

Original article:

Knowledge, attitude and practices among the inhabitants of Lahore, Pakistan towards the COVID-19 pandemic: an immediate online based cross-sectional survey while people are under the lockdown.

Kanwal Ashiq¹, Sana Ashiq², Mayyda Asif Bajwa³, Samreen Tanveer⁴, Mehwish Qayyum⁵

Abstract:

Background: COVID-19 is an emerging infectious disease and has reached a status of global health emergency. It is widespread in Pakistan causing morbidity and mortality amongst masses. **Objectives:** Undertaken study aims at investigating knowledge, attitude and practices of the people residing in Lahore, Pakistan whilst the global crisis with sparse data available previously. **Methodology:** Following lockdown announcement, an immediate online cross sectional study was conducted from the 31st March to 6 April 2020. Data was analyzed by using SPSS IBM version 22. 00. **Results:** A total of 316 responses were received. Our study has shown that people 95.80% were well familiar with COVID-19, informed via news channels 46.2%. 91.7% believed the virus is contagious, 95.8% reported that the virus is spread by the respiratory droplets, 89.2% believed that all ages are at risk while 62.3% believed it risky for geriatrics only. 60.4% believed in its prevention with 91.7% respondents agreeably quarantined themselves while 6.6% didn't. 99.7% participants were aware of social/physical distancing and 75.6% found it affecting mental health i.e. cause anxiety, depression etc. 59.2% of respondents were optimistic expecting it to end soon while 32.3% were uncertain. 49.1% said they have diagnostic facility and 89.6% acknowledged efforts of researchers/healthcare providers (doctors, pharmacist, nurses, allied health professionals and paramedical staff) for the society. 94.3% believed that there is need of awareness regarding COVID-19. **Conclusion:** An ever increasing need of awareness amongst the local population regarding COVID-19 is needed. It will lend hands in preventing spread of COVID-19 with minimal secondary transmission. It is recommended that extensive survey studies are required that can provide supportive data in developing and implementing public health policies regarding COVID-19 pandemic. It would further control and arrest the spread of COVID-19 in country.

Keywords: Coronavirus, COVID-19, Pakistan, Pandemic, Quarantine

*Bangladesh Journal of Medical Science, Special Issue on Covid19, 2020. Page : S 69-S 76
DOI: <https://doi.org/10.3329/bjms.v19i0.48169>*

Introduction

A walk down through history, brings to our notice a gigantic number of outbreak of diseases, affecting masses all around the globe. Epidemic or pandemic, has tremendously affected people in terms of morbidity and mortality, overall affecting the lives, economy and lifestyles in the worst possible way. The history of pandemic has been well known to the public, with its first ever encounter through a viral outbreak reported in 1918. This was renowned

as Spanish flu with H1N1 influenza virus being the causative agent. The viral outbreak affected as many as 500 million people across the world with a massive rise in death toll shooting from 17 to 50 million. A similar situation was faced on the face of the globe in 2009 by the spread H1N1 Swine flu during the time frame of 2009-2010. This contributed to an enormous feat rate inflicting around 6.8 billion people while killing nearly 5 million people of the world population¹. In recent times,

1. Kanwal Ashiq, Faculty of Pharmaceutical Sciences, The Superior College Lahore, Superior University 17-km Lahore, Pakistan.
2. Sana Ashiq, Centre for Applied Molecular Biology (CAMB), University of the Punjab Lahore, Pakistan.
3. Mayyda Asif Bajwa, Faculty of Pharmaceutical Sciences, The Superior College Lahore, Superior University 17-km Lahore, Pakistan.
4. Samreen Tanveer, Faculty of Pharmacy, University of Central Punjab Lahore, Pakistan.
5. Mehwish Qayyum, Faculty of Pharmaceutical Sciences, The Superior College Lahore, Superior University 17-km Lahore, Pakistan.

Correspondence to: Kanwal Ashiq, Faculty of Pharmaceutical Sciences, Superior College Lahore, Superior University 17-km Lahore, Pakistan. E-mail : kanwal.ashiq@superior.edu.pk / pharmacist.kanwal6@gmail.com

COVID-19 outbreak is accounted as a global issue with a health emergency like situation. This has been closely associated with unprecedented outburst of pneumonia with an etiology previously not known well. The viral outbreak was first reported in Wuhan City, lying within Hubei province in the last month of year 2019. Following the findings of this disease, a novel virus that is corona virus was identified as the sole agent. Later named by the WHO (World Health Organization) as COVID-19. This has shown close association with previous outbreaks reported under, severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS)²⁻³. Structurally, coronaviruses are described as enveloped, single-stranded positive large RNA virus that is known for its zoonotic feature. Morphologically, it appears as spherical virions composed of a core shell fitted with surface projections akin to a solar corona. This is how the name was established from Latin word corona, meaning crown. Apparently, SARS-CoV-2 transferred from animals to humans via its oral consumption as food, finding its display in the Huanan sea food market in Wuhan, China⁴. The symptoms seen in patients infected with COVID-19 indicated a higher leukocyte count with high levels of plasma pro-inflammatory cytokines followed with abnormal respiratory findings. To understand better, a case with COVID-19 was reported with the 5 days of recurring fever with body's temperature affixed at 39.0 °C. Patient also had a cough presenting sounds of coarse breathing. Through clinical investigations, the sputum of the subject revealed positive real-time polymerase chain reaction (PCR) confirming COVID-19 infection⁵. In order to better understand the transmission and risk factors, a consistent data of epidemiological information must be obtained. This would rather explain, course and magnitude of geographic spread, infection related risks, transmission routes and to better plan to reduce this global burden via epidemiological models enabling prioritized surveillance post collection of real time data⁶. The current healthcare system of Pakistan does not promise a thorough service to the entire population. Thus, the only option feasible in times remains restriction of spreads, in turn less active cases. The number may decrease with timely testing of masses, quarantining active patients, imparting isolation and social distancing practices amongst public to break the chain of spread. Also passive counseling of public with communication between designated health authorities is the need of hour⁷. In addition to this, with rising threat of COVID-19 improving the

technical skills and knowledge of healthcare workers is also of paramount importance. Improvement in knowledge and global updates is a must to combat this pandemic disease⁸. The spread of this disease has taken the entire world alike, people's knowledge, adherence to control measures, precautions and overall attitude is important to be learnt in best interest of public health^{9, 10}. The underlying study aims at investigating the knowledge, attitude and practices of the people residing in Lahore, Pakistan on this global crisis, as previously no such study was found through extensive literature review.

Materials and Methods

Duration

Following the lockdown announcement of towns/cities, immediately a week study was conducted from the 31st March to 6th April, 2020. An online cross sectional study was done in order to obtain the data since physical interaction for questionnaire distribution and filling was not possible to have the community based survey.

Participants

For the purpose of sample collection, a form of two pages was generated by consulting the recent published studies^{9, 11}. Further, sample collection proforma was uploaded on the Google forms and links were shared on different platforms (WhatsApp, FaceBook, LinkedIn, Twitter etc). Authors have also sought help from their reliable connections to spread this sample collection form in order to get maximum response from the volunteers. Participants who were sixteen years of age or above were allocated for the data collection based on their understanding. No area was confined to allow maximum data collection throughout the region. Respondents had to respond either in no or yes in order to confirm their participation voluntarily. Once approval of voluntary participation was confirmed participants were navigated to the sample collection instrument. Sample collection instrument and statistical analysis The sample collection form was divided into the two parts. First section dealt with demographic information including: Name, age, gender, marital status, education and residence city/town. Second area broadly covered knowledge, attitude and practice analysis which included various questions provided with yes, no and may be options. Knowledge was analyzed through question 1 to 17 while questions from 18 to 25 assessed population attitude. However, questions from 25 to 29 were constructed to know the practices followed by the population in the current scenario. Following this, collected data was

analyzed by using SPSS IBM version 22. 00. Option codes 0, 1, and 3 were assigned to maybe, yes and no respectively while entering the data in SPSS. Frequencies, percentages, standard deviation (SD), independent t-test and ANOVA were calculated to evaluate the received data. The value of p (statistical significance level) was kept less than 0.05 which considered significant for this study.

Results

A total of 316 responses were obtained. The socio demographic information (table 1) showed that the majority of the population belonged to an age group of 21-25. Among 316 respondents 169 (53.48%) were females while 147 (46.52%) were males and most of them had a graduation degree 120 (37.97%).

Table 1. Demographic characteristics of the participants

	n (%)	±SD
Age		0.58
16-20	83(26.27%)	
21-25	168(53.16%)	
26-30	27(8.54%)	
31-35	18(5.70%)	
36-40	13(4.11%)	
above 40	7(2.22%)	
Gender		0.5
Male	147(46.52%)	
Female	169(53.48%)	
Marital Status		0.32
Married	51(16.14%)	
Unmarried	265(83.86%)	
Education		0.55
Matric or below	21(6.65%)	
Intermediate	67(21.20%)	
Undergraduation	76(24.05%)	
Graduation	120(37.97%)	
Post-graduation	32(10.13%)	

Results regarding knowledge, attitude and practices were summarized in Table, 2, 3 and Figure 1. Our study has revealed that 303 people (95.80%) were familiar with COVID-19 and most of them heard about this disease through news channels 146 (46.2%) as compared to the social media 147 (46.5%), family 10 (3.2%) and other sources 13 (4.11%). 218 (69.1%) knew the cause of this pandemic while 93 (29.4%) were unaware of the exact cause of this pandemic, demonstrating the need to educate people about the disease. 290 (91.7%) participants revealed their knowledge of contagiousness of virus and 303 (95.88%) reported that virus spreads by the respiratory droplets. 283 (89.2%) respondents answered that the virus affects people of all age

groups. 197 (62.3%) claimed that elderly people were more prone to the infection while 21(6.64%) respondents were uncertain about this and 98 (31.0%) participants answered in negation. In terms of treatment of the COVID-19, 265 (83.9%) said that it was not available while 51 (16.1%) believed that treatment is available for COVID-19 infection.

191 (60.4%) of the current study candidates believed that COVID-19 infection is preventable while 115 (36.4%) were uncertain about this. 290 (91.7%) respondent quarantined themselves including their family members. 315 (99.7%) participants were well aware that social/physical distancing is helpful in avoiding the infection and breaking the chain of spread of disease. Regarding the COVID-19 diagnostic facility 155 (49.1%) respondents were found to have diagnostic facility as compared to the 81 (25.6%) who lied on the other extreme while 80 (25.3%) were unsure about this question. 297 (94%) of the participants responded in affirmation to the knowledge of COVID-19 symptoms which included dry cough, fever, fatigue and difficulty in breathing while 19 (6%) were unconvinced about the symptoms of COVID-19 infection. 238 (75.3%) participants thought that early supportive and symptomatic treatment could be helpful in cure of COVID-19 infection. 295 (93.4%) of the respondents said that isolation from the people who are infected with the COVID-19 virus is an effective way to reduce the spread of the virus as compared to 17 (5.4%), who were unsure about it.

295 (93.4%) of participants were well informed that people having interaction with someone having this infection should be immediately isolated for 14 days as an observational period. 308 (97.5%) of this survey candidates said that COVID-19 pandemic badly affected the world economy and 272 (86.1%) of the participants answered that in the prevailing scenario, people are faced with trouble in getting basic necessities (food/rations etc.). 239 (75.6%) of participants said that this pandemic affects people's mental health i.e. causing anxiety, depression etc. 187 (59.2%) of the respondents were optimistic and said that COVID-19 infection will end soon as compared to the 102 (32.3%) who were uncertain while 27 (8.5%) replied in negative. 193 (61.1%) of this survey candidates were satisfied by the government initiatives and practices to prevent infection as compared to the 65 (20.6%) and 58 (18.4%), who were not sure about it. 91 (28.8%) respondents said that herbal plants could be beneficial in treatment of infection as compared to the 190 (60.1%) who were

indeterminate. Only 174 (55.1%) respondents claimed that people took this as a health emergency and followed preventive measures. 283 (89.6%) survey participants acknowledged the efforts of researchers/healthcare providers (doctors, pharmacists, nurses, allied health professionals and paramedical staff) for their society. 298 (94.3%) participants responded that there is a dire need to spread general awareness regarding COVID-19 and the same number of participants revealed that they wash hands for 20

seconds and follow recommended procedure for washing hands. To prevent infection, participants practiced measures including social/physical distancing 219 (69.3%), wear mask 27 (8.54%) etc. To improve mental health, participants replied that they adopted healthy activities which included exercise, yoga and walk 133 (42.1%), maintain personal hygiene 62 (19.6%), avoid junk food, eat fruits and take good sleep 55 (17.4%), reading 23 (7.3%) etc.

Table 2. Knowledge, attitude and practices assessment of the respondents

Items	Yes n (%)	No n (%)	May be n (%)	±SD
You know about COVID-19	303 (95.80%)	3 (0.9%)	10 (3.3%)	0.138
You know the cause of this COVID-19 pandemic	218 (69.1%)	93 (29.4%)	5 (1.5%)	0.478
COVID-19 virus is highly contagious	290 (91.7%)	10 (3.16%)	16 (5.0%)	0.232
Virus spread by respiratory droplets	303 (95.88%)	11 (3.48%)	2 (0.06%)	210
COVID-19 affect all age groups	283 (89.2%)	16 (5.0%)	17 (5.3%)	0.49
Only elderly people affected severely	197 (62.3%)	98 (31.0%)	21 (6.64%)	0.516
Treatment is available for COVID-19 virus infection	51 (16.1%)	265 (83.9%)	0	0.445
COVID-19 infection is preventable	191 (60.4%)	109 (3.2%)	115 (36.4%)	0.535
You and your family members have quarantined in order to avoid infection	290 (91.7%)	21 (6.6%)	5 (1.5%)	0.249
Do you think social/physical distance is helpful in preventing the spread of disease?	315 (99.7%)	01 (0.3%)	0	0.056
Is there any diagnostic testing facility available in your region?	155 (49.1%)	81 (25.6%)	80 (25.3%)	0.715
Dry cough, fever, fatigue and difficulty in breathing are the symptoms of COVID-19 infection.	297 (94%)	0	19 (6%)	0.238
Early supportive and symptomatic treatment can be helpful in cure of COVID-19 infection	238 (75.3%)	11 (3.5%)	67 (21.2%)	0.465
Isolation from the people who are infected with the COVID-19 virus is an effective way to reduce the spread of the virus.	295 (93.4%)	4 (1.3%)	17 (5.4%)	0.255
People who have interaction with someone having this infection should be immediately isolated for 14 days as an observational period.	295 (93.4%)	3 (0.9%)	18 (5.7%)	0.254
COVID-19 pandemic affects the world economy badly	308 (97.5%)	1 (0.3%)	7 (2.2%)	0.158
In prevailing scenario people facing trouble in getting basic necessities (food/rations etc)	272 (86.1%)	14 (4.4%)	30 (9.5%)	0.37
COVID-19 pandemic affects mental health (depression, anxiety, loss of interest etc.)	239 (75.6%)	32 (10.1%)	45 (14.2%)	0.493
Do you think this infection can be controlled soon?	187 (59.2%)	27 (8.5%)	102 (32.3%)	0.594
Are you satisfied by current practices and initiatives taken by the government?	193 (61.1%)	65 (20.6%)	58 (18.4%)	0.624
Herbal plants can be used treat this infection	91 (28.8%)	35 (11.1%)	190 (60.1%)	0.688
People taken this health emergency seriously and follow preventive measures	174 (55.1%)	81 (25.6%)	61 (19.3%)	0.668
You acknowledge the efforts of researchers/healthcare providers (doctors, pharmacist, nurses, allied health professionals and paramedical staff) for their society	283 (89.6%)	14 (4.4%)	19 (6%)	0.231
There is need of general awareness about COVID-19 pandemic	298 (94.3%)	7 (2.2%)	11 (3.5%)	0.239
You wash hands for 20 seconds and follow recommended procedure for washing hands	298 (94.3%)	3 (0.9%)	15 (4.7%)	0.236

*All calculated *p* values were less than 0.05 which means these were significant.

Table 3. Answers reported by the respondents

Items	n (%)
From where you heard about this disease?	
News Channels	146 (46.2%)
Social Media	147 (46.5%)
Family	10 (3.2%)
Others	13 (4.11%)
In your opinion, reason of COVID-19 is	
Caused by virus	273(86.3%)
By eating infected food	13(4.11%)
Gathering	14(4.4%)
Poor immunity	16(5.06%)
Preventive measures you have taken to avoid or spread the COVID-19 infection	
Social/physical distancing	219(69.3%)
Wear mask	27(8.54)
Hand wash	70(22.2%)
Healthy activities adopted during quarantine to improve mental health	
Exercise, yoga and walk	133(42.1%)
Reading	23(7.3%)
Cooking	18(5.7%)
Indoor games	25(7.9%)
Avoid junk food, eat fruits and take good sleep	55(17.4%)
Maintain personal hygiene	62(19.6%)

Discussion

To the best of our knowledge it is the first study in Pakistan which is based on knowledge, attitudes and practices of the community towards the COVID-19. Majority of the population in this study is educated and belongs to females. Current study indicates that the community is well informed and has sound knowledge about the COVID-19. News channels and social media have played a significant role in this regard, to make communities familiar with COVID-19 pandemic^{9, 12}. However, this study has several limitations i.e. only literate people were accessible through online portals and to fill the form. English language must be understood by the respondents, participants needed to have an account to access the questionnaire and dissemination of the sampling instrument only through an online platform¹⁰. Majority of the population stated that COVID-19 is transmitted through respiratory droplets, can affect all age groups and elderly people were more prone to develop severe infection which could lead to death¹³. Public was well aware about the signs and symptoms of the COVID-19 infection which included dry cough, fever, fatigue and difficulty in breathing. Many participants of this study were unsure if COVID-19 infection is preventable and early supportive treatment and isolation of the infected patient is helpful in controlling the spread or not. Many studies suggested that COVID-19 infection is preventable at the general population and national level through implementation of proper strategies. For COVID-19 infection there is no treatment available and a large number of the respondents agreed on this point¹⁴. Quarantine or social distancing is helpful in reducing the number of COVID-19 cases. In the prevailing scenario, the government deemed that lockdown could be a best option which may prove beneficial in controlling the infection and declared countrywide lockdown. Many people respect this decision and keep themselves under the lockdown but still there are people who didn't take this health emergency seriously. These people are at high risk to have infection and become a source of spreading COVID-19 infection which may result into a hindrance in achieving the goal i.e. controlling the infection^{15, 16}. This survey indicates that more than fifty percent of the respondents admire government initiatives and practices in order to cope with the current situation while remaining are not satisfied. The present study has also highlighted that the public is facing troubles while getting basic necessities (food/rations etc). Further, Pakistan is

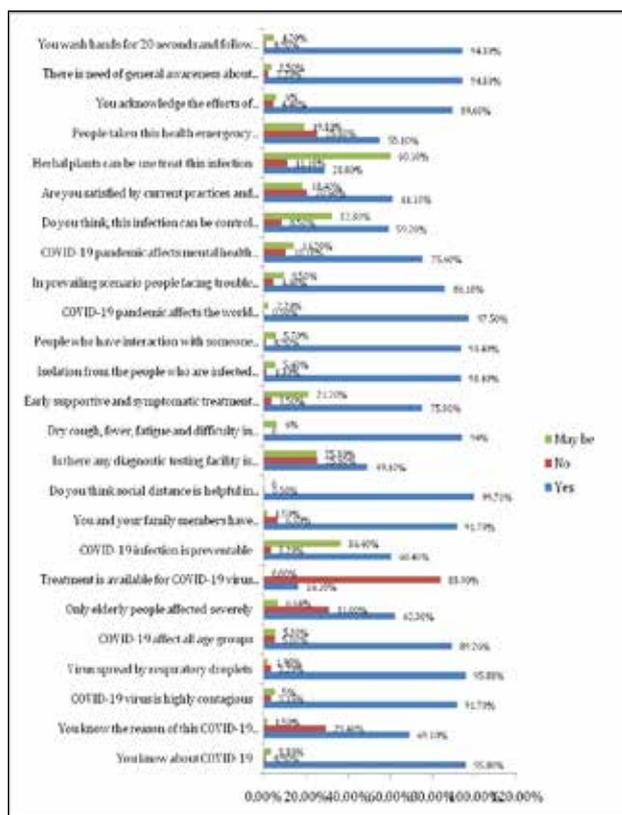


Figure 1. Knowledge, attitude and practices assessment of the respondents

already facing the economic crisis and it is quite difficult to sustain this lockdown for a longer period otherwise it is supposed that people may face issues to have basic necessities^{17,18}. Many people residing in Pakistan also imply herbal medicines to treat various ailments with strong belief but for COVID-19 cure, many people are unconfident. An investigation has suggested that cure of H1N1 and SARS through Chinese traditional medicine is well documented, based on human evidence and historical data and such medicine could be an alternative approach to prevent COVID-19 in high risk communities¹⁹. This study is also focused on the availability of diagnostic facilities to the public. Less than half of participants agreed on its availability while remaining claimed that it is not available or unsure. Earlier, Pakistan lacked the COVID-19 diagnostic facility and now Pakistan has received Primer from Japan and the rapid diagnostic kits from China. Now, Pakistan has the diagnostic facility at major centers and still there is need to establish more testing points to screen maximum population²⁰. COVID-19 also poses challenges to the mental well-being and resilience of the societies. This current global health emergency has badly impacted the psychological health (i.e. depression, anxiety, boredom, frustration etc.) of the individuals. To deal with it many people have adopted healthy activities which include exercise, yoga, playing indoor games, reading, writing, cooking etc.^{21, 22} further launching of many new free online courses in this duration of crisis is also an effective way to keep people (especially students) busy and has opened new doors of learning²³. Worldwide frontline heroes including the health care providers (doctors, pharmacists, nurses, allied health care professionals and paramedical staff) and researchers are working tirelessly to fight against the COVID-19 by putting their lives at risk. People not only Pakistan, but globally acknowledge their efforts and struggle²⁴⁻²⁶.

Conclusion

Present study concludes that people are well informed about COVID-19 however still there is need of awareness amongst masses regarding COVID-19 to counteract the spread. People should rather quarantine themselves in order to prevent infection, catering this as a health emergency by keenly observing precautionary measures. However, to keep a mental and physical balance of health, people should adopt healthy activities during the lockdown. It is obvious from this study that the community also acknowledges the struggle and determination of the researchers and frontline healthcare providers for the well-being of their society.

Conflict of interest

The authors declare that there is no conflict of interest.

Funding

None

Ethical clearance

This cross sectional survey study has been conducted after obtaining suitable informed consent from volunteers. After approval from the participants data were collected and confidentiality of the information was secured.

Authors contribution

Data gathering and idea owner of this study: Kanwal Ashiq

Study design: Kanwal Ashiq, Sana Ashiq

Data gathering: Kanwal Ashiq, Sana Ashiq, Mayyda Asif Bajwa, Samreen Tanveer, Mehwish Qayyum

Writing and submitting manuscript: Kanwal Ashiq, Sana Ashiq

Editing and approval of final draft: Kanwal Ashiq, Sana Ashiq, Mayyda Asif Bajwa, Samreen Tanveer, Mehwish Qayyum

Acknowledgments: Authors would like to acknowledge all participants who volunteer themselves for this survey.

References:

1. Arshad A, Afzal S. An update on preventive measures of COVID-19 in Pakistan. *Annals of King Edward Medical University*. 2020; **26**(1):1-2. <http://annalskemu.org/journal/index.php/annals/article/view/3266>
2. Sohrabi C, Alsafi Z, O'Neill N, Khan M, Kerwan A, Al-Jabir A, et al. World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19). *International Journal of Surgery*. 2020; **76**:71-76. <https://doi.org/10.1016/j.ijssu.2020.02.034>
3. Lipsitch M, Swerdlow DL, Finelli L. Defining the epidemiology of Covid-19—studies needed. *New England Journal of Medicine*. 2020; **382**:1194-1196. <https://doi.org/10.1056/NEJMp2002125>
4. Velavan TP, Meyer CG. The COVID-19 epidemic. *Tropical Medicine and International Health*. 2020; **25**(3):278-80. <https://doi.org/10.1111/tmi.13383>
5. Rothan HA, Byrareddy SN. The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. *Journal of Autoimmunity*. 2020; **109**:102433. <https://doi.org/10.1016/j.jaut.2020.102433>
6. Xu B, Kraemer MU, Gutierrez B, Mekar S, Sewalk K, Loskill A, et al. Open access epidemiological data from the COVID-19 outbreak. *The Lancet Infectious Diseases*. 2020; **20**(5):534. [https://dx.doi.org/10.1016%2FS1473-3099\(20\)30119-5](https://dx.doi.org/10.1016%2FS1473-3099(20)30119-5).
7. Raza S, Rasheed MA, Rashid MK. Transmission Potential and Severity of COVID-19 in Pakistan. *Preprints*. 2020: 1-10. <https://dx.doi.org/10.20944/preprints202004.0004.v1>
8. Bhagavathula AS, Aldhaleei WA, Rahmani J, Mahabadi MA, Bandari DK. Novel Coronavirus (COVID-19) Knowledge and Perceptions: A Survey on Healthcare workers. *MedRxiv*. 2020: 1-15. <https://doi.org/10.1101/2020.03.09.20033381>
9. Zhong B-L, Luo W, Li H-M, Zhang Q-Q, Liu X-G, Li W-T, et al. Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey. *International Journal of Biological Sciences*. 2020; **16**(10): 1745-1752. <https://dx.doi.org/10.7150%2Fijbs.45221>
10. Geldsetzer P. Knowledge and Perceptions of COVID-19 Among the General Public in the United States and the United Kingdom: A Cross-sectional Online Survey. *Annals of Internal Medicine*. 2020. <https://doi.org/10.7326/M20-0912>
11. Rao ASS, Vazquez JA. Identification of COVID-19 can be quicker through artificial intelligence framework using a mobile phone-based survey in the populations when cities/towns are under quarantine. *Infection Control & Hospital Epidemiology*. 2020; **41**(7):826-830 <https://doi.org/10.1017/ice.2020.61>
12. La V-P, Pham T-H, Ho M-T, Nguyen M-H, P Nguyen K-L, Vuong T-T, et al. Policy Response, Social Media and Science Journalism for the Sustainability of the Public Health System Amid the COVID-19 Outbreak: The Vietnam Lessons. *Sustainability*. 2020; **12**(7):2931. <https://www.mdpi.com/2071-1050/12/7/2931#>.
13. Guo Y-R, Cao Q-D, Hong Z-S, Tan Y-Y, Chen S-D, Jin H-J, et al. The origin, transmission and clinical therapies on coronavirus disease 2019 (COVID-19) outbreak—an update on the status. *Military Medical Research*. 2020; **7**(1):1-10. <https://link.springer.com/article/10.1186/s40779-020-00240-0>
14. Adhikari SP, Meng S, Wu Y-J, Mao Y-P, Ye R-X, Wang Q-Z, et al. Epidemiology, causes, clinical manifestation and diagnosis, prevention and control of coronavirus disease (COVID-19) during the early outbreak period: a scoping review. *Infectious Diseases of Poverty*. 2020; **9**(1):1-12. <https://link.springer.com/article/10.1186/s40249-020-00646-x>.
15. Wilder-Smith A, Freedman D. Isolation, quarantine, social distancing and community containment: pivotal role for old-style public health measures in the novel coronavirus (2019-nCoV) outbreak. *Journal of Travel Medicine*. 2020; **27**(2):taaa020. <https://academic.oup.com/jtm/article/27/2/taaa020/5735321>.
16. Watkins J. Preventing a covid-19 pandemic. *British Medical Journal*. 2020; **368**:m810 <https://doi.org/10.1136/bmj.m810>.
17. Hina H, Qayyum A. Effect of financial crisis on sustainable growth: Empirical evidence from Pakistan. *Journal of the Asia Pacific Economy*. 2019; **24**(1):143-64. <https://doi.org/10.1080/13547860.2019.1573453>.
18. Remuzzi A, Remuzzi G. COVID-19 and Italy: what next? *The Lancet*. 2020: 1225-1228. [https://doi.org/10.1016/S0140-6736\(20\)30627-9](https://doi.org/10.1016/S0140-6736(20)30627-9).
19. Luo H, Tang Q-l, Shang Y-x, Liang S-b, Yang M, Robinson N, et al. Can Chinese medicine be used for prevention of corona virus disease 2019 (COVID-19)? A review of historical classics, research evidence and current prevention programs. *Chinese Journal of Integrative Medicine*. 2020; **26**(4): 243–250. <https://link.springer.com/article/10.1007/s11655-020-3192-6>.

20. Saqlain M, Munir MM, Ahmed A, Tahir AH, Kamran S. Is Pakistan prepared to tackle the coronavirus epidemic? *Drugs & Therapy Perspectives*. 2020; **36**: 213–214. <https://link.springer.com/article/10.1007/s40267-020-00721-1>.
 21. Wang C, Pan R, Wan X, Tan Y, Xu L, Ho CS, et al. Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in china. *International Journal of Environmental Research and Public Health*. 2020; **17**(5):1729. <https://doi.org/10.3390/ijerph17051729>.
 22. Qiu J, Shen B, Zhao M, Wang Z, Xie B, Xu Y. A nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: implications and policy recommendations. *General Psychiatry*. 2020; **33**(2): e100213. <https://dx.doi.org/10.1136%2Fgpsy-ch-2020-100213>.
 23. Wang G, Zhang Y, Zhao J, Zhang J, Jiang F. Mitigate the effects of home confinement on children during the COVID-19 outbreak. *The Lancet*. 2020; **395**(10228):945-7. [https://doi.org/10.1016/S0140-6736\(20\)30547-X](https://doi.org/10.1016/S0140-6736(20)30547-X).
 24. Chan AH, Rutter V, Ashiru-Oredope D, Tuck C, Babar ZU. Together we unite: the role of the Commonwealth in achieving universal health coverage through pharmaceutical care amidst the COVID-19 pandemic. *Journal of Pharmaceutical Policy and Practice*. 2020; **13**:1-7. <https://doi.org/10.1186/s40545-020-00214-6>
 25. Cadogan CA, Hughes CM. On the frontline against COVID-19: Community pharmacists' contribution during a public health crisis. *Research in Social and Administrative Pharmacy*. 2020. <https://doi.org/10.1016/j.sapharm.2020.03.015>.
 26. Unadkat S, Farquhar M. Doctors' wellbeing: self-care during the covid-19 pandemic. *British Medical Journal* *BMJ*. 2020; **368**:m1150. <https://doi.org/10.1136/bmj.m1150>.
-