

Awareness of COVID-19 among Pharmacy Students of Pakistan

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Abstract

Background: COVID-19 is an infectious disease caused by the most recently discovered Coronavirus and has been a global threat. The objective of our study is to assess the knowledge and practice of pharmacy students in different Universities of Pakistan related to the nature and management of the COVID-19 pandemic. **Methods:** A descriptive and cross-sectional study was conducted from March to July 2020 by using an online as well as a self-administered questionnaire. Undergraduate pharmacy students were considered as the study population. The questionnaire was outlined with 6 sections including demographics; symptoms; risk; action and prevention; treatment options; and distinguishing characteristics of COVID-19, cold, and flu. The data were coded, entered, and analyzed using a statistical package for social sciences SPSS (IBM, version 22). **Finding:** Out of 1266 total respondents, the majority 863 (68.2%) were female pharmacy students with ages ranging from 18-26 years. The mean percentage of knowledge, awareness, and perception of the study sample about the symptoms, risk, transmission, prevention, and action against COVID-19 was found to be 56.43%. **Conclusion:** The low level of awareness immediately demands the update of the respective curriculum, conduct evidence-based learning, webinars, and mock drills to all the professionals as well as to the students of different disciplines by the Government and health departments. Students of health science should utilize their academic knowledge with a professional touch to assist the community to contain the disease. They can ensure the safety of people voluntarily by different public awareness programs to overcome such a global crisis.

Key words: COVID-19, Students, Pharmacy, Universities, Pakistan, Pandemics, Perception.

INTRODUCTION

COVID-19 is an infectious respiratory disease caused by the most recently discovered coronavirus named severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) belonging to the family *coronaviridae*.^[1] On March 11, 2020 the World Health Organization (WHO) declared COVID-19 as a pandemic due to its rapid and global spread.^[2]

The virus gets transmitted through the respiratory tract as droplets or respiratory secretions. It can also get transmitted by direct contact with the infected person and indirect contact via touching the contaminated surface with poor hygiene practice.^[3]

It is sometimes asymptomatic in nature. In case of symptomatic nature, it manifests from mild symptoms like fever, fatigue, dry cough, and myalgia to pneumonia and acute respiratory distress syndrome (ARDS) in severe cases as well.^[4] There are total 94,124,612 confirmed cases as of 21 January 2021 with death tally reaching to 2,034,527 globally.^[5] Among these data, a total of 5,382,718 confirmed cases are contributed from Eastern Mediterranean Region of which 521,211 cases are confirmed in Pakistan only with a death toll to 10,997 as of the same date.^[5-6]

As it has affected millions of people all over the world, the WHO COVID-19 incident management team and other related organizations are

actively involved in delivering assistance and harmonization for revival and bringing back normal life.^[7-8] All the healthcare employees are working day and night to make the world free of COVID-19.^[9] In this regard, the pharmacists, being a frontline healthcare practitioner, can contribute to the management based on the vibrant approaches of clinical, public-awareness campaigns as well as managerial tasks within the scope of their expertise.^[10]

For a containment strategy, the WHO has suggested preventive measures such as hand washing, avoiding crowd, maintaining social distancing, wearing masks and gloves, and travel restriction to those areas which are at high risk.^[11] Now, the Oxford University-AstraZeneca vaccine, permitted late in 2020 after being effective in 70% of people in trial, has been launched on 5 January 2021 with a great ray of hope. Until now, not a single drug has been fully approved for the therapy of COVID-19.^[12] The repurposing of prior used

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drugs such as hydroxychloroquine/azithromycin, remdesivir, ivermectin, dexamethasone, lopinavir/ritonavir, arbidol, oseltamivir, favipiravir, and tocilizumab are used in an approach along with supportive treatment for its therapy in different healthcare settings.^[13] Self-medication is not suggested as adverse effects of repurposed drugs are being fatal in many cases such as cardiac adverse effects of hydroxychloroquine.

As pharmacists are the frontline healthcare workers in different healthcare settings such as clinical settings in hospitals, community pharmacies, and in different public health sectors. The academic knowledge and professional touch for the management of such pandemics are inevitable for such professionals to better take care of themselves and to serve the community. The purpose of our study is to evaluate the awareness of pharmacy students in different Universities of Pakistan regarding symptoms, risk, preventive measures, and different types of treatment options for COVID-19 pandemic.

METHODS

Study Design and Participants

A descriptive, cross-sectional study was carried out from 01 March 2020 to 31 July 2020 using online as well as self-administered questionnaires. A total of 1266 undergraduate pharmacy students were selected by convenience sampling from six different pharmacy institutions from the most developed Province of Pakistan – Punjab Province. The selected institutions were Punjab University College of Pharmacy (PUCP), University of the Punjab; Faculty of Pharmacy, University of Central Punjab (UCP); Akhtar Saeed College of Pharmaceutical Science (ACPS); Gulab Devi Institute of Pharmacy, Gulab Devi Educational Complex (GDEC); and Institute of Pharmaceutical Sciences, University of Veterinary and Animal Sciences (UVAS) from Lahore and Faculty of Pharmacy, Bahauddin Zakariya University (BZU) from Multan.

Inclusion/Exclusion Criteria

All the current undergraduate students in pharmacy program were invited to participate in the survey. The students of any age, gender, socioeconomic status, and residence type who accepted to be enrolled were included. The students who were from faculties other than pharmacy and who were already passed out were excluded from the study.

Study Instrument

A structured questionnaire was designed after extensive literature review for data collection constituting six sections. The questionnaire was validated by experts in pharmacy academia (FKH). The reliability of questionnaire was evaluated with Cronbach alpha yielding a value of 0.78. Incomplete forms were not included in final data. The first section of questionnaire consisted of demographics as gender, age, professional year/semester, and name of university. Whereas, the second section included knowledge and awareness about symptoms of COVID-19 such as; fever, dry cough, sore throat, headache, shortness of breath, sneezing, exhaustion, body aches, diarrhea, and abdominal pain.^[14] Similarly, the third section constituted awareness about risks of COVID-19 infection such as; smoking, drinking alcohol, co-morbidities, susceptibility to infection, acute cardiac injury, diabetes, and lung diseases and transmission of COVID-19 from animals or humans.^[15] Likewise, the fourth section included knowledge about the preventive measures like wearing mask, drinking boiled water, avoiding touching eyes; mouth; and nose with unclean hands, self-isolation, and quarantine after travelling to foreign countries.^[16] The fifth section comprised of questionnaire related to the awareness about treatment options for

COVID-19 infections like different antivirals, supportive oxygen therapy, and mechanical ventilation. The last section were about the knowledge of the distinguishing characteristics of cold, flu, and COVID-19 infection like incubation period of cold; flu; and COVID-19, species of corona virus, and co-morbidities.¹⁷

Data Collection Procedure

The pharmacy students were approached through personal visits to the selected universities before the start of lockdown period and were informed about the aims and objectives of the research. After taking consent, the data were collected only from those who were willing to participate in study. Continuous guidance was provided in case of any misunderstanding about the questions. After the start of country-wide lockdown, it was difficult to approach the students personally. Therefore, to deal with such hurdle, an online Google form was prepared of the same questionnaire and then shared through WhatsApp application platform. The personal information was kept confidential and all the incomplete data forms were excluded from the study.

Statistical Analysis

The data were coded, entered, and analyzed using statistical package for social sciences SPSS (IBM, version 22). Results were expressed by using descriptive statistics (frequencies and percentages).

Ethical Consideration

The study has been reviewed and approved by The Human Ethical Committee University College of Pharmacy, University of the Punjab, Lahore (HEC/PU/PUCP/099/2016). The ethical and professional considerations were followed throughout the study to keep the data and investigational information strictly confidential.

RESULTS

Population Demographics

Overall, 1266 participants had completed the questionnaire. Out of which, 863 (68.2%) were female students and rest were male. The majority of students 492 (38.9%) were from PUCP, whereas least number of students 105 (8.3%) were from GDEC. Table 1 shows all the demographic characteristics of respondents.

Awareness about symptoms of COVID-19 infection

The respondent's knowledge and awareness about most common symptoms of COVID-19 infection like fever, dry cough, shortness of breath, and sore throat was (1127) 89%, (1056) 83.4%, (1038) 82%, and (749) 59.2% respectively. Overall, 78.4% all participants were aware about the most common symptoms. The most common symptom agreed by participants was fever (1127) 89%. The least common symptom according to the participants was abdominal pain (184) 14.5%. The mean percentage of awareness of all symptoms among whole sample included most as well as least common symptoms was 50.28%. The senior students had better knowledge and awareness about the symptoms of COVID-19 infection as shown in Table 2.

Awareness about risks, prevention and supportive/alternative treatment options for COVID-19 infection

The respondents were aware that lung diseases, smoking, acute cardiac injury, drinking alcohol, and diabetes were potential risk factors for COVID-19 infection. The lung diseases, smoking, acute cardiac injury,

Table 1: Demographic characteristics of participants.

Particulars	Frequency (N)	Percentage (%)
Gender		
Male	403	31.8
Female	863	68.2
University		
Punjab University College of Pharmacy (PUCP), University of the Punjab, Lahore	492	38.9
Faculty of Pharmacy, University of Central Punjab (UCP), Lahore	286	22.6
Akhtar Saeed College of Pharmaceutical Sciences (ASCPS), Lahore	120	9.5
Gulab Devi Institute of Pharmacy, Gulab Devi Education Complex (GDEC), Lahore	105	8.3
Faculty of Pharmacy, Bahauddin Zakariya University (BZU), Multan	119	9.4
Institute of Pharmaceutical Sciences, University of Veterinary and Animal Sciences (UVAS), Lahore	144	11.4
Professional Year		
1 st	269	21.2
2 nd	266	21.0
3 rd	281	22.2
4 th	250	19.7
5 th	200	15.8

N= Frequency, %= Percentage,

drinking alcohol, and diabetes were considered as potential risk by (894) 70.6%, (762) 60.2%, (660) 52.1%, (474) 37.4%, and (594) 46.9% respondents respectively. Similarly, 82.7% (1047) students knew that wearing mask as a useful way for the prevention and action against COVID-19 pandemic. Similarly, (1264) 99.8% disagreed to drink hot water for removal and killing COVID-19 virus. There were (980) 77.4% participants who agreed to avoid touching nose, eyes, and mouth with unwashed or non-sanitized hands during COVID-19 pandemic. The respondent's opinion about treatment options for COVID-19 pandemic was analyzed. A total of (837) 66.1% respondents thought that the antiviral drugs are useful therapy for COVID-19 pandemic, (836) 66% believed that the mechanical ventilation as a useful treatment option, whereas (632) 49.1% and (599) 47.3% were of the view that the use of oxygen therapy and intubation as supportive therapy respectively are effective for COVID-19 pandemic. The mean percentage of awareness about risks, prevention and supportive treatment options for COVID-19 infection among whole sample was 61.92%. The students in higher classes were less aware about the risks, prevention, and supportive treatment options for COVID-19 infection compared to the lower-level students as shown in Table 3.

The mean percentage of knowledge, awareness, and perception of the

Table 2: Symptoms of COVID-19 infection.

Symptoms	1 st year Students N (%)	2 nd year Students N (%)	3 rd year Students N (%)	4 th year Students N (%)	5 th year Students N (%)	Total Students N (%)
Dry cough						
True	207(77)	226(85)	230(81)	221(88)	172(86)	1056(83)
False	62(23)	40(15)	51(18)	29(11)	28(14)	210(16)
Fever						
True	232(86)	238(89)	249(88)	226(90)	182(91)	1127(89)
False	37(13)	28(10)	32(11)	24(9)	18(9)	139(11)
Sore throat						
True	158(58)	167(62)	175(62)	133(53)	116(58)	749(59)
False	111(41)	99(37.2)	106(37)	117(46)	84(42)	517(40)
Shortness of breath						
True	209(77)	209(78)	228(81)	222(88)	170(85)	1038(82)
False	60(22)	57(21)	53(18)	28(11)	30(15)	228(18)
Headache						
True	92(34)	99(37)	102(36)	100(40)	77(38)	470(37)
False	177(65)	167(62)	179(63)	150(60)	123(61)	796(62)
Sneezing						
True	120(44)	123(46)	128(45)	102(40)	93(46)	566(44)
False	149(55)	143(53)	153(54)	148(59)	107(53)	700(55)
Exhaustion						
True	92(34)	80(30)	90(32)	74(29)	59(29)	395(31)
False	177(65)	186(69)	191(68)	176(70)	141(70)	871(68)
Body aches						
Agree	98(36)	90(33)	110(39)	99(39)	75(37)	472(37)
Disagree	171(63)	176(66)	171(60)	151(60)	125(62)	794(62)
Diarrhea						
True	63(23)	66(24)	72(25)	58(23)	50(25)	309(24)
False	206(76)	200(75)	209(74)	192(76)	150(75)	957(75)
Abdominal pain						
True	39(14)	37(13.9)	45(16)	33(13)	30(15)	184(14)
False	230(85)	229(86.1)	236(84)	217(86)	170(85)	1082(85)
Mean % of Correct Knowledge of symptoms	42	50	50	50	51	50

N= Frequency, %= Percentage

	1st Year Students N (%)	2nd Year Students N (%)	3rd Year Students N (%)	4th Year Students N (%)	5th Year Students N (%)	Total Students N (%)
Risks						
Smoking						
True	161(59.9)	160(60.2)	171(60.9)	153(61.2)	117(58.5)	762(60.2)
False	108(40.1)	106(39.8)	110(39.1)	97(38.8)	83(41.5)	504(39.8)
Drinking alcohol						
True	106(39.4)	107(40.2)	101(35.9)	86(34.4)	74(37.0)	474(37.4)
False	163(60.6)	159(59.8)	180(64.1)	164(65.6)	126(63.0)	792(62.6)
Acute cardiac injury						
True						
False	153(56.9)	148(55.6)	153(54.4)	111(44.4)	95(47.5)	660(52.1)
	116(43.1)	118(44.4)	128(45.6)	139(55.6)	105(52.5)	606(47.9)
Diabetes						
True	125(46.5)	119(44.7)	128(45.6)	123(49.2)	99(49.5)	594(46.9)
False	144(53.5)	147(55.3)	153(54.4)	127(50.8)	101(50.5)	672(53.1)
Lung disease						
True	182(67.7)	183(68.8)	189(67.3)	188(75.2)	152(76.0)	894(70.6)
False	87(32.3)	83(31.2)	92(32.7)	62(24.8)	48(24.0)	372(29.4)
Preventive measures Wear mask						
True						
False	212(78.8)	218(82.0)	233(82.9)	215(86.0)	169(84.5)	1047(82.7)
	57(21.2)	48(18.0)	48(17.1)	35(14.0)	31(15.5)	219(17.3)
Drinking hot water						
True	2(0.7)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	2 (0.2)
False	267(99.3)	266(100.0)	281(100.0)	250(100.0)	200(100.0)	1264 (99.8)
Avoid cold eating						
True	142(52.8)	146(54.9)	138(49.1)	103(41.2)	90(45.0)	619 (48.9)
False	127(47.2)	120(45.1)	143(50.9)	147(58.8)	110(55.0)	647 (51.1)
Avoid touching mouth, eyes, and nose with unclean hands						
True	186(69.1)	195(73.3)	208(74.0)	223(89.2)	168(84.0)	980(77.4)
False	83(30.9)	71(26.7)	73(26.0)	27(10.8)	32(16.0)	282(22.6)
Treatment option						
Antiviral						
True	182(67.7)	179(67.3)	194(69.0)	158(63.2)	124(62.0)	837(66.1)
False	87(32.3)	87(32.7)	87(31.0)	92(36.8)	76(38.0)	429(33.9)
Intubation						
True	145(53.9)	139(52.3)	136(48.4)	98(39.2)	81(40.5)	599(47.3)
False	124(46.1)	127(47.7)	145(51.6)	152(60.8)	119(59.5)	667(52.7)
Oxygen therapy						
True	143(53.2)	139(52.3)	131(46.6)	121(48.4)	98(49.0)	632(49.1)
False	126(46.8)	127(47.7)	150(53.4)	129(51.6)	102(51.0)	634(51.1)
Mechanical ventilation						
True	181(67.3)	169(63.5)	191(68.0)	165(66.0)	130(65.0)	836(66)
False	88(32.7)	97(36.5)	90(32.0)	85(34.0)	70(35.0)	430(34)
Mean % of Correct Knowledge	62.5%	62.7%	61.7%	61.3%	61.4%	61.92%

N= Frequency, %= Percentage, COVID-19= Coronavirus disease 2019

respondents about the symptoms, risk, transmission, preventive measures, and treatment options against COVID-19 was 56.43%.

DISCUSSION

This study concerns the adequacy of knowledge about prevention, symptoms, and treatment options of COVID-19 pandemic. The students of health science must possess the updated information about the public health threat not only for their personal care but also for better care of public. Many research articles demonstrated greater percentage of knowledge in physicians and medical students about prevention and treatment of COVID-19 as compared to our study. Currently there is a great threat among the public due to COVID-19 outbreak as a pandemic situation. The human-to-human

transmission is on rise and creating a global havoc.

This is the first of its kind study in Pakistan where the knowledge of pharmacy students ($n = 1266$) has been assessed related to symptoms, risk, preventive measures, and therapy for COVID-19 pandemic. Association between pharmacy students and knowledge of symptoms of COVID-19 showed that the majority of final year Pharmacy students (80%) were well aware about the most common symptoms of COVID-19. The overall level of awareness among all participants related to most common symptoms was 78.4%. This is comparable to the study conducted in Iran where 79.6% of the medical students had related knowledge about COVID-19 symptoms.^[18] The most common symptom agreed by participants for COVID-19 was

fever (89%) which is somehow similar to the study conducted in Bangladesh (91.8%) and contrary to the findings of study conducted in India (18.2%).^[19-20] The high percentage of response among study sample about risks of COVID-19 was lung disease (894) 70.6% and the recorded mean of awareness about risks of COVID-19 was 78.4%. Our study revealed that the most active response to prevent COVID-19 infections is to wear mask and to avoid touching nose, mouth, and eyes with unclean hands. This finding matches with a findings of a study conducted in India, where about 97% of the participants were following the same practices.^[20] A study from Iran^[18] demonstrated that 94.6% of students were well aware about the preventive measures and tackling aspect, whereas only 77.9% population from our study were in same status. This indicates the need of training on containment strategy against pandemic. The most common response about the therapy for COVID-19 pandemic was the use of antiviral drugs (837) 66.1%. The correct response of the total respondents regarding knowledge about the distinguishing characteristics of cold, flu, and COVID-19 pandemic that included incubation period, association between greater risk and age of peoples, quarantine, susceptibility, and transmission was 60.2%. Data showed there was no association between level of professional year of PharmD students and awareness about risks, prevention, transmission, and therapy for COVID-19 pandemic. The mean percentage of adequate knowledge, awareness, and practice of study sample about all the symptoms, risk, transmission, preventive measures, and therapy against COVID-19 pandemic was 56.43% which is less than the findings of a study conducted in Mumbai, India (71.2%),^[21] Iran(86.96%),^[18] and China (90%).^[22-23] Such findings might be attributed by the lack of training to the students and the less interest of students on management of public health that indicates a proper action plan from the government level to train healthcare as well as other students for voluntary works for the effective containment strategy. Not only the professionals, but also the students should be given priority for managing disease burden as they can be a great asset for spreading awareness regarding COVID-19 management. The correct information through the social media and from government level is mandatory for proper management of COVID-19 pandemic.

Strengths and Limitations

This study has provided a useful and detailed insight into the knowledge, attitude, and practices of pharmacy students towards COVID-19 pandemic in Punjab Province, Pakistan. Inclusion of pharmacy students from six different Universities of Punjab is a key strength that facilitated in-depth investigation about the awareness regarding COVID-19. This a first of its kind study in Pakistan where the awareness of pharmacy students regarding COVID-19 pandemic has been assessed. However, there are some potential limitations in this study. Due to lockdown approach for containment of COVID-19 by the government of Pakistan, many data were taken online. Another limitation was that it was conducted in Punjab Province only. The findings obtained from this study may not generalize the awareness level of pharmacy students from whole Pakistan. As Punjab is the most developed province and pharmacy students of different universities from different cities were selected for the study, the findings would not be that much different from other parts of the country as well.

CONCLUSION

This study concerns the adequacy of knowledge of pharmacy students about the symptoms, risk factors, preventive measures, and therapeutic option for COVID-19 pandemic management. The poor findings of mean percentage of knowledge, awareness, and perception of study sample (56.43%) urges the training programs for containment strategy of COVID-19 pandemic that

must clear the ambiguities about such disease and its management approach. Not only the professional healthcare workers, but also the students of health science should deserve the adequate training and information regarding management of such pandemic. The academic knowledge and professional touch strengthen the ability and confidence level that definitely has positive impact towards managing such a global public health threat. Government and health departments should update and modify the respective curriculum, conduct online scientific knowledge-based course, seminars or webinar, as well as mock drills and make evidence based teaching network for university students. Students then utilize academic knowledge with professional touch to ensure safety of the people by voluntarily spreading awareness to overcome such pandemic crisis.

Contributors

The project is completed by KK, AZ, GMH and RK is supervised by FKH. All work is done smoothly and with coordination among all coauthors. Detailed work plan, monitoring, and evaluation system has been prepared by them. They have collected, analyzed and compiled the data followed by the interpretation of the factual materials from this study paper. FKH reviewed and approved the paper, including the revisions. Final manuscript has been approved by all Authors.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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