The paradigm shift for educational system continuance in the advent of COVID-19 pandemic: Mental health challenges and reflections

Aneela Maqsood [a], Jaffar Abbas [b,*], Ghazala Rehman [c], Riaqa Mubeen [d]

[a] *Head of the Department of Behavioral Sciences, Fatima Jinnah Women University, The Mall, Old Presidency Rawalpindi, 46000 Pakistan*

[b] *Antai College of Economics and Management (ACM), School of Media and Communication (SMC), Shanghai Jiao Tong University (SJTU), No. 800 Dongchuan Road, Minhang District, 200240 Shanghai, China*

[c] *Director of Gazail Mental Health Services, Ltd. Surrey, United Kingdom*

[d] *School of Management, Harbin Institute of Technology (HIT), No. 92 West Dazhi Street, Nangang District, 150001 Heilongjiang, Harbin, China*

ABSTRACT

Background: The coronavirus pandemic appeared as the worst global health disaster of the century. Since the advent of the Second world war-2, humankind has experienced the most challenging health emergencies. The novel respiratory disease (SARS-CoV-2) emerged in Wuhan at the end of December 2019.

Aim: The study focuses on providing education through the educational system with a mode of delivery using digital solutions with a new paradigm method.

Method: This research incorporates the statistical data related to the Pakistani Ministry of Health's coronavirus epidemic to draw the results.

Results: WHO reported more than 51.949 million confirmed COVID-19 patients in more than 200 territories and countries. This epidemic caused more than 1.282 million deaths; however, more than 36.49 million people have recovered from the infection of the deadly disease COVID-19, as of November 11, 2020. The COVID-19 has put forward unique challenges in personal and social life spheres. The precautionary measures, including social distancing, called for abrupt closure of educational institutions, leaving the digital solutions as the primary mean of continuity in educational activities.

Conclusion: The current review looks into the dynamics of embracing the change in the educational system, ranging from delivery mode to shifting to a new paradigm moving to digital solutions. This study looks into the challenges, issues, barriers, and success parameters of Pakistan's online learning management system. From the preparedness phase to the actual implementation of the learning system at higher education, the level is noteworthy. The private sector has provided higher, secondary, and primary levels; the private sector came forward to maintain learning continuity. The review suggests a way forward ahead for the educational system's continuity and sustainability in the coronavirus pandemic and educational institutions' crises.

Introduction

By the end of December 2019, a new infectious respiratory disease appeared in Wuhan, China, and the World Health Organization named it the COVID-19 virus. The ongoing global health emergency caused by the human-to-human transmissible disease called SARS-CoV-2; severe acute respiratory syndrome coronavirus is a transferrable virus (Abbas et al., 2020). Health professionals identified this fatal disease the first time in Wuhan during late December 2019. According to data from the WHO and John Hopkin University, there are more than 51.949 million confirmed global patients of COVID-19 in 200 territories and countries. According to the (WHO, 2020) COVI-19 transmittable disease caused more

than 26 million confirmed infected cases worldwide (Shuja et al., 2020). WHO declared the outbreak of the pandemic a global health emergency and global concern on January 30, 2020, and later announced it the epidemic on March 11, 2020 (Ahmed et al., 2020; Lai et al., 2020). The epidemic has caused more than 1.282 deaths; however, more than 36.49 million people have fully recovered from the infection of this deadly disease as of November 11, 2020 (Chakraborty and Maity, 2020).

The impact of the COVID-19 on the public health care system

This pandemic (COVID-19) has caused short-term and long-term health issues, such as mental stress, higher anxiety level, a mental

disorder called Post-traumatic stress disorder (PTSD). The fragile health care system in Pakistan was already overwhelmed before the advent of the COVID-19 outbreak. According to the UNDP's available data, one-doctor treats 963 patients; and one hospital bed is available for 1608 people seeking hospitalized treatments. In this crisis, the IMF provided a bailout to Pakistan, amounting to 6 billion US dollars to settle the financial crisis and revive the Pakistan economy. Pakistan Government initiated to support the public health system to combat the pandemic of coronavirus. Pakistan's economy was launching in the stability stage to recover the financial crisis when the coronavirus outbreak hit all sectors of the economy massively (Leung et al., 2020).

The outbreak of the COVID-19 increased poverty and food security

The pandemic COVID-19 infected 51.949 million people as of November 11, 2020, caused food security problems, and one-third of the total population (35%) is already below the poverty line. The pandemic has hugely affected the lower-income segments of society. The poverty level increased to over 50% of the population after the struck of the COVID-19 in Pakistan (Chan Sun and Lan Cheong Wah, 2020). The pandemic has made the situation worse, and 66% of the population (145 million) are spending life below the poverty line. This segment needs instant economic relief packages to improve their quality of life. They need support to continue sending their children to schools, colleges, and universities when the lockdown is over. The novel COVID-19 disease is a critical issue faced by developing and developed countries worldwide. COVID-19 is rapidly spreading around the world. Many scientists and researchers have been investigating the nature of novel coronavirus and evaluating the short-term and long-term impacts of this disease (Akram et al., 2020). So far, there has been no report on the effectiveness of any clinically approved antiviral drugs or vaccines against COVID-19. It rapidly spreads to all regions worldwide and brought colossal health, economic, environmental, and social challenges to the entire humankind (Prem et al., 2020). The COVID-19 pandemic, as the most crucial global health calamity of the century, has put forward challenges to meet in almost every field of human functioning, including education and the whole structure of the social system (Chakraborty and Maity, 2020).

Virtual mode of teaching under the COVID-19 pandemic

The benevolence of information technology's influence on multiple aspects of our lives today has massive impacts, and society cannot refute the role of advanced technologies. Neither can its growing popularity and use in the education sector be denied (Abbasi et al., 2020). The last 50 years have seen tremendous global growth in the provision of education systems at all levels. Hence, COVID-19 is a big challenge that these expanded national education systems have ever faced. Many governments have ordered institutions to cease face-to-face instruction for most of their students, requiring them to switch, almost overnight, to online teaching and virtual education (Daniel, 2020). The virtual model of teaching and learning is not a new phenomenon altogether. For the last many years, numerous educational intuitions have mainly started face-to-face teaching (Prem et al., 2020). Assessment is an indispensable part of learning and teaching, as it creates the achievement of course learning outcomes by the students. Diverse assessment options that can help in utilizing online must consider the issues in educational environment unique to a pandemic situation. Regardless of several online platforms available for assessment with unique advantages and limitations. There is a need to use the learning management system (LMS) features that make the online review more reliable (Khan and Jawaid, 2020).

Raising the literacy rate for children and young age group is the major challenge for Pakistan. In the advent of the COVID-19 pandemic, Pakistan has taken initiatives to launch tele-education as a regular feature by using television media. It is imperative to look for introducing innovative online teaching tools for education delivery in a challenging

Table 1
It shows, literacy rate, total enrolments, teachers serving at various institutes.

Literacy rate	70%
Male literacy	75.5%
Female literacy	59.8%
Total enrolments	55,616,000
Primary education	40,650,010
Secondary education	10,884,400
Post-secondary education	3,949,000
University level post graduates	1,463,000
Public sector universities enrolments (81%)	1,192,000
Private sector universities enrolments (19%)	270,000
Teachers serving with public and private universities	515,000
Teachers serving with pall levels of educational institutions	565,000
Education shift to online learning increased 35% internet users	77,000,000

Source: Ministry of Education, and Pakistan Economic Survey (Hasan et al., 2021).

situation (Qazi et al., 2020). There are 212 Higher Educational Commission (HEC) recognized universities in Pakistan, including military, private, public, and vocational universities. In Pakistan, most public sector universities (110) are working under the umbrella of Government; however, private universities have increased during the last two decades. At present, there are 75 private universities across the country. Please see (Table 1).

Pakistan's literacy rate is over 70%, including male 75.5% and female 59.8%, respectively. There are 55,616,000 total enrolled students across the country, including primary (40,650,010), secondary (10,884,400) and post-secondary (3,949,000). The enrolled students at universities for post-graduate programs are 1.463 million, including enrolment of 1.192 million students at the public sector (81%) universities and 0.27million students (19%) of private universities. There are more than 515,000 teachers affiliated with both private and public sector universities. There are 1659 functional degree colleges to provide education in Pakistan. Presently, more than 565,000 teachers are serving at all levels of educational institutes in Pakistan. Because of the education shift to online teaching, Internet users increased by 35% (77 million) in 2020, according to a digital report of Pakistan. The spread of COVID-19 and the closure of educational institutions worldwide draw our attention to a massive shift in the development of online learning environments (Mukhtar et al., 2020). The developed countries with advanced technological innovations have a well-developed system in place to offer e-learning for students. In developing countries, educational managers, teachers, and policymakers have faced a significant hurdle with converting COVID-19 challenges into opportunities, for instance, developing effective e-learning models addressing the needs of higher education levels, including the technical and specialized areas of educational programs (Farooq et al., 2020). In the emergence of the COVID-19 pandemic, several countries encountered massive challenges and barriers to provide technical and monetary resources and Pakistan faced a massive struck to face such challenges in the provision of online education (Dhahri et al., 2020a). Partnering with technologically advanced educational and technical institutions can play a major role in promoting online learning (Dong et al., 2020).

Global challenges and response of educational institutes under COVID-19 epidemic

The past literature highlights "the International Association of Universities is closely monitoring challenges and response to Covid19 situation in higher education and the world" (Bergman, 2020; Crawford et al., 2020). The World Bank's Policy paper is worth mentioning. It states,' as per April 8, 2020, Universities and other tertiary education institutions over 220 million post-secondary students −13% of the total number of students affected globally (Regehr and Goel, 2020). It had suffered significant displacement due to the COVID-19 situation and affected social, economic and political segments of the society

(Yoosefi Lebni et al., 2020). The emergence of the COVID-19 has affected young and old people as well around the world (Shuja, Shahidullah, et al., 2020). The availability of vaccine will be helpful to reduce mental stress among students and all walks of people in the society (Dhahri et al., 2020b; Su et al., 2020). The immediate challenge would be broad-scale institutional disruption, staff-student displacement, technical debts-having outdated technical platforms, maintaining institutional operations, course works, exams and modification of assessments, and maintaining route operations" (Hilburg et al., 2020; Rajhans et al., 2020). To sum up, there is a higher need to embrace our national policies for higher education digital teaching by linking with universities across the world and seeking assistance (Ashwin et al., 2020; Hodges et al., 2020). It would be beneficial to learn how universities worldwide have prepared themselves for moving their education to the digital platform during and after the Covid-19 world (Yancy, 2020). The emergence of the COVID-19 pandemic has affected almost every segment of the economy. Education can play an indispensable role in educating university students and other people on following protective measures to curb the rapid spread of the disease (Abbas et al., 2019). I would help boost the economic activities of many industries, such as education, tourism, and other business industries (Aman et al., 2019; Mamirkulova et al., 2020)

Closure of educational institutes

With the spread of COVID-19 in Pakistan, the Government ordered educational institutions to suspend their regular academic activities to view the students' safety. Besides, as the country enters nearly a month of a partial to complete lockdown and total suspension of educational institutions, it faces an unprecedented challenge to cope with re-adjusting its academic year (Mukhtar, 2020). The majority of students struggled hugely due to the internet providers' low quality and connectivity issues. We need to be mindful of the specific challenges of the 'transition of the existing face-to-face teaching system to embrace the digital education method adequately. The technical transformation requires developing and building the institutions and professionals' capacity to carry out their teaching effectively, state-of-the-art teaching resources, and material to support their students. The expectations are also to use various visual aids, user-friendly resources to deliver knowledge. It would involve the use of conference calls and recording of the use of power points presentations. Flow charts are some ways of expressing to impart knowledge (Bhamani et al., 2020).

Another challenge shows the relationship between societal behaviors. The students' general response to online education appears to link with issues of transition. We cannot ignore the family's negative opinions/suspicions about using electronic products for a long time; these opinions may summarize the changes in providing education and learning; these are unnecessary. Lack of workstations and personal space at home in a joint family system is another challenge of education provision. Especially keep in mind for those families where parents and their children both need to work and study from home. The unfriendly study/workspace and atmosphere appear a challenging task.

E-learning

Besides, this non-disciplined lifestyle and lack of focus during E-learning, in some cases, would appear demotivating for the students taking online classes. Societal norms are still not explicit that people are generally multitasking while making a phone (audio and video call). Additionally, the concept of part working from home is yet to evolve in our developing country. Creating a peaceful workstation or workspace at home, with minimum disruption, also requires 'commitment and professionalism'; who would provide a guideline about this? A non-disruptive interactive teaching environment would mean accessibility to computer and internet connection, where the student joins the team meeting; without any disruptions. We know that our IT professionals are already exercising these models very effectively for the past two decades. A key issue is addressing how to sustain students' interest in interactive teaching on the specified allocated time. A warm, interactive teaching model requires user-friendly virtual modules of e-learning. These factors are useful to enhance all participation, including those who feel shy, to start.

Both teachers and students need to familiarize themselves with these practical issues; short training orientation workshops can work as a compelling idea to discuss these issues with the support of visual aids. Another critical challenge would emerge in students' relative lack of tolerance towards frequent technical problems and connectivity; we can address this safely by ensuring that lectures are available to those who failed to connect. We have to acknowledge students' frequent frustration expressed concerning limited internet access or attempted failure to join; this is likely to remain an ongoing issue for the time. Nevertheless, the essential bond between students and teachers is a relationship of trust and unconditional regard. Preparing students for this change positively would suggest that students would need 'confidence-building exercises' and 'reassurance' to adapt comfortably with the shift in education delivery.

Teachers have to keep alternate modes of learning, both electronic recordings and print copies of lectures (outlines/bullet points) making available to students. We have to take students along in this journey and display tolerance towards their frustration regarding frequent connectivity issues or constant disruption. The lack of awareness among students about digital learning ethics has worsened the situation. It would be worth explaining. The enlisted technical challenges are not long enough; however, the first is the unavailability of internet services in remote areas; they are less likely to benefit from online education. Is there any alternate solution to this? Do we have any alternative contingency plan?. The bandwidth limitations across the country, with insufficient exceptions, when shared with the enlarged practice burden on inadequate internet infrastructure, would likely add to most students' misery. Some might suggest high-speed internet to solve this issue; however, it is not cost-effective; it would be practically quite difficult to bear the cost.

Another series of challenges involves Government and regulatory aspects. Since the primary responsibility for ensuring quality education lies with the Government's shoulders, the lack of a pre-defined online learning policy will work as the Government's responsibility. Now, Government and regulatory bodies do not seem to be on the same page. For instance, the MoE (Ministry of Education) has issued the appropriate notification form on March 1, 2020, to close universities. The regulatory body is encouraging teachers (from school to Universities) to initiate online classes.

Launch of Tele-education

Ministry of Federal Education, Professional Training, and Pakistan Television have collaborated to launch the National TV for online classes to promote Tele-education and deal with the need for educational coaching due to schools' closure (Naslund et al., 2017). It was helpful to mitigate the losses due to the closure of educational institutes. Subject specialists will teach students, and videos will go on TV (Bhamani et al., 2020). The facility will benefit schoolchildren, children living in remote areas and help parents assist a child's learning (Cascella et al., 2020).

The missing link is 'lack of facilitation' in the process and 'structured operating procedures (SOP's),' backup with proper legislation, to appropriately support the use of online services and digital media. It has caused immense pressure and chaos for the teachers and students at large. In the absence of any formal policy and guidelines, education delivery and quality would remain the primary variable. Holistically, the existing political and bureaucratic structures based on traditional public management principles; appear not to facilitate thorough education delivery using e-learning. The clarity of dearth and reliable data paucity to make sound and timely decisions is challenging, requiring attention to consider these factors for future study aspects.

As a way forward, there is a strong need for the analysis of challenges for online learning in Pakistan, particularly during this pandemic COVID-19 scenario. The first step would be to team up all the stakeholders, including students, faculty, Heads of educational institutions, Vice-Chancellors, regularity bodies, Higher Education Commission (HEC), and Pakistan's Government. The educational institutions face multi-faceted challenges collectively, and these issues refer to broadly classifications as societal, technical, and regulatory (Khan et al., 2020). Short online training workshops would help (i) effective use of digital media (ii) sending computers and resolution of interact connectivity issues for underprivileged students (iii) outlining uniform delivery of education method (iv), and follow up quizzes and assessments after each module. We would need backup support by (v) legislation (vi), formal educational policy regarding data protection issues (vii), and learning from the experiences of International Universities by developing linkages.

Looking at how the universities and institutions have responded to Pakistan's situation, the situation is hopeful. Despite technical and resource challenges, universities and private sector education have quickly met to restructuring the online educational system with a well-planned preparedness plan including professional pieces of training for faculty, staff, and students along with quality assurance and a secure mechanism of monitoring of the quality of the online educational system. By facilitating students and faculty, students had access to a technical database. The psychosocial challenges were dealt through by offering online counseling services by most of the Universities of Pakistan and pairing up volunteer counseling and psychological support services. The continuity education system in higher education as per compliance with HEC and Quality Enhancement Cell, along with the action plan to reach out to those students who have limited access is the visible outcomes. The universities' reliable monitoring and management system with an adaptable approach makes a higher education system in Pakistan compatible with world standards. The review strongly recommends evaluating the Government-owned primary, secondary, and higher secondary schools and colleges to develop institutional planning with conducive system support to shift to the virtual educational system. The review suggests a strong need to address the socio-cultural aspects of society as potential barriers.

Declaration of Competing Interest

The authors are well informed and declared no competing interests.

Acknowledgments

Compliance with Ethical Standards

The ethics committee of the School of Media and Communication of Shanghai Jiao Tong University (SJTU) has reviewed and approved this study before the execution of the research. The authors have informed the respondents that this research has to execute in accordance with relevant institutional and national guidelines and with the appropriate institutional ethics committee's approval.

The informed consent form and ethical approval

The authors have received participants' written, informed consent to participate in the research. The investigators received the informed written consent from all subjects involved in the study, including permission to publish the study outcomes. The authors assured participants that the data received/feedback would be strictly confidential. The study investigators acknowledged that participants have cooperated to save time in filling the survey forms.

Availability of data and material

Data is available at the request from the corresponding author.

Funding

References

Abbas, J., Aman, J., Nurunnabi, M., Bano, S., 2019. The impact of social media on learning behavior for sustainable education: evidence of students from selected universities in Pakistan. Sustainability 11 (6), 1683. http://www.mdpi.com/2071-1050/11/6/1683.

Abbas, J., 2020. The impact of coronavirus (Sars-cov2) epidemic on individuals' mental health: the protective measures of Pakistan in managing and sustaining transmissible disease. Psychiatr Danub 32 (3-4), 472–477. doi:10.24869/psyd.2020.472.

Abbas, J., Ling, J., Ziapour, A., Shuja, K.H., 2020. The role of interventions to manage reduce covid-19 mortality rate of the COVID-19 patients worldwide. Found. Univ. J. Psychol. 4 (2), 33–36. doi:10.33897/fujp.v4i2.158.

Abbasi, S., Ayoob, T., Malik, A., Memon, S.I., 2020. Perceptions of students regarding E-learning during Covid-19 at a private medical college. Pak. J. Med. Sci. 36 (COVID19–S4), S57–S61. doi:10.12669/pjms.36.COVID19-S4.2766.

Ahmed, A., Aqeel, M., Aslam, N., 2020. COVID-19 health crisis and prevalence of anxiety among individuals of various age groups: a qualitative study. The Journal of Mental Health Training, Education Practice 15 (7), 1–9. doi:10.1108/JMHTEP-07-2020-0046.

Akram, W., Adeel, S., Tabassum, M., Jiang, Y., Chandio, A., & Yasmin, I. (2020). Scenario Analysis and Proposed Plan for Pakistan Universities-COVID-19: Application of Design Thinking Model.

Aman, J., Abbas, J., Mahmood, S., Nurunnabi, M., Bano, S., 2019. The influence of islamic religiosity on the perceived socio-cultural impact of sustainable tourism development in Pakistan: a structural equation modeling approach. Sustainability 11 (11), 3039. https://www.mdpi.com/2071-1050/11/11/3039.

Ashwin, P., Boud, D., Calkins, S., Coate, K., Hallett, F., Light, G., Luckett, K., McArthur, J., MacLaren, I., McLean, M., 2020. Reflective Teaching in Higher Education. Bloomsbury Academic.

Bergman, M.M., 2020. The World after COVID. World 1 (1). doi:10.3390/world1010005.

Bhamani, S., Makhdoom, A.Z., Bharuchi, V., Ali, N., Kaleem, S., Ahmed, D., 2020. Home learning in times of COVID: experiences of parents [COVID-19; home learning; online learning; parent support]. J. Educ. Educ. Dev. 7 (1), 18. doi:10.22555/joeed.v7i1.3260.

Cascella, M., Rajnik, M., Cuomo, A., Dulebohn, S.C., Di Napoli, R., 2020. Features, evaluation and treatment coronavirus (COVID-19). Statpearls. StatPearls Publishing.

Chakraborty, I., Maity, P., 2020. COVID-19 outbreak: migration, effects on society, global environment and prevention. Sci. Total Environ. 728, 138882. doi:10.1016/j.scitotenv.2020.138882.

Chan Sun, M., Lan Cheong Wah, C.B., 2020. Lessons to be learnt from the COVID-19 public health response in Mauritius. Public Health Pract. 1, 100023. doi:10.1016/j.puhip.2020.100023.

Daniel, S.J., 2020. Education and the COVID-19 pandemic. Prospects doi:10.1007/s11125-020-09464-3.

Dhahri, A.A., Arain, S.Y., Memon, A.M., Rao, A., Mian, M.A., 2020a. The psychological impact of COVID-19 on medical education of final year students in Pakistan: a cross-sectional study. Ann. Med. Surg. 60, 445–450. doi:10.1016/j.amsu.2020.11.025.

Dhahri, A.A., Iqbal, M.R., Ali Khan, A.F., 2020b. A cross-sectional survey on availability of facilities to healthcare workers in Pakistan during the COVID-19 pandemic. Ann. Med. Surg. 59, 127–130. doi:10.1016/j.amsu.2020.09.027.

Dong, C., Cao, S., Li, H., 2020. Young children's online learning during COVID-19 pandemic: Chinese parents' beliefs and attitudes. Child Youth Serv. Rev. 118, 105440. doi:10.1016/j.childyouth.2020.105440.

Farooq, F., Rathore, F.A., Mansoor, S.N., 2020. Challenges of online medical education in Pakistan during COVID-19 pandemic. J. Coll. Physicians Surg. Pak. 30 (6), 67–69. doi:10.29271/jcpsp.2020.Supp1.S67.

Hasan, S.M., Rehman, A., Zhang, W., 2021. Who can work and study from home in Pakistan: evidence from a 2018–19 nationwide household survey. World Dev. 138, 105197. doi:10.1016/j.worlddev.2020.105197.

Hilburg, R., Patel, N., Ambruso, S., Biewald, M.A., Farouk, S.S., 2020. Medical education during the COVID-19 pandemic: learning from a distance. Adv. Chronic Kidney Dis. doi:10.1053/j.ackd.2020.05.017.

Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A.J.E.R. (2020). The difference Between Emergency Remote Teaching and Online Learning. 27.

Khan, R.A., Jawaid, M., 2020. Technology enhanced assessment (TEA) in COVID 19 Pandemic. Pak. J. Med. Sci. 36 (COVID19–S4), S108–S110. doi:10.12669/pjms.36.COVID19-S4.2795.

Khan, S., Khan, M., Maqsood, K., Hussain, T., Noor-ul-Huda, & Zeeshan, M. (2020). Is Pakistan Prepared for the COVID-19 Epidemic? A Questionnaire-based Survey. 92(7), 824–832. https://doi.org/ 10.1002/jmv.25814

Lai, C.C., Shih, T.P., Ko, W.C., Tang, H.J., Hsueh, P.R., (2020, Mar). Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease-2019 (COVID-19): The epidemic and the challenges. Int J Antimicrob Agents 55 (3), 105924. doi:10.1016/j.ijantimicag.2020.105924.

Leung, T.Y., Sharma, P., Adithipyangkul, P., Hosie, P., 2020. Gender equity and public health outcomes: the COVID-19 experience. J. Bus. Res. 116, 193–198. doi:10.1016/j.jbusres.2020.05.031.

Mamirkulova, G., Mi, J., Abbas, J., Mahmood, S., Mubeen, R., Ziapour, A., 2020. New silk road infrastructure opportunities in developing tourism environment for residents better quality of life. Global Ecol. Conserv. 24, e01194. doi:10.1016/j.gecco.2020.e01194.

Mukhtar, K., Javed, K., Arooj, M., Sethi, A., 2020. Advantages, limitations and recommendations for online learning during COVID-19 pandemic era. Pak. J. Med. Sci. 36 (COVID19–S4), S27–S31. doi:10.12669/pjms.36.COVID19-S4. 2785.

Mukhtar, S., 2020. Mental health and emotional impact of COVID-19: applying health belief model for medical staff to general public of Pakistan. Brain Behav. Immun. 87, 28–29. doi:10.1016/j.bbi.2020.04.012.

Naslund, J.A., Aschbrenner, K.A., Araya, R., Marsch, L.A., Unützer, J., Patel, V., & Bartels, S.J. (2017). Digital Technology for Treating and Preventing Mental Disorders in Low-Income and Middle-Income Countries: A Narrative Review of the Literature. 4(6), 486–500.

Prem, K., Liu, Y., Russell, T.W., Kucharski, A.J., Eggo, R.M., Davies, N., Flasche, S., Clifford, S., Pearson, C.A.B., Munday, J.D., Abbott, S., Gibbs, H., Rosello, A., Quilty, B.J., Jombart, T., Sun, F., Diamond, C., Gimma, A., van Zandvoort, K., Funk, S., Jarvis, C.I., Edmunds, W.J., Bosse, N.I., Hellewell, J., Jit, M., Klepac, P, 2020. The effect of control strategies to reduce social mixing on outcomes of the COVID-19 epidemic in Wuhan, China: a modelling study. Lancet Public Health 5 (5), e261–e270. doi:10.1016/S2468-2667(20)30073-6.

Qazi, A., Naseer, K., Qazi, J., AlSalman, H., Naseem, U., Yang, S., Hardaker, G., Gumaei, A., 2020. Conventional to online education during COVID-19 pandemic: do develop and underdeveloped nations cope alike. Child Youth Serv. Rev. 119, 105582. doi:10.1016/j.childyouth.2020.105582.

Rajhans, V., Memon, U., Patil, V., Goyal, A., 2020. Impact of COVID-19 on academic activities and way forward in Indian Optometry. J. Optom. doi:10.1016/j.optom.2020.06.002.

Regehr, C., Goel, V., 2020. Managing COVID-19 in a large urban research-intensive university. J. Loss Trauma 1–17. doi:10.1080/15325024.2020.1771846.

Shuja, K.H., Aqeel, M., Jaffar, A., Ahmed, A., 2020a. COVID-19 pandemic and impending global mental health implications. Psychiatr. Danub. 32 (1), 32–35. doi:10.24869/psyd.2020.32.

Shuja, K.H., Shahidullah Aqeel, M., Khan, E.A., Abbas, J, 2020b. Letter to highlight the effects of isolation on elderly during COVID-19 outbreak. Int. J. Geriatr. Psychiatry doi:10.1002/gps.5423.

Su, Z., Wen, J., Abbas, J., McDonnell, D., Cheshmehzangi, A., Li, X., Ahmad, J., Šegalo, S., Maestro, D., Cai, Y., 2020. A race for a better understanding of COVID-19 vaccine non-adopters. Brain Behav. Immunity – Health 9, 100159. doi:10.1016/j.bbih.2020.100159.

Yancy, C.W., 2020. COVID-19 and African Americans. JAMA 323 (19), 1891–1892. doi:10.1001/jama.2020.6548.

Yoosefi Lebni, .J.., Abbas, J., Moradi, F., Salahshoor, M.R., Chaboksavar, F., Irandoost, S.F., Nezhaddadgar, N., Ziapour, A, 2020. How the COVID-19 pandemic effected economic, social, political, and cultural factors: a lesson from Iran. Int. J. Soc. Psychiatry doi:10.1177/0020764020939984, 20764020939984https://doi.org/.