Only 37.7% always maintained a distance of one meter from others and significantly, males seemed to be practicing these more than females.

The participants' attitude towards learning mechanisms and processes are presented in Figure 3. Most students (71.7%) agreed that COVID-19 had affected their learning process and a vast majority (82.6%) of the students indicated that they have been able to use academic e-learning methods effectively. The general trend observed here was that a significantly higher number of females agreed that COVID-19 had affected their learning process, but they have been able to effectively use academic e-learning methods as well as specifying that virtual classes are an effective learning tool. Most of the students used virtual classes and self-learning during COVID-19 but only 53.5% of them always had access to the internet. While the majority of the students (91.9%) had a computer/laptop/tablet at home, only 51.7% had very good computer skills. Most of the students (60.5%) thought that virtual classes are an effective learning tool, the majority of them being females. The platforms most used by the participants were Zoom (85.5%) and

Blackboard (59.9%). Only 13.4% of the participants were highly satisfied with the virtual class experience, but only 6.4% of the students had extreme difficulties with virtual classes. The majority of the students (59.3%) thought face to face classes are better and rated them highly relevant (63.4%) for student-teacher interaction as well. A high number of the students (54.7%) thought that virtual learning should continue even after the end of the COVID-19 pandemic, the majority of them being males.
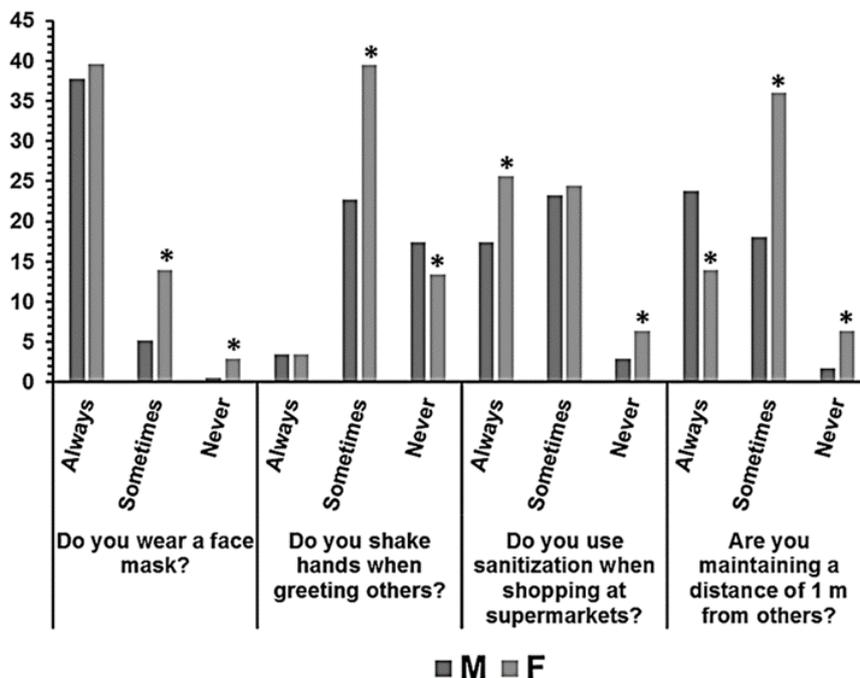

Figure 2.
Attitude and practice comparison between males and females using Chi-Square test
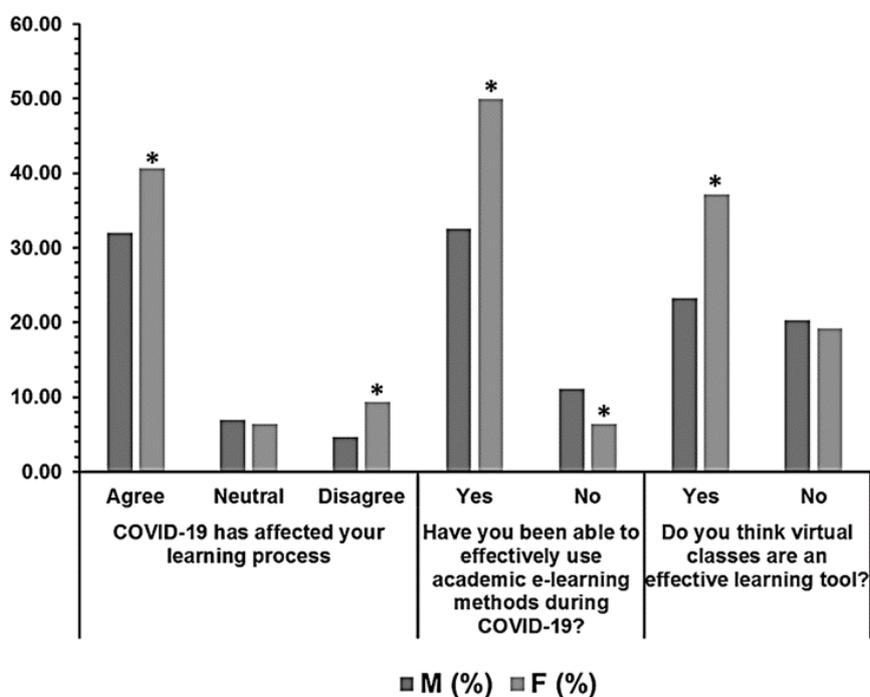(*significant difference p < 0.05)

Figure 3.
Learning practices comparison between males and females using Chi-Square test
(*significant difference p < 0.05)

COVID-19 is a contagious disease spreading rapidly that has already surpassed Middle East Respiratory Syndrome (MERS) and SARS in the rate of transmission and mortality [18]. Increased awareness in the

general public and particularly the health care providers can be a game-changer, which could help prevent the proliferation of the COVID-19 disease. This current study used a reliable questionnaire to evaluate KAP and the impact of COVID-19 on the learning methods of pharmacy students. Many students displayed a satisfactory knowledge level, a positive attitude and good practices regarding COVID-19, demonstrating that they are responding appropriately to the present pandemic. This is reassuring mainly when the survey was performed in the early stages of the pandemic in Saudi Arabia and is consistent with studies in other countries that show university students have good knowledge about the pandemic [4, 12, 20, 25]. A study in Egypt by Hamza *et al.* found that the knowledge score of COVID-19 associated knowledge in senior pharmacy students was 83%. Another study in China by Peng *et al.* 2020 revealed that 82.3% of the students had good knowledge about the pandemic [10, 25]. The higher levels of knowledge about the COVID-19 pandemic among pharmacy students may be credited to their access to numerous reliable sources like healthcare professionals, university newsletters, and government media briefings. It may also be attributed to the training pharmacy students receive as interns in the healthcare system. The majority of our participants had knowledge of COVID-19 symptoms, incubation period and preventive measures like wearing masks and maintaining social distance.

More than 80% of the participants were able to correctly specify elderly and people with comorbidities in the high-risk category for COVID-19. But some participants (20.9%) wrongly perceived children to be at high risk, contrary to what is stated by the CDC and WHO [31, 34]. This could be attributed to a partial lockdown applied at certain time points in the country including for children going to schools and public spaces. Therefore, it is suggested that public awareness programs emphasize deepening understanding of the high-risk categories for COVID-19. In our study, the majority of the participants (77.33%) stated always wearing a mask as a preventive measure when going out, which is similar to studies done in students in Jordan whereas in Egypt, only 50% of pharmacy students reported wearing a mask when leaving home [4, 10]. However, in another study from Jordan, it was revealed that only 9.7% of students from six different medical schools often or always wear a mask [12]. This variance, despite evidence that wearing a face-mask could decrease the transmission of infection and help stop the spread of the infection, could be described by the fact that at the early stages of the pandemic, there were many contradictions concerning the advice for face masks, though this changed later [7, 16, 17]. Initially, there was a shortage of masks globally and a considerable price-rise in some countries [9, 19]. In Saudi Arabia also, this happened and, in some areas, only 35% of community pharmacies had face-masks available for sale from April 20 to May 15, 2020 [13]. Subsequently, significant efforts were made by the government to ensure the accessibility of masks to the public easily and widely and later on May 30, 2020, face mask wearing was enforced and it was made mandatory to wear face masks in public in Saudi Arabia [21]. Accordingly, we believe this triggered the response rates seen in our study.

Study limitations

The study presented a series of limitations. First, it was realised with pharmacy students from only one university. Therefore, it may not be generalized to other students' populations in this or other universities in the Kingdom of Saudi Arabia. Second, being an online survey, we trusted the participants correctly recorded their understanding and perceptions without being able to check it directly. However, this applies to all online surveys. Regardless of these limitations, we believe this study offers many valuable insights into the students' perceptions and the impact of the pandemic on the student community in Saudi Arabia. Therefore, we trust the findings are beneficial to deliver additional guidance to health and education policy makers.

Conclusions

In conclusion, large-scale pandemics, like the one we are currently going through, test the integrity of awareness campaigns conducted frequently, specifically through online platforms in a socially-active community like university students. In this study, students displayed satisfactory knowledge, as apparent by the knowledge scores. It is satisfying to discover that participants also have good attitudes and engage in low-risk practices for the prevention of COVID-19. The findings of this study illustrate the significant role institutions like universities can play in developing suitable educational *curricula* and arranging protective health measures for their staff and students, specifically considering the possibility of physical reopening of schools in the near future. These might include information *via* social media channels, posters, seminars and workshops on good practices like regular handwashing, maintaining physical distance and good respiratory etiquette to enhance safer lifestyles and prevent COVID-19 transmission.

Conflict of interest

The authors declare no conflict of interest.

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