Assessing the Levels of COVID-19 Literacy Among University Students

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Abstract

Purpose: This study assessed the levels of COVID-19 literacy among university students in Pakistan.
Design/methodology/approach: A cross-sectional survey method was adopted using an online questionnaire for data collection. A total of 371 received questionnaires were analyzed by calculating the means, standard deviations, Pearson correlations, and t-test.
Research limitation(s): The results should be generalized with caution as study is not the representative of the whole university students' community in Pakistan.
Key finding(s): A large majority (83.3%) of students had COVID-19 literacy at a sub-optimal level as more than half of the sample exhibited literacy at moderate levels, followed by those having low levels. There was a statistically significant relationship of COVID-19 literacy with the geographical background, which meant that the urban student had higher literacy as compared to rural students.
Practical implication(s): These findings had serious implications for public health in Pakistan calling for an improvement in health education. The university and library administration should develop a need-based mechanism to improve health literacy of students as they act as an agent of information delivery for those around them.
Contribution to knowledge: It would be a worthy contribution to the existing literature on health literacy in general and COVID-19 literacy in particular as limited research has been conducted so far.

Paper type: Research.
Keyword(s): COVID-19 pandemic; Health literacy; COVID-19 literacy; University libraries; Pakistan.

Introduction

The coronavirus disease (COVID-19) has infected more than 18.5 million people along with about .70 million deaths globally (World Health Organization, 2020; Worldometer, 2020) since its emergence and recognition as a global pandemic (Cucinotta & Vanelli, 2020; LloydSherlock et al., 2020; Mahase, 2020; Watkins, 2020). It is caused by SARS-COV-2, in Wuhan, (Khan, Kazmi, Bashir, & Siddique, 2020; Li, Lu, & Zhang, 2020; Phan, 2020). This infection not only wreaked havoc, dismantled everyday life, and, caused panic, and over-burdened the health care systems of the world (Bao, Sun, Meng, Shi, & Lu, 2020; Xu, Li, Tian, Li, & Kong, 2020) but also exposed the ill-preparedness of governments and health care systems of the world (Duan, Wang, &Yang, 2020; Nguyen et al., 2020a; Nguyen et al., 2020b; Rosenbaum, 2020). The rapid spread of COVID-19 infection called for peoples' ability to utilize credible health information at a faster pace to respond to the emerging health needs in the pandemic scenario (Nguyen et al., 2020a; Nguyen et al., 2020b; Paakkari & Okan, 2020; Zarocostas, 2020). The pandemic situation required individuals' preparedness besides systems preparedness to respond proactively so that they may make informed decisions and adopt health-protective behaviours (Paakkari & Okan; Zarocostas).

Knowledge of the risky factors of infectious diseases is and has always been critical not only to control infection but also to avoid the devastating effects of pandemics (Abel & Mcqueen, 2020; Parikh et al., 2020). Therefore, health personnel aimed to educate people about the COVID-19, the ways to avoid getting and spreading the infection, practical solutions (e.g. washing hands, wearing masks, social distancing, etc.), and where to find credible health advisory (Paakkari & Okan, 2020; Prem et al., 2020). Unfortunately, the abundance of conspirative information spreading faster than coronavirus itself over social media platforms and other outlets put public health at a severe risk (DeLuca, 2020; Naeem, Bhatti, & Khan, 2020; Zarocostas, 2020). The Director-General of the World Health Organization stated, during an address at the Munich Security Conference on the 15th of February 2020, "we're not just fighting an epidemic; we're fighting an infodemic" (Zarocostas, p.2). The infodemic associated with COVID-19 challenged the people's

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ability to acquire and use credible health information (Paakkari & Okan). It posed an unprecedented challenge for health education, communication, and healthcare systems (Nguyen et al., 2020a). The need for designing health literacy programs has never been more realized during COVID-19 pandemic and infodemic (Abel & Mcqueen; Paakkari & Okan).

Literature Review

There is a sizable literature on health literacy in general. A limited number of studies are available examining health literacy in the COVID-19 context. Health literacy is essential to cope with the pandemic situations like COVID-19 as it enables people to adapt their existing lifestyles, reduce uncertainty, prevent from over-reactions, and adopt preventive behaviours (Able & McQueen, 2020; Greenhalgh, 2015; Maverick Insider, 2020; Moro et al., 2010; Naveed & Shaukat, 2020; Nguyen et al. 2020a; Watson, 2011). People with limited health literacy are more at risks of being infected with COVID-19, and face health deprivation (Okan et al., 2020; Sørensen, 2020). They are less likely to adopt health preventive measures (Nielsen-Bohlman, Panzer, & Kindig, 2004), and are likely to have higher fear and depressions (Nguyen et al., 2020a; Nguyen et al., 2020b), are greater consumer of medical care (Cho, Lee, Arozullah, & Crittenden, 2008), require more hospitalization (Baker et al., 2002), are bearer of increased inpatients expenditures (Howard, Gazmararian, & Parker, 2005), and have high mortality rates (Baker et al., 2007).

In view of above, adequate health literacy is useful to deal with the COVID-19 pandemic as enables people for the applying credible information in making need-based decisions and motivate them for the adoption of preventive behaviours. According to Paakkari and Okan (2020), it should be considered "concerning social responsibility and solidarity and is required not only by people in need of health information but also by information service providers" (p. e250). Social responsibility and solidarity are required from the general public to avoid unintended sharing of unreliable, false, and conspirative information about the COVID-19 pandemic.

Several studies in the context of COVID-19 were conducted using an online questionnaire by selecting samples from medical and non-medical populations in Asia and North America. (e.g. Fauzi, Husamah, Miharja, Fatmawati, Permana, & Hudha, 2020; Nguyen et al., 2020a; Nguyen et al., 2020b; Parikh et al., 2020). These studies reported that the health literacy of both general and medical populations was not at an optimal level, which was quite alarming. Seng, Yeam, Huang, Tan, and Low (2020) pointed out that "understanding the levels and determinants of pandemic related health literacy across different populations is essential for healthcare policymakers to formulate optimal strategies for effective communication of critical medical information in the COVID-19 crisis and future pandemics" (p. 5). There was a need for more investigations focusing health literacy related to COVID-19. No study appeared to have been conducted in Pakistan addressing the COVID-19 literacy of university students. Therefore, the present research intended to assess the levels of COVID-19 literacy among university students in Pakistan by addressing specifically the following research objectives.

Research Objectives

1. To assess the self-perceived level of COVID-19 literacy among university students.
2. To determine the nature of the relationship of COVID-19 literacy with socio-academic variables of university students.

Research Methodology

A cross-sectional survey was conducted to assess the COVID-19 literacy of university students using an online questionnaire. The questionnaire was designed in Google forms and comprised of 23-items of the COVID-19 Literacy Scale (CLS) developed by Naveed, Shaukat, and Anwar (2020). This scale had a two-factor solution, namely, 'infection spread and symptoms' (11 items, CA= .957) and 'infection prevention and treatment' (12 items, CA=.936). Each statement was measured on 5-point Likert-type scale i.e. '1=strongly disagree', '2= disagree', '3=Undecided', '4= agree', and '5=strongly agree'. CLS is a valid and reliable measure for COVID-19 literacy assessment because it has been reported to have a satisfactory

content, face, and construct validity along with high reliability (Naveed, Shaukat & Anwar, 2020). The data for certain socio-academic variables such as age, gender, study program, positive COVID-19 testing, the experience of COVID-19 symptoms, and geographical background were also collected.

Three universities, two public, and one private sector, from the province of Punjab, Pakistan such as the University of the Punjab, Lahore (PU), University of Sargodha, Sargodha (SU), and University of Management and Technology, Lahore (UMT) were purposively selected as research setting. The first two universities such as PU and SU belonged to the public sector whereas the later one 'UMT' belonged to a private sector. The reasons for the selection of these universities due to easy access to data sources as they belonged to tow of three selected universities. Also, the researchers easily got permission for data collection in these universities. All the students enrolled in social science and business programs were selected as study population and the survey instrument was administered in online classes with the help of instructors of these three universities with prior permission. The students were requested for volunteer participation in the survey; a total of 371 questionnaires were received and were used later on for analysis. The reliability of the instrument was calculated, based on the dataset of this study, using Cronbach alpha i.e. 0.91.

Firstly, the mean score and standard deviation for each statement were calculated. Afterward, the composite variables were created using 23-items for overall scale and its sub-dimensions by computing the means of these statements. The means scores of 23-items of the overall scale, as well as items of the sub-dimensions in literacy level, were also summed as literacy score of each student to determine the levels of COVID-19 literacy such as 'Low', 'Moderate', and 'High' based on Bloom cut off point. Lastly, the correlation coefficient such as Pearson *r* and *t*-statistics were calculated for relationship testing.

Results

Demographic Profile

Out of 371 survey responses, there were 171 (46.09%) students from the University of the Punjab, 138(37.2%) students belonged to the University of Sargodha, and 50 (13.5%) students were from the University of Management and Technology with 147 (39.8%) males and 223 (60.4%) females. There were 148 (39.9%) males and 223 (60.1%) females. Most of these students (n=303, 81.7%) belonged to graduate programs (16 years of education) which was followed by those (n=68, 18.3%) who belonged to postgraduate programs (MS/MPhil/Ph.D.). The age of these students ranged from 19 to 51 years. A large majority of the survey respondents (n=313, 84.4%) had their age up to 25 years, followed by those who aged in the range of 26 – 30 years (n=31, 8.3%). There were only 27 (7.3%) students having age more than 30 years. More than half of the students (n= 201, 54.2%) had a geographical background as urban whereas 170 (45.8%) students belonged to rural areas. As far as COVID-19 infection is concerned, A large majority (n=351, 94.6%) of the sample did not infect with COVID-19. Only 20 (5.4%) students got COVID-19 infection. Besides, a large majority of these students (n=335, 90.3%) did not experience COVID-19 symptoms. Only 36 students (9.7%) experienced such symptoms.

Self-Perceived COVID-19 Literacy of University Students

The university students were asked to assess their self-perceived COVID-19 literacy on a five-point Likert scale. The mean and standard deviation of responses of these students for each statement was outlined and ranked in Table 1. These figures indicated that these participants were literate about COVID-19 as they expressed agreements to the statements related to precautionary measures of COVID-19 pandemic, isolation of an infected person, avoiding physical contacts with infected people, quarantine period, nature of the infection, social distancing, isolation, major symptoms, avoidance of body fluids of infected people, infection spread, time to go for self-quarantine, when to contact for health professionals, curative possibility, non-availability of vaccination, and death rate due to COVID-19 death rate with mean score 3.79 and above. However, these students were less aware of the transmission of infection from an asymptomatic person, when and where to go far testing, how to find credible information about the pandemic, the risk of possible infection from cured people, the role of spiritual healers, and alternative

medicine, ways of transmission and levels, and identification of possible infected people and area as the mean score for these statements were ranged from 3.11 to 3.51.

Table 1. Self-perceived COVID-19 Literacy of University Students (n=371)

Rank	Statement	Mean	Std. Dev.
1	I am aware of precautionary measures (e.g. washing hands, using sanitizer, wearing a mask, social distancing, avoiding public gatherings and traveling, covering mouth while sneezing, and self-quarantine).	4.27	1.07
2	I know that the COVID-19 infected person must be isolated for two to three weeks.	4.25	1.11
3	Avoiding physical contact with infected persons is useful for self-protection.	4.18	1.11
4	I am aware that the person who has contacted with the COVID-19 infected person must be isolated for two to three weeks.	4.18	1.08
5	I understand that COVID-19 is transmitted form one person to another.	4.17	1.12
6	I am aware of that quarantine and isolation are effective measures to reduce the spread of COVID-19 infection.	4.17	1.09
7	I know that isolation is compulsory for symptomatic people.	4.16	1.14
8	I am aware of COVID-19 symptoms (e.g. coughing, sore throat, fever, shortness of breath, and so on).	4.12	1.09
9	Avoiding the body fluids of infected people is helpful for self-protection.	4.04	1.05
10	I understand that the infected people can spread it up to 14 days.	3.99	1.07
11	I am aware of when to go for self-quarantine.	3.98	1.09
12	I know that when to contact health professionals for treatment.	3.96	1.07
13	I understand that the COVID-19 infected people can be cured.	3.93	1.02
14	There is no vaccine for treatment of COVID-19.	3.88	1.18
15	I am aware of the death rate due to COVID-19 pandemic.	3.79	1.15
16	I know that asymptomatic person can spread COVID-19 infection for 15 days when infected with it.	3.51	1.06
17	I understand when and where to go for COVID-19 testing.	3.49	1.08
18	I know where to find credible information about COVID-19 pandemic.	3.41	1.19
19	I am aware of the risks of possible infection from cured patients.	3.39	1.09
20	I understand the role of spiritual healers in pandemics.	3.32	1.13
21	I understand the role of alternative medicine healing COVID-19.	3.22	1.14
22	I understand the transmission ways and levels of COVID-19.	3.16	1.11
23	I am able to identify the possible infected people and areas around me.	3.11	1.19

Levels of COVID-19 Literacy

The university students' levels of COVID-19 literacy were grouped as 'Low', 'Moderate', and 'High' based on Bloom cut off point. The score of 23-items of the overall scale as well as items of the sub-dimensions in literacy level was summed as the literacy score of each student. If the summed score of students was ≥ 80, they were characterized as 'high' in the literacy level. The students having a summed score between 60 and 79 were considered as 'moderate, in the literacy level. The 'low' literacy level was assigned to those students having their sum scores less than 60. Table 2 outlined the frequency and percentage of three levels of COVID-19 literacy for the overall scale and its sub-dimensions. These figures revealed that about half of the survey participants, with slight variations, had a moderate level of literacy for overall scale as well as for its sub-dimensions. For the overall scale, it was followed by those having low literacy (n=108, 29.1%) and high literacy (n=62, 16.7%). As far as the dimension of 'infection spread and symptoms' is concerned, 99(26.7%) of the respondents were in high literacy level and 75 (20.2%) had a low level of literacy. For the dimension of 'infection prevention and treatment" 116 (31.3%) and 66 (17.8%) fall in the category of low and high literacy levels respectively. It is worth noting here that a large

majority of the survey sample had COVID-19 literacy at the sub-optimal level which was quite alarming, worrisome, and troublesome.

Table 2. Students' Literacy levels for CLS and Sub-dimensions (n=371)

Dimension	Low	Moderate	High
Infection spread and symptoms	75 (20.2%)	197 (53.1%)	99 (26.7%)
Infection prevention and treatment	116 (31.3%)	189 (50.9%)	66 (17.8%)
Overall COVID-19 literacy	108 (29.1%)	201 (54.2%)	62 (16.7%)

Relationship of COVID-19 Literacy with Socio-academic Variables

For relationship testing, the calculations of the composite mean score were performed by computing the mean scores of items for overall scale as well as its sub-dimensions. Later on. the statistics such as Pearson correlation, independent sample *t*-test, and one-way ANOVA were applied to test the relationship of the COVID-19 Literacy Scale and sub-dimensions with socio-academic variables of university students. The results are presented in Table 3.

Table 3. Relationship of COVID-19 Literacy with Socio-academic Variables

Variable	Statistics	Value	Sig.
Age	Pearson correlation	.016	.752
Gender	Independent sample *t*-test	-.779	.437
Program of study	Independent sample *t*-test	.721	.308
COVID-19 symptoms experience	Independent sample *t*-test	.683	.495
Positive COVID-19 testing	Independent sample *t*-test	-1.155	.262
Geographical background	Independent sample *t*-test	1.793	.036*

*P < .05

The results of Pearson correlation resulted no statistically significant relationship of COVID-19 literacy for overall scale (r= .016, P= .752 > .05) as well as for its sub-dimensions such as 'Infection Spread and Symptoms' (r= .009, P= .868 > .05) and 'Infection Prevention and Treatment' (r= .019, P= .723 > .05). An independent sample t-test which carried out to investigate the mean differences in the index of overall scale and its sub-dimensions based on gender, study program, COVID-19 symptoms experienced in the last three months, positive COVID-19 testing, and geographical background. These results indicated no statistically significant mean difference in COVID-19 literacy for overall scale and its subdimensions based on gender, study program, COVID-19 symptoms experienced in the last three months, and positive COVID-19 testing as p-values were greater than alpha at .05. However, the results of independent sample *t*-test indicated a statistically significant mean differences in the index of overall scale (t= 2.791, P= .036 < .05) and its sub-dimensions such as 'Infection Spread and Symptoms' (t= 1.919, P= .031 < .05) and 'Infection Prevention and Treatment' (t= 2.131, P= .004 < .05) based on geographical background of university students. The mean scores of urban students were greater than the mean score of rural students indicating that urban students had higher COVID-19 literacy than rural students.

Discussion and Conclusions

The present research assessed the levels of COVID-19 literacy among university students in Pakistan deploying a cross-sectional survey along with an online questionnaire. The findings revealed that a large

majority of the university students had COVID-19 literacy at the sub-optimal level as more than half the students assessed themselves for COVID-19 literacy at moderate levels (n=201, 54.2%). This was followed by those students having low levels (n=108, 29.1%). Out of 371 survey participants, only 62(16.7%) had health literacy related to the COVID-19 pandemic at a high level. These results were not anticipated as WHO, the Government of Pakistan, mass-media, telehealth centers of each university communicated health information proactively through public health advisory platforms, and public service messages. It would be interesting to investigate the information seeking behaviour of university students for COVID-19 so that health information communication services might be designed in a compatible way. These results were quite alarming and worrisome that might have serious implications for public health in Pakistan. These results were consistent with the results of that of Fauzi, Husamah, Miharja, Fatmawati, Permana, and Hudha (2020) who also reported that the biology teacher candidates also exhibited COVID-19 literacy either at low or moderate levels and only a few candidates were categorized at a high level.

There was no relationship of COVID-19 literacy of university students with their age, gender, study program, positive COVID-19 testing, and experience of COVID-19 symptoms. However, the statistically significant mean differences were found in students' COVID-19 literacy scores based on their geographical background. In other words, urban students had higher COVID-19 literacy as compared to rural students. The reason might be due to the lack of or limited access to the internet in rural areas as it was also one of the serious concerns of rural students towards online classes during the COVID-19 pandemic. The government, university administration, and library staff should respond immediately to these results and develop a need-based mechanism to improve COVID-19 literacy of students in Pakistan as the university students act as an agent of information delivery for those around them. The focus should be on rural students as rural areas of Pakistan lack appropriate information infrastructure. In addition, the teachers are expected to engage university students with assignments related to the COVID-19 pandemic and infodemic and its devastating effect on socio-economic development. Although, the situation of cases having COVID-19 pandemic is under control in Pakistan due to smart lockdowns as there are only 26,845 active cases out of 2,81,131 total confirmed cases as of 5th August 2020 (Government of Pakistan, 2020). These results called for an improved health literacy program through a platform compatible with the information-seeking behaivour of people of Pakistan. The failure or limited health communication related to the COVID-19 program might put public health at severe risk and the people might face the devastating consequence of the COVID-19 pandemic. The cost of low health literacy is always underestimated worldwide and governments, as well as the general public, usually pay high costs for it without realization.

COVID-19 literacy should be considered as a crucial and frontline tool to respond to COVID-19 infection as many studies reported that the people with knowledge of COVID-19 likely to adopt health-protective behaviors (Naveed & Shaukat, 2020; Riad, Huang, Zheng & Elavsky, 2020). The knowledge of COVID-19 not only helps people to reduce carelessness, prevent over-reactions, and make informed decisions about health issues (Able & McQueen, 2020) but also prepare them for a collective societal response (Naveed & Shaukat, 2020; Paakkari & Okan, 2020; Zarocostas, 2020). That is why COVID-19 literacy is more important to respond appropriately for infection prevention and care as individual preparedness along with system preparedness is essential to cope with complex health problems in pandemic situations. According to Paakkari and Okan (2020), health literacy related to COVID-19 is an underestimated problem requiring attention not only of the governments but also of individuals as it has the potential to help people to understand the reason behind recommendations and outcome of adopting protective behaviours. The development of people's ability to cope with complex health situations such as COVID-19 is more needed than ever.

Given the above, the governments should invest in health education, communication, and promotion for the preparation of people to respond with the prevailing pandemic and infodemic situations requiring rapid and sound reaction. These results would be useful not only for policymakers in making evidence-based and informed decisions about COVID-19 but also for information professionals engaged in health literacy programs in Pakistan and other developing countries especially South Asian countries such as Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, and Siri Lanka as these countries share similar characteristics. In limitations, these results should carefully be generalized as the survey was conducted

with students of only three universities in Pakistan and this research does not claim in any way to be the voice of students of whole Pakistani universities. It is hoped that this research would be a worthy contribution to the existing research on COVID-19 Pandemic in general and health literacy related to COVID-19 in particular as limited studies were available so far.

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