A Comparative Cross-Sectional Study- Knowledge, behavior and psychological change among Medical and Non-medical Students in Jordan during COVID-19 pandemic

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ABSTRACT

Background: Coronavirus disease 2019 (COVID-19) has rapidly spread worldwide, and it was officially declared to be a pandemic by the World Health Organization on March 11, 2020. COVID-19 is associated with increasing morbidity and mortality and has impacted the lives of the global populations.

Aim: To compare the knowledge of medical and non-medical students at Jordanian universities in issues related to COVID-19 and to evaluate the psychological and behavioural changes in Jordanian students' lives following directly/indirectly exposure to the COVID-19.

Methods: A descriptive cross-sectional online survey was sent to a convenience sample in Jordanian universities through social media (Facebook and WhatsApp) between 16th of June and 30th of June 2020. The questionnaire was designed to collect the demographic, participant's source of information regarding COVID-19, knowledge on COVID-19, the psychological consequences of COVID-19, impact of COVID-19 on participant's behaviour. The final version of the questionnaire was further tested for content validity by experts in the field. Chi-square test was used to find significant differences between the two groups.

Results: A total of 912 participants completed the survey, with 507(55.6%) being medical students and 405(44.4%) being non-medical students. About 90% of students believed in the existence of corona virus (n=817), but not in the seriousness of the infection (n=85, 9.3%). The majority 82.2% (n=750) agreed that the fake news on social media caused panic situations. A total of 275 medical students avoided following news as compared to 187 non-medical students, and the difference was statistically significant (p-value = 0.003). There were 438 medical students and 338 non medical students who avoided leaving the house for unnecessary needs (p-value = 0.004).

Conclusion: Medical students had better knowledge and were more aware on COVID-19 than that of non-medical students; for this reason, medical students tended to change their behaviours in a good way. The current pandemic seems to impact the psychology of the both groups with no difference significant.

Keywords: Covid-19, medical students, Knowledge, psychological impact, behaviour.

INTRODUCTION

Coronavirus disease 2019 (COVID-19) is an emerging respiratory disease caused by a novel coronavirus [1]. COVID-19 was first detected in December 2019 in Wuhan, China [2]. On January 30, 2020, the World Health Organization (WHO) declared that COVID-19 is a pandemic disease [3]. As of December 2019, until May 31, 2021, about 170 million cases were reported globally and more than 3.5 million deaths [4].

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COVID-19 can spread to humans through intermediate host such as bats or from human-to-human, through respiratory droplets and body contacts [1]. Contact with contaminated surfaces, hands, and touching of faces, eye, nose, mouth are predominant ways to get exposed to the infected droplets [5]. The main signs and symptoms of COVID-19 include fever, cough, and shortness of breath [6]. While the incubation period of COVID-19 is between 2–14 days after exposure [4]. Preliminary data suggest that older adults and persons with underlying health conditions or compromised immune systems might be at greater risk for severe illness from this virus [7].

Jordan recorded the first case of COVID-19 in March 2020[8]. Jordan witnessed a sudden increase in the number of infected people during the past threemonths (March, April and May) with a peak of more than 9,000 cases on the 22th March 2021[4].

In order to suppress this pandemic, the government enforced strict quarantine measures and initiated a public information campaign utilizing various media to alert citizens about the dangers of the virus. Many studies have shown that practicing preventive measures on an individual level is effective in curbing the spread of infection [3], i.e. wearing a mask, washing hands, using a hand sanitizer, maintaining social distancing, and staying at home [3].On the other hand, the world health organization (WHO) released some mental health considerations that should be followed during this crisis such as; avoid watching and listening to news constantly, staying connected with loved ones through digital media, reassuring and supporting each other, along with taking care of one's own health i.e. exercising, eating healthy, and sleeping well regularly [9].This in turn, can affect the behavioral and psychological response of the population[10-11].

As Jordan is a youthful country, university students account for the biggest proportion of the people. Hence, we must pay attention to study their knowledge about COVID-19 especially after the large amount of misconceptions and false information that are circulating on social media regarding transmission of the disease and methods of acquisition[12]. As well as the impact of this pandemic on their behavior and psychological responses[13].

As our study is novel, the findings of this study may inform health officials on further interventions, awareness, and policy improvements pertaining to the COVID-19 outbreak in Jordan, at this critical time.

Aim of the study

This study aimed to compare the knowledge of medical and non-medical students at Jordanian universities in issues related to COVID-19. Additionally, this study aimed to evaluate the psychological and behavioral changes in Jordanian students' lives following directly/indirectly exposure to the COVID-19.

Ethical approval

This study was approved by the Research Ethics Committee at Faculty of Pharmacy in ASU, Amman, Jordan (No: 2020-PHA-25). The consent to participate was implied by the act of completing and returning the e-survey.

Methods

Study design and population

A descriptive cross-sectional online survey was conducted on the16th of June 2020 in Jordan.

Questionnaire development and data collection

Following an extensive literature review on studies related to COVID-19 pandemic, a draft questionnaire was designed to cover the areas of our interest in this study [5-8-13-14]. The questionnaire was written in two languages; it was written in the English language because it is the medium of instruction in Jordanian universities and was translated to the Arabic language as Arabic is the first language in Jordan. The translation was validated by the Translation Department at the Applied Science Private University (ASU) followed the standard 'forward-backward' procedure. The final version of the questionnaire was further tested for content validity by experts in the filed who gave their constructive suggestions, positive feedback for the process. The final version of the questionnaire was organized into five main sections addressing different topics of interest. Section I

included items to collect demographics data about students' characteristics. The students in the second section were asked a multiple-choice question about their source of information about COVID-19. Section III was planned to assess participants knowledge and believes about COVID-19 pandemic. Section IV was to assess the psychological consequences of COVID-19 pandemic on study participants. Finally, section V was to assess the behavioral impact of COVID-19 on the Jordanian students.

Sampling strategy and sample size

A convenience sample of eligible participants was invited to participate in the study from governmental and private Jordanian universities through social media (Facebook and WhatsApp). The covering letter stressed anonymity and confidentiality and explained aim and objectives of this study. The participants did not receive any benefit or payment for filling-out the questionnaire.

Based on a total university student population of 377,000[14], sample size calculation using a margin of error of 5%, confidence level of 95%, and response distribution of 50%, a minimum sample size of 384 of people is needed.

Statistical analysis

Data were analyzed by using statistical package for social science (SPSS) version 26. The descriptive analysis was performed using frequency/percentage for qualitative variables. Age variable was expressed as mean ± SD. The chi-square test was used to describe the statistical differences between medical and non-medical students groups. P-values <0.05 indicated that a difference was statistically significant.

Results

Participants' characteristics

A total of 912 students completed the survey. Students' characteristics are shown in **Table 1**. The mean age of the participants was 23.83 ± 1.50 years, ranging from 18 to 26 years. The majority of students were male (n=656, 71.9%). A large fraction of our participants was from urban areas (n=866, 94.9%). There were 851 (93.3%) of students were undergraduate while the number of post-graduate students was 61(6.7%). About half of students were studying in health/medical field (n=507, 55.6%) and 405 students (44.4%) were studying in other fields. Approximately, all students were committed in home quarantine (n=844, 92.5%).

Table 1: Demographic characteristics of the study sample (n=912)

Age (M ± SD)	23.83 ± 1.50
Academic level n(%)	
post-graduates	61(6.7)
Undergraduates	851(93.3)
Gender n(%)	
Male	656(71.9)
Female	256(28.1)
Accommodation place n(%)	
City	866(94.9)
Urban	46(5.1)
Field of study n(%)	
Medical field	507(55.6)
Non-medical field	405(44.4)
Students infected previously by n(%) corona	12(1.3)
Students committed in home quarantine	844(92.5)

Participants' sources of information about COVID-19

Students' sources of information about the COVID-19 pandemic **(Table 2**) were varied between social media platforms which presented the most common sources of information (38.4%), followed by visual and audible media (34.1%). Unexpectedly, academic research presented only 13.2% of information resources, while, the world health organization (WHO) reports were reported to be the least common source of information (1.0%).

Table 2: Sources of information about COVID-19 among the study participants (n=912)

Source	Percent
Academic research	13.2
Social media	38.4
Visual and audible media	34.1
Public's conversation	4.6
WHO reports	1.0

Participants knowledge and believes about COVID-19 pandemic

Interesting results were revealed and outlined in **Table 3** about knowledge of the two groups on COVID-19 pandemic. About ninety percent of students believed in the existence of corona virus (n=817), but not in the seriousness of the infection (n=85, 9.3%). The majority of the students knew well the common symptoms of COVID-19 infection in the respiratory system (n=842, 92.3%). However, the students were evenly split between those who knew the symptoms of the infection on the digestive system (n=436, 47.8%) and who did not. Unfortunately, students expressed less knowledge about the effect of antihypertensive medications (20.4%) antibiotics (31.0%) and Hydroxychloroquine (36.6%) on the COVID-19 infection.

Table 3: Students' knowledge and beliefs about COVID-19 pandemic (n=912)

Statements	Total correct answer N(%)	Medical students N	Non-medical students N	χ^2	p-value*
Corona virus is a biological weapon.	567(62.2)	290	277	9.558	0.002*
Corona virus is a real fact.	817(89.6)	470	347	14.990	<0.001*
Corona virus infection is a serious disease.	85(9.3)	43	42	13.728	0.001*
Common symptoms of corona include shortness of breath, coughing, and sore throat, accompanied by a very high fever.	842(92.3)	474	368	10.148	0.006*
The drugs hydroxychloroquine is effective in treating corona infection.	334(36.6)	188	146	30.814	<0.001*
Antibiotics play an effective role in the recovery of COVID-19.	283(31.0)	169	114	33.163	<0.01*

Statements	Total correct answer N(%)	Medical students N	Non-medical students N	χ^2	p-value*
The risk of antihypertensive in infection with COVID-19	186(20.39)	100	86	4.666	0.202
Heat and hot weather can eliminate the Corona virus.	501(54.9)	305	196	25.794	<0.001*
Cold weather and snow cannot kill the Corona virus.	437(47.9)	231	206	15.194	<0.001*
Corona virus does not affect children under the age of 16	785(86.1)	449	336	21.808	<0.001*
The incubation period of Corona virus is less than a week.	239(26.2)	146	93	15.648	<0.001*
An infected person with Corona virus can develop diarrhea and intestinal pain.	436(47.8)	275	161	30.492	<0.001*
A person can develop corona without showing symptoms.	776(85.0)	450	326	32.761	<0.001*
Corona infection might leads to death.	137(15.3)	80	57	14.476	<0.001*
The disease is transmitted from one person to another by touching places contaminated with the infected person's secretions by the hand, then touching the eyes, mouth, and nose.	838(91.8)	481	357	12.969	0.002*
Corona virus is believed to be spread mainly from person to person through respiratory droplets that result when the infected person coughs or sneezes	269(29.5)	165	104	8.628	0.013*
The person infected with Corona virus can transmit the disease during the incubation period.	773(84.8)	453	320	44.055	<0.001*
Most of the deaths caused by the Corona virus are for the elderly and those suffering from chronic diseases.	834(91.4)	475	359	22.295	<0.001*
People who have contacted with the patient infected with Corona virus should be banned for 14 days.	841(92.2)	474	367	4.604	0.100
Many pre-existing medications are tried to relieve symptoms, rather than treat them.	686(75.2)	281	405	26.758	<0.001*
Focusing on strengthening the immune system can prevent the infection with Corona virus.	712(78.1)	417	295	6.164	0.46
Entering the hospital can accelerate the recovery of patient with Corona virus.	580(63.6)	326	254	1.661	0.436
A single mask can be used multiple times.	736(80.7)	422	314	2.278	0.320
All family members can use the same mask.	837(91.8)	475	362	8.958	0.011*

*Chi square as a test of significance, p-value<0.05

In this section the majority of questions were significantly different between the two groups. Medical students were more knowledgeable than non-medical students regarding the questions: seriousness of the disease, symptoms of the COVID-19 infection, effectiveness of drugs, influence of weather on the corona virus, and transmission the disease (p-value < 0.05). Non-medical student (n=405, 44.4%) tended to answer correctly for only one question " Many pre-existing medications are tried to relieve symptoms, rather than treat them" more than medical students (n=185, 20.3%) and the difference was statistically significant (p < 0.001).

The psychological effect of COVID-19 pandemic on study participants.

Table 4. depicted the psychological effects of the ongoing pandemic among Jordanian students. The vast majority (84.6%, n=772) of students were afraid of visiting crowded places and 58% (n=529) reported fear of leaving their homes. Almost all students (93.7%, n=855) expressed concerns about safety of their families. The majority 82.2% (n=750) agreed that the fake news on social media caused panic situations and 67.3% (n=614) reported that they believe the situation is not as bad as portrayed by the media.

Table 4: The proportion of students who expressed agreement about the psychological effects of COVID-19 (n=912)

Statements	Total agreement n(%)	Medical students	Non-medical students	χ^2	p-value*
I am afraid to leave my home because of the Corona virus.	529(58.0)	295	234	0.470	0.493
I am afraid to visit crowded places, i.e. stores and markets	772(84.6)	433	339	1.027	0.311
I fear for my health even when I am at home.	368(40.3)	204	164	1.041	0.308
I fear for the health of my family.	855(93.7)	479	376	3.171	0.075
I am concerned when a family member walks out.	732(80.2)	412	320	0.891	0.345
I feel that the government should isolate patients infected with the Corona virus in specific hospitals.	842(92.3)	473	369	2.208	0.137
I feel unsure about the current infection control measures.	392(42.9)	221	171	1.170	0.279
I feel the fake news appearing on social media regarding Corona virus causing panic.	750(82.2)	421	329	0.404	0.525
I feel the situation is not as bad as being portrayed by the media.	614(67.3)	320	294	6.024	0.140

*Chi square as a test of significance, p-value<0.05

There was no statistically significant difference in the questions between the two groups in this section.

The behavioral impact of COVID-19 on study participants.

This section aimed to evaluate the impact of COVID-19 pandemic on students' behavior in terms of abiding with the government recommendations about wearing masks, keeping social distancing and personal hygienic habits. The results are demonstrated in **Table 5.**The vast majority of students avoided the use of public facilities such as prayer places (88.9%),

gardens and buses (90.3%). Most of students changed their social habits to new ones, such as hand shakinghabits (85.9%), limiting the physical contact (85.3%) with others and family reunions (84.2%). Similarly, most of students changed their personal habits such as wearing masks (89.4%), washing hands repeatedly (83.4%), quitting smoking (55.8%) and carrying a hand sanitizer (80.7%) due to the COVID-19 pandemic.

Table 5: The proportion of students who changed their behavior because of COVID-19 (n=912)

Statements	Total Agreement N(%)	Medical students	Non-medical students	χ^2	p-value*
I thought about quitting smoking (or any other bad habits).	509(55.8)	315	194	11.286	<0.001*
I have thought applying for leave in the course due to COVID-19.	358(39.2)	215	143	3.904	0.048*
I claimed to be sick to avoid going to the course	132(14.4)	76	56	0.546	0.460
I have identified physical contacts with people.	778(85.3)	438	340	1.567	0.211
I recently avoided using public health care facilities.	824(90.3)	460	364	1.209	0.271
I recently avoided going to prayer places.	811(88.9)	458	353	5.359	0.021*
I have recently started avoiding watching, reading, or listening to news because it makes me anxious.	462(50.6)	275	187	8.781	0.003*
My planes were recently canceled, i.e. family reunions, social gathering, travel or meeting due to COVID-19	768(84.2)	429	339	1.173	0.279
I have recently purchased a lot of groceries fearing of running out of food	426(46.7)	261	165	2.830	0.092
I wash my hands more frequently than before.	761(83.4)	439	322	4.392	0.036*
I carry hand sanitizer all the time	736(80.7)	437	299	34.189	<0.001*
I started to wear a mask because of corona virus.	816(89.4)	465	351	4.092	0.043*
I used to by my basic needs using delivery service.	478(52.4)	298	180	16.370	<0.001*
I avoid shaking hands or hugging, and just greeting the head	784(85.9)	446	338	6.953	0.008*
I always wear a mask everywhere outside the home.	729(79.9)	420	309	2.670	0.102
I avoid leaving the house for unnecessary needs .	776(85.0)	438	338	8.391	0.004*

*Chi square as a test of significance, p-value<0.05

Among medical students, there was an overall agreement in responses 1.5-2 fold more than non medical students. A total of 275 medical students avoided following news as compared to 187 non-medical students, and the difference was statistically significant (p-value = 0.003). There were 438 medical students and 338 non medical students who avoided leaving the house for unnecessary needs (p-value = 0.004).

Discussion

Since the outbreak of COVID-19 almost two years ago, it has been documented that the pandemic effects are not restricted to physiological deterioration and death of infected patients. The whole life style and mental health of the public have been impacted, especially students who have lived with greater concerns of losing their future given the new learning methods in universities. Therefore, this study aimed to investigate what medical and non-medical students know about COVID-19 and how this pandemic affected their behaviours and mental health.

Overall, only few students were relying on academic research as a source of information about COVID-19 and most of the students indicated that they get COVID-19 information from social media and other media websites. This outcome could be explained by two ways. First, academic

research entities such as journals and publishers are not significantly involved in social media websites. Second, in Jordan, students in general do not receive adequate training on how to get information from a trusted source. Our study aligns with a previous study in Jordan, which indicated that social media represents the most common source of information about COVID-19 among university students [14]. Accordingly, students need to be trained to how to filter information, especially those with medical background and journals need to actively implement programmes that target students on social media.

As expected, medical students had better knowledge on COVID-19 and this could be explained by the higher exposure to medical information as part of their studies. Nonetheless, both medical and non-medical students had some gabs in their knowledge. Surprisingly, previous studies showed that both medical and non-medical students in Jordan had very good knowledge on COVID-19 [14,15]. The studies in the literature showed variation in the levels of knowledge on COVID-19 among university students [16,17]. There are several factors that could contribute to these findings. First, students in different countries are exposed to different COVID-19 information based on local governments. Second, some of the information about COVID-19 are still controversial and the students' confusion toward this information is justified given the conflicting reports about it.

Our findings indicated that most of the students have good knowledge on COVID-19. For example, our students had good knowledge on COVID-19 symptoms, but not the impact of COVID-19 on the digestive system. The students were afraid about the safety of their families and they were afraid of visiting crowded places or even leaving homes. Additionally, our findings showed an overall change in behaviour of students. This includes social and cleaning habits. These outcomes could be attributed to the global economic and social consequences of COVID-19. Previous studies linked fears and uncertainty with diseases like depression, anxiety, and the feeling of stigmatization[18,19,20,21].

In summary, this study provides health officials in Jordan with a comprehensive assessment of students' knowledge on COVID-19. Additionally, it emphasizes how COVID-19 changes the behaviour of students. Nevertheless, further studies with a larger sample size are necessary to shed more light on this topic.

This study has several limitations. First, the sample frame was not representative and we believe that there are many students with different level of knowledge might be missed in our study. Second, self-reporting could induce bias.

Conclusion

Medical students had better knowledge and were more aware on COVID-19 than that of non-medical students; for this reason, medical students tended to change their behaviors in a good way. The current pandemic seems to impact the psychology of the both group with no difference significant.

Conflicts of interest

The authors declare that they have no conflicts of interest to disclose.

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المعرفة والسلوك والتغيير النفسي بين طلاب الكليات الطبية وغير الطبية في الأردن خلال جائحة COVID-19

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ملخص

الخلفية: انتشر مرض فيروس كورونا 2019 (COVID-19) بسرعة في جميع أنحاء العالم، وأعلنت منظمة الصحة العالمية رسميا أنه وباء في 11 مارس 2020. ويرتبط COVID-19 بزيادة معدلات الاعتلال والوفيات، وقد أثر على حياة سكان العالم. الهدف: مقارنة معرفة طلاب الطب وغير الطبيين في الجامعات الأردنية في القضايا المتعلقة ب COVID-19 وتقييم التغيرات النفسية والسلوكية في حياة الطلاب الأردنيين بعد التعرض المباشر/غير المباشر ل .COVID-19

الطرق: تم إرسال استطلاع وصفي عبر الإنترنت إلى عينة ملائمة في الجامعات الأردنية من خلال وسائل التواصل الاجتماعي (فيسبوك وواتساب) بين 16 يونيو و30 يونيو 2020. وقد صمم الاستبيان لجمع المعلومات الديمغرافية، ومصدر معلومات المشاركين فيما يتعلق بCOVID-19 ، والمعرفة بشأنCOVID-19 ، والعواقب النفسية لCOVID-19 ، وتأثير COVID-19على سلوك المشاركين. واختبر الخبراء في الميدان الصيغة النهائية للاستبيان من أجل صحة المحتوى. تم استخدام اختبار Chi-square للعثور على اختلافات كبيرة بين المجموعتين .

النتائج: أكمل ما مجموعه 912 مشاركا الدراسة الاستقصائية، وكان 507 (55.6 في المائة) من طلاب الطب و405 (44.4 في المائة) من غير طلاب الطب. حوالي 90٪ من الطلاب يؤمنون بوجود فيروس كورونا(n = 817) ، ولكن ليس في خطورة العدوى (ن = 85، 9.3٪). ووافقت الأغلبية 82.2٪ (ن= 750) على أن الأخبار المزيفة على وسائل التواصل الاجتماعي تسببت في حالات ذعر. تجنب ما مجموعه 275 طالب طب متابعة الأخبار مقارنة ب 187 طالبا من غير طلاب الطب، وكان الفرق مهما إحصائيا) القيمة .(p = 0.003 كان هناك 438 طالب طب و338 طالب طب تجنبوا مغادرة المنزل لتلبية احتياجات غير ضرورية) قيمة.(p = 0.004

استنتاج: كان لدى طلاب الطب معرفة أفضل وكانوا أكثر وعيا ب COVID-19 من الطلاب غير الطبيين؛ لهذا السبب، يميل طلاب الطب إلى تغيير سلوكهم بطريقة جيدة. ويبدو أن الوباء الحالي يؤثر على نفسية المجموعتين دون فرق كبير.

الكلمات الدالة: Covid-19، طلاب الطب، والمعرفة، والأثر النفسي، والسلوك.

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