Socio-Economic and Mental Health Impacts of COVID-19 Lockdown on Students Learning in Pakistan

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ABSTRACT

Evaluation of the e-learning activities in this crisis period amid COVID-19 has significant importance to propose effective mediations for the smooth running of learning and teaching. Keeping this in mind, the present study takes a lead and identifies the key problems associated with online classes during the COVID-19 lockdown in Pakistan. In addition, we examine the "Stay at Home" orders of government impacts on the mental health of students. The empirical analysis is based on a cross-sectional survey covering students from all educational groups across Pakistan. A sample of 1,114 students is collected via a structured questionnaire constructed using Google Form and floated online to students in all educational institutions in Pakistan. Results indicate that students living in a city that has "Stay at Home" orders in place at the time of the survey is linked with a decrease in mental health by 0.525 standard deviations (p-value=0.0560), suggesting that "Stay at Home" orders have led to a significant reduction in the mental health of the students. Students who report being stayed at home during lockdown have significantly better mental health scores. Additionally, we provide a comprehensive descriptive statistical analysis of the online classes designed for lockdown on different socio-economic and mental health aspects.

1. Introduction

The COVID-19 pandemic affected all spheres of life and sectors of the economy exacerbating the education crises in the developing world—where large disparities have already reduced the opportunities for vulnerable students. It is responsible for the largest disruption of education systems in modern history, affecting nearly 1.6 billion learners in around 200 countries across the globe. To slow the spread of the disease, lockdown measures have been put in place, limiting people's ability to leave their homes and interact with other people. A major public health concern relates to how these measures impact the mental health of students. In this study, we attempt to examine the impact of lockdown measures on the mental health of students in Pakistan.

The closure of schools, colleges, universities, and other learning spaces has impacted nearly 94% of the world's student population, and this figure goes up to 99% in low and lower-middle-income countries. There is an estimate that 23.8 million additional children may drop out permanently due to the harsh economic effects of the pandemic (UN, 2020). UNICEF claims that at least 463 million school children have no access to distant learning during the strict lockdown. It is equivalent to one-third of the world's schoolchildren or 31% of the total global student population. Pakistan lies in the South Asian region—where 147 million students have no access to learning, making it the highest concentration of students without schools (UNICEF, 2020).

Pandemic compelled education institutions to end in-person instruction and switch to online teaching. Cambridge University in the United Kingdom was the first institution to move all face-to-face teaching online on March 24, 2020 (Castle, 2020). In Pakistan, the education institutes were also forced to replace the traditional approach with online teaching, using technology tools like Google Classroom, Microsoft Teams, WhatsApp, Zoom, etc. Online education, by and large, remains a far distant reality for millions around the world and in Pakistan in particular. The students in under-developed remote areas of Pakistan such as Balochistan, FATA, Khyber Pakhtunkhwa, and Gilgit-Baltistan experienced difficulties due to unavailability and in some cases poor connectivity of internet facilities, with poor students having no access to gadgets necessary to acquire online educations (Tahir, 2020).

Pakistan's Higher Education Commission (HEC) encouraged education institutions to use the learning management system (LMS) to carry out educational activities online across the country via an official notification. Moreover, it instructed the institutions facing technological and spatial limitations to remain closed for any academic activities

till May 31, 2020 (HEC, 2020). The roadmap is clear that online education is the only alternative in this pandemic and the foreseeable future. Pakistan's educational infrastructure lacks modern technology except for some reputed varsities. Most of the top-ranked varsities are already working on online teaching programs which facilitated them to accelerate it during the pandemic. The government's timely decision to lift the complete lockdown and to replace it with the selective smart lockdown carries enormous social and economic implications and possibly, it will have lasting effects on the plight of millions of students (children and youth). The UN estimates that 23.8 million additional pre-primary to tertiary students will drop out and lose access to school next year due to pandemics' economic impact alone (UN, 2020).

The shutting of the learning institutions due to the COVID-19 outbreak leads to an unprecedented impact on the educational sector. During the lockdowns (both strict and smart), educators are directed to teach through online learning platforms. Abidah et al. (2020) highlight that, to overcome anxieties and mental stress during the lockdown and for the persistence of educational activities, there is a dire need to adopt innovative teaching. Some other researchers (Strielkowski, 2020; Kumar, 2020) conclude that the COVID-19 pandemic results in the digital revolution in the higher education system via interaction at the virtual environment, online examination, digital open books, teleconferencing, and online lectures. Gonzalez et al. (2020) report a significantly positive influence of this pandemic on learning performances and efficiency by implementing online education schemes. However, the online learning strategies are often discriminatory to poor and marginalized students especially from remote areas in Pakistan like Balochistan, FATA and Gilgit-Baltistan. During the lockdown, shut down of educational institutes badly damaged the teaching-learning process and education system of the country (Sarwar et al., 2020; Farooq et al., 2020).

Evaluation of the teaching-learning practices in this crisis period is extremely important to propose effective mediations for the smooth running of learning and teaching. Keeping all this in mind, the fundamental objective of this research is to assess a) the awareness, knowledge, and attitude of the students regarding COVID-19, b) learning status, platforms used for online classes and materials sharing during lockdown period, and c) impact of lockdown on economic, health and educational conditions of students during this lockdown amidst the COVID-19 pandemic. The impact of COVID-19 on educational activities is analyzed by Kapasia et al. (2020) for Indian graduates and post-graduate students, Bayham & Fenichel, (2020) for the USA and Cao et al. (2020) for Chinese students. However, to the best of our knowledge, no prior study exists for Pakistan on this issue covering wider dimensions of COVID-19 lockdown and its impact

on students including economic and mental health conditions during the lockdown. The empirical findings of the study are based on a sample of 1,114 students currently enrolled in different educational institutions across Pakistan covering all educational groups, school-going, college students and university undergrad and grad students. The empirical findings yield interesting insights into the issue under study.

The rest of the paper is organized as: Section 2 provides the overall evolution of COVID-19 and how it leads to the disruption of educational activities. In addition, some relevant literature is discussed as well. Section 3 discusses the framework of the study along with data details and collection methods and the methodological approach. The empirical results and their discussion is provided in Section 4 while section 5 concludes the study.

2. Evolution of COVID-19 and the Educational Disruption

The unexpected and dramatic emergence of novel Coronavirus disease (COVID-19) took the world by storm and sent shock waves all around (Iqbal & Younas, 2021). It started from the Chinese city of Wuhan, in early December 2019, and later on December 31, Wuhan Municipal Health Commission, China, reported a cluster of cases of pneumonia in Wuhan, Hubei Province (WHO, 2020). On January 7, 2020, the Chinese authorities formally identified a new type of virus, later named COVID-19. At first, it was declared an outbreak. The alarming level of spread and severity of the disease, having an unprecedented impact on human life in the post-war era, pushed the World Health Organization (WHO) to characterize the COVID-19, as a pandemic, on March 11, 2020. The role of the government increases manifold to mitigate the disruptive impact of the disease in all spheres of life. The governments around the world followed the Chinese model and locked down the countries, cities, and towns to bring life down to a standstill. After the confirmation from Chinese authorities that the human-to-human transmission had taken place, in Wuhan, the first epic center of the novel COVID-19, went into an unprecedented lockdown on 23 January 2020 which was the beginning of a new norm for the world.

From here on, the task was gigantic to stop the spread and restrict it to remain inside Chinese borders. It was too big a task, and fighting an unknown enemy, with little clues, put experts and epidemiologists on the back foot. The world was dependent on China to learn about the disease. The nature of the disease and the inability to contain the disease in today's globalized world helped it spread. Standard operating procedures (SOP's), national and local measures, such as smart lockdowns, social distancing, restrictions on

immigration, use of sanitizers, and use of face-masks, and avoiding face-to-face meetings and teachings, helped avoid a large number of casualties. Nevertheless, fatalities and spread are ceaseless, albeit at a lower rate.

By and large, the pandemic has fundamentally changed the way people behave and the world function. It has forced people to adopt a new way of life in post-COVID-19 times. Nevertheless, the denial in some quarters remained high, citing the stories related to fake conspiracy theories and misconceptions. The knowledge, attitudes, and practices (KAP) towards COVID-19 is integral to assess the change in the behavior of the public, to avoid further complexities due to emotional panic and misconceptions about this deadly virus (Zhong et al. 2020). To date, the infectious disease has affected 79.6 million. Among those affected by the disease, 1,744,373 have succumbed to death, and 55.1 million have recovered. As of Dec 24, 2020, Pakistan has reported 465,000 confirmed cases, with recoveries of 417,000, and 9,668 people have died of COVID-19 (WHO, 2020). Pakistan confirmed its first two cases of COVID-19 on February 26, 2020. The situation slowly deteriorated in the country, and at one point in time, Pakistan was ranked among the third-riskiest countries for COVID-19 by the Deep Knowledge group on nations and their measures against the Pandemic (DKG, 2020).

In East Asia and the Pacific region, Pakistan is ranked 33 among 36 countries, and only Papua New Guinea, Solomon Islands, and Afghanistan were ranked lower to Pakistan in safety scores. The rampage was real. Pakistan recorded 5,830 cases on average in mid-June, and during the week of June 21, the fatality rate soared to 123 deaths per day (daily average by week). Resilient Pakistan, however, showed a steady decline in the new cases—which baffled analysts, infectious disease experts and remains a mystery to date. Nevertheless, the establishment of the National Command Operation Center (NCOC) was the game changer for Pakistan—which helped to tackle down the surge in infections through awareness campaigns impacting behavioral patterns regarding precautionary measures. Pakistan government's smart-lockdown policy proved successful, and prompt response after some initial setbacks, the government handled the situation aptly. Even then, it was nothing less than a miracle that was required to avoid a steep spike in infections.

Pakistan formulated a National Action Plan (NAP) to serve as a policy document to ensure that all the guiding principles for preparedness, containment, and mitigation are followed to deal with the COVID-19. As a developing country, Pakistan lacks medical infrastructure and hospital admission facilities. According to the NAP, all provinces are urged to identify and prepare the quarantine facilities to meet contingencies, as per the

SOP's issued by the National Institute of Health (NIH). Pakistan government ordered to close all educational institutions across the country on March 13, 2020, after deliberation in a meeting of the country's National Security Committee (NSC). The NAP recommended using the vacant buildings of the educational institutions, including hostel facilities, to retain people for quarantine. To prevent the escalation of the disease through transmission, most of these places accommodated travelers.

There are some conflicting views on the consequences of COVID-19 on education. In a systematic review of school closures and management practices during COVID-19, Viner et al. (2020) argue that school closure did not contribute to control the epidemic during the SARS outbreak in China, Hong Kong, and Singapore. On the contrary, however, models based on COVID-19 studies predict that school closures reduce the fatalities rate by 2–4%–which is much less than other SOP's adapted. For example, a study by Kapasia et al. (2020) on the impact of lockdown on e-learning shows that 70% of the students who participated in online classes, faced multiple problems such as depression, anxiety, poor internet connectivity, and an unfavorable study environment at home. Besides, students from unprivileged backgrounds and remote areas faced acute challenges during online learning.

Crawford et al. (2020) conduct a desktop analysis to provide intra-period higher education responses to COVID-19 across 20-countries and find diverse responses across the spectrum. Some education providers did not respond at all, while some redeveloped the online application education platform, and few provided isolation facilities to selected students. The findings show that how agile higher education is to prepare for a pandemic. Some world-class institutions (for example, Cambridge University) showed agility and were already prepared to transfer the whole academic work from the traditional system to online.

In another study on the effect of COVID-19 on education, Edeh et al. (2020) conclude that the pandemic caused learning disruptions, decreased access to education, and increased student loans. The research finds that poor infrastructure hindered learning opportunities as network problems, power outages, poor digital skills, and unavailability of the internet adversely affected education. It recommends all stakeholders, including children, youth, and parents to adopt technology and improve their digital skills. Burgess and Seivertsen (2020) assess the impact of online education and studied the Swedish case and argued that the "global lockdown of education institutions is going to cause a major (and likely unequal) interruption in students' learning, disruptions in internal assessments, and the cancellation of public assessments for qualifications or their replacement by an

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inferior alternative".

Di-Pietro et al. (2020) make use of existing literature as well as international data from sources such as Eurostat, PISA, ICILS, PIRLS, and TALIS to assess the accurate impact of COVID-19 on students learning by employing different methodologies. The study concludes that different methodologies can potentially undermine the children's achievements and the study further highlights that students will suffer an unequal learning loss, with some students suffering more than others. Secondly, the loss of learning time will influence both cognitive and non-cognitive skills acquisition and will have both short-term and long-term consequences on the students learning. The authors acknowledge that it is a new terrain, and to assess the magnitude of damage, due to COVID-19 interruptions, we can rely on pre-COVID studies.

Carlsson et al. (2015) determine that even just ten days of extra schooling significantly raise scores on tests of the use of knowledge 'crystallized intelligence' by 1% of a standard deviation. The study conducted in Sweden concludes that there is no significant impact on problem-solving skills (an example of 'fluid intelligence). If we apply these results to an extraordinary situation in COVID-19 times, there is a huge disparity among the skills of the pre-COVID-19 Students and post-COVID-19 students. Lavy (2015) studies the student groups from two countries, who were subjected to different hours of study in key subjects and concludes that one more hour per week over the school year in the main subjects increases test scores by around 6% of a standard deviation, which is significant differences in test scores. On a positive note, Jena (2020) concludes that the emergence of COVID-19 has worked as a catalyst for the educational institutions of India to grow, forcing the institutes to explore and opt for technology-rich platforms, not used before to ensure that education reaches remote areas.

The education institutions in Pakistan faced a complete (and in some rare cases a partial) lockdown and faced an unprecedented challenge to cope to readjust their academic year. In Pakistan, the number of affected students stands at 46,803,407. The breakdown of this figure reveals that the number of students affected at the pre-primary level is 8,636,383, at a secondary level, it is 13,357,618 and at the tertiary level, it is about 1,878,101 (Saeed, 2020). It is a critical juncture for a developing country like Pakistan— which already has a very high number of students out of school. The lack of technology/digitalization, poor internet access (of only 36.8%), inability to use the internet, traditional educational policies and teaching methods, and a cultural hindrance to online learning made it difficult for all the population to have access to online teaching. The present study explores the different dimensions of e-learning in Pakistan and assesses

how Pakistanis students coped with the impacts of COVID-19 on education at schools, colleges and universities.

All the researchers agree on the same point that physically attending the school raises the professional and social skills of students. From the very beginning, it increases the ability of the students, and missing school altogether can have profound consequences for the skill growth of the student. Moreover, in the case of no exams, the inaccuracies in the results can bring forth life-changing differences.

3. Data and Methodology

3.1 Study Design, Research Instruments and Participants

A quantitative approach is utilized to evaluate the mode of learning, learning status, effectiveness, and problems related to online classes in Pakistan during lockdown amidst the COVID-19 pandemic. A cross-sectional survey is carried out among the students at different universities across Pakistan. A self-administered questionnaire is designed based on previously published literature. The questionnaire comprises of five sections. The first section deals with the demographic information of the participants; the second section contains questions related to awareness, knowledge, and attitude regarding COVID-19; the third section is related to the information about learning status during the lockdown, online classes material sharing platforms and modes of teaching; the fourth section describes the opinion of students regarding academic decisions; and the last section is associated with the impacts of lockdown on economic, health and educational conditions of students. This survey was conducted from August 20 to September 1, just before the two weeks of the scheduled reopening of educational institutions in Pakistan by the Government of Pakistan. The key participants of the study include schools, colleges, undergraduate and graduate students studying in different educational institutions of Pakistan.

3.2 Data Collection and Analysis Approach

An online survey is recognized as the most suitable and convenient tool to collect statistics from a geographically diverse large sample. For that reason, data is collected online by using Google Forms, an online application provided by Google Inc. Participants were called on different social media platforms to willingly participate in this study by using authors' professional and personal networks, and endorsement by many public and private teachers, professors, student union presidents, and educators of higher education institutes from all over Pakistan. Participants who have Pakistani nationality enrolled in any school, college and university, and have taken and/or taking online classes were asked

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to fill in the survey by clicking on the online survey link. A total of 1,114 students from different educational institutions provided complete information related to the survey.

The empirical analysis is exploratory in nature and several tools have been used to analyze the responses received based on the questionnaire. Specifically, the impact of COVID-19 lockdown on students' learning is examined various frequency tables and percentages have been used to explore the pattern of the responses of the students who participated in the survey. The findings yield interesting results.

3.3 Regression Model

To analyze the impact of "Stay at Home" orders on the mental health of the students, we define the following model;

Mental Health = f (lockdown, individual characteristics, online classes characteristics)

This baseline model can be specified in the regression form to make it estimate able with some econometrical technique:

$$\llbracket Y \rrbracket\_i = \alpha + \beta \text{Lockdown}\_i + \gamma X\_i + \delta Z\_i + \varepsilon\_i \qquad (1)$$

Where $\llbracket Y \rrbracket\_i$ is the dependent variable of the model which represents the mental health of university student i. X_i is a vector that denotes the individual characteristics. $Z\_{(i}$)represents the online classes characteristics and other control variables. While ε_i is the disturbance term of the model. α is the intercept term and β, γ, and δ are the coefficients of the independent and control variables.

3.4 Chi-Square Distribution

The ratio of sample variance and population variance multiply by the degree of freedom is used to obtain the chi-square distribution. This happens when the population follows the normal distribution with population variance. The Chi-square test uses adjusting chi-square significance to factor out the sample size. The following equation is a general representation of the chi-square test.

$$X^2 = \frac{[(n-1) \times s^2]}{\partial^2}$$

The researcher widely uses the chi-square test for the association of attributes. Based on chi-square testing we can accept or reject our pre-defined research hypothesis about the dependence between any two variables. The chi-square testing approach used in this study is based on the following steps.

Step 1: Define the Research Hypothesis

Null Hypothesis: H0: Two variables are independent

Alternative Hypothesis: H1: Two variables are not independent

Step 2: Construction of Cross Tabs

The next step is to construct the cross tabs for each under consideration variable and then find the chi-square test value via using the following equation:

$$X^2 = \frac{\sum(\partial i - ei)}{ei}$$

Step 3: Find tabulation value

After finding the calculated value of the chi-square test, the next step is to compare this value with the tabulated value which can find with the help of the following equation:

$$X^2\text{Tab} = X^2\text{d.f at } \alpha$$

Where d.f represents the degree of freedom which can be calculated with the following equation:

$$df = (r - 1)(c - 1)$$

Step 4: Decision Criteria

Reject H_0 if α≥p

4. Empirical Findings and Discussion

4.1 Descriptive Statistical Analysis

4.1.1 Demographic Characteristics

The demographic analysis of the participants is provided in Table 1. It can be seen that the majority of the respondents are male (64.4%), aged between 18 to 25 years (83.1%) and having a domicile of Punjab province (58%). The number of students who belonged to urban areas is greater than in rural areas. Additionally, the highest proportion of the respondents is of undergraduate students (65%), day scholars (69.6%), having major in science subjects (79.8%), and with a family income of between PKR 30,000 to PKR 60,000.

Table 1: Demographic characteristics of participants

Variable Name	Characteristics	Frequency	Percent
Student Gender	Male	717	64.36
	Female	397	35.64
Student Age	Below 18	61	5.48
	Between 18 to 25	926	83.12
	Between 26 to 30	86	7.72

	Above 30	41	3.68
Student Domicile	Azad Jammu and Kashmir	46	4.13
	Balochistan	54	4.85
	FATA	4	0.36
	Gilgit Baltistan	26	2.33
	Islamabad (Capital)	164	14.72
	Khyber Pakhtunkhwa	126	11.31
	Punjab	646	57.99
	Sindh	48	4.31
Region	Rural	360	32.32
	Urban	754	67.68
Stream of Study	Art	89	7.99
	Commerce	136	12.21
	Science	889	79.80
Class Level	Matric	38	3.41
	Inter & Undergraduate	723	64.9
	Masters & above	353	31.69
Residence	Day Scholar	775	69.57
	Hosteller	339	30.43
Student Family Income	Below PKR 30K	318	28.55
	Between PKR 30K to PKR 60K	441	39.59
	Above PKR 60K	355	31.87
Total		**1,114**	**100**

Table 2 presents the educational movement of students across different divisions of Pakistan. The permanent residence of most students included in the survey is Rawalpindi (21.36%), followed by Islamabad (14.54%), Lahore (10.59%), Gujranwala (5.21%), Sargodha (4.58%), Gilgit-Baltistan (4.04%), and Peshawar (4.04%). Furthermore, the highest concentration of students included in the survey is found in Islamabad as an institutional region (49.73%), followed by Lahore (13.64%), Rawalpindi (6.73%), Sargodha (5.66%), Quetta (3.41%), and Mardan (3.05%). Islamabad and Lahore are documented as the educational hubs in Pakistan as first having the largest number of universities in Pakistan and second is known as a city of colleges. A large number of educational institutes constitute a concentration of a substantial proportion of students in these cities.

Table 2: Movement of students for the education

Permanent Residence	Frequency	Percent	Institute Location	Frequency	Percent
Rawalpindi	238	21.36	Islamabad	554	49.73
Islamabad	162	14.54	Lahore	152	13.64
Lahore	118	10.59	Rawalpindi	75	6.73
Gujranwala	58	5.21	Sargodha	63	5.66
Sargodha	51	4.58	Quetta	38	3.41
Gilgit-Baltistan	45	4.04	Mardan	34	3.05
Peshawar	45	4.04	Mirpur	27	2.42
Mardan	41	3.68	Peshawar	25	2.24
Mirpur	36	3.23	Karachi	24	2.15
Quetta	36	3.23	Multan	18	1.62
Faisalabad	35	3.14	Jhelum	17	1.53
Hazara	33	2.96	Gujranwala	16	1.44
Larkana	31	2.78	Faisalabad	15	1.35
Kohat	30	2.69	Larkana	12	1.08
Multan	24	2.15	D G Khan	8	0.72
Dera Ghazi Khan	21	1.89	Chakwal	5	0.45
Karachi	20	1.8	Bahawalpur	4	0.36
Makran	17	1.53	Gilgit-Baltistan	4	0.36
Muzaffarabad	12	1.08	Abbottabad	3	0.27
Bahawalpur	10	0.9	Risalpur	3	0.27
Bannu	9	0.81	Sahiwal	3	0.27
Sahiwal	9	0.81	Taxila	3	0.27
Kalat	6	0.54	Attock	2	0.18
Poonch	6	0.54	D I Khan	2	0.18
Hyderabad	5	0.45	Hazara	2	0.18
Swat	5	0.45	Kohat	2	0.18
Waziristan	5	0.45	Sukkur	2	0.18
Zhob	5	0.45	Hyderabad	1	0.09
Dera Ismail Khan	1	0.09	-	-	-
Total	**1,114**	**100**	**Total**	**1,114**	**100**

4.1.2 Awareness, knowledge, and attitude regarding COVID-19

The second portion of this survey is designed to evaluate the awareness, knowledge, and attitude of the students regarding COVID-19. Table 3 reports the results. First, we asked the participants "when they heard about this novel COVID-19 virus". Out of 1,114 respondents, 349 students (31.33%) heard about it in December 2019 and 283 students (25.4%) heard during March 2020. More than half of the students (60.41%) key source of information about COVID-19 is social media. Due to a rapid increase in the COVID-19 reporting cases, the country was put under a nationwide lockdown from April 1 and stretched twice until 9 May. After 9th May 2020, the government of Pakistan introduced an innovative method of lockdown which is named "Smart Lockdown". It means all educational institutes would remain under strict lockdown till 15th September 2020 and partial lockdown would be implemented in different regions of the country. In other words, an area would be under strict lockdown if the number of newly reported COVID-19 cases acceded to the normally reporting number of cases. We asked the students about their place of residence during the lockdown. The highest proportion of the respondents (91.74%) reported that they are residing at their own home during this COVID-19 compelling lockdown period. Lastly, we asked the students about the difficulties they faced during the lockdown period. The majority of the participants (37.07%) reported that access to finance is the key problem during the lockdown, followed by access to transport (26.84%), access to health facilities (18.13%) and access to food difficulties (17.95%).

Table 3: Awareness, knowledge, and attitude regarding COVID-19

	Description	Frequency	Percent
The time when heard about COVID-19	During December 2019	349	31.33
	During January 2020	247	22.17
	During February 2020	235	21.1
	During March 2020	283	25.4
Source of information about COVID-19	Friends & Family	112	10.05
	Social Media	673	60.41
	Print Media	20	1.8
	Television	309	27.74
Place residing during the lockdown	At own home	1022	91.74
	At relatives or other places*	92	8.26
Problems during lockdown	Access to finance	413	37.07
	Access to food	200	17.95
	Access to health facilities	202	18.13
	Access to transport	299	26.84

Total		**1,114**	**100**

Note: * Other places including rented house, hostel, friends' home, etc

4.1.3   Learning status during the lockdown

A series of questions were asked from the students to analyze the learning status and academic sphere during the lockdown period for instance, online lecture format, syllabus coverage, study time and availability of gadgets for online classes. Table 4 reports our findings where 51.71% stated that the format of the online lecture was video in nature and the remaining reported it as an audio format. According to respondents, the Higher Education of Pakistan failed to implement the plans about syllabus coverage during online classes. The highest number of students (57.81%) revealed that below 25% syllabus was covered during online classes while 27.2 % of students reported that 25% to 50% syllabus was covered during the lockdown period. The lockdown period also damaged the study hours as a high number of respondents (65.53%) reported that they did not study regularly during the lockdown period.

Among the surveyed students who were attending online classes, 61.85% used smart phones to attend the online classes followed by laptop users (35.19%) and desktop computer users (2.96%). When we asked about the possession of gadgets used for online classes, the majority of them (66.79%) claimed that they had their own gadget. 21.27% reported that they borrowed it from family or relatives and the rest of them borrowed from friends, neighbors, rented out, and other sources. To assess the learning status, we asked whether they had any experience of online class before the COVID-19 lockdown where 80.25% answered with No option.

Table 4: Learning status during the lockdown

Variable Name	Description	Frequency	Percent
Format of lecture	Audio Lecture	538	48.29
	Video Lecture	576	51.71
Syllabus covered	Below 25%	644	57.81
	Between 25% to 50%	303	27.2
	Above 50%	167	14.99
Studied Regularly	Yes	350	31.42
	No	730	65.53
	Don't want to disclose	34	3.05
Gadget for online classes	Desktop computer	33	2.96

	Laptop	392	35.19
	Smart Phone	689	61.85
Possess of Gadgets for online classes	I have my own	744	66.79
	Family or Relatives	237	21.27
	Friends	73	6.55
	Rented Out	26	2.33
	Neighbours	20	1.8
	Others	14	1.26
Experience of Online Class before COVID-19 lockdown	Yes	220	19.75
	No	894	80.25
Total		**1,114**	**100**

4.1.4 Platforms for online classes, material sharing, and evaluation

Reliable and quality platforms for online classes remained a key concern since the Corona virus disease emerged. We asked several questions related to the platform used and/or recommended by the Higher Education Commission for online classes in Pakistan. It is found that students were using different platforms for online classes, e-lectures, material sharing, and learning evaluation such as YouTube, Google Classroom, WhatsApp, MS Team, Zoom App and other digital platforms like Skype and Face book. Survey responses revealed that the majority of the students (39.68%) used Zoom App for sharing material and attending online classes followed by MS Team (31.87%), WhatsApp Group (7.01%), Google Classroom (3.32%) and YouTube (1.97%). While 16.16% of students used other platforms including Skype, Face book and LMS university software (see Table 5).

WhatsApp groups remained convenient for the respondents to share material related to online classes as the majority of them had their own smart phones. As far as the evaluation of online classes is concerned, more than half of the students show disagreement about the regular evaluation of understanding by the respective educational institute. Assignment and projects were the key criteria of course evaluation in the majority of Pakistani educational institutes. When we asked the respondents about satisfaction with the evaluation method then almost 53% of students showed no satisfaction with this evaluation system. A sub-portion of our survey was related to the sensitivity of information and comfort ability with the online classes. A bigger portion of students (74.51%) did not feel comfortable with using online learning websites like Edx, Coursera and Udemy etc. to cover the missing syllabus during the lockdown period.

Almost 52% of students showed fear related to misuse of personal information during online learning activities and profile making of online learning applications. When we asked about the overall satisfaction from online learning apps, 45.96% of students were not satisfied with the applications suggested by HEC Pakistan for online classes like Zoom, Team and Google Classroom. While 27.38% reported that they are just satisfied with these learning applications.

Table 5: Platforms for online classes, materials sharing, and evaluation

Various platforms	Description	Frequency	Percent
Platforms of online classes	Zoom App	442	39.68
	MS Team	355	31.87
	WhatsApp	78	7
	Google Classroom	37	3.32
	YouTube	22	1.97
	Others	180	16.16
Platforms of materials sharing	WhatsApp Groups	379	34.02
	MS Team	257	23.07
	Zoom App	137	12.31
	Email	132	11.65
	Google Classroom	119	10.68
	LMS	25	2.44
	Others	65	5.84
Regular evaluation of understanding by the institute	Yes	525	47.13
	No	589	52.87
Course evaluation	No exam	125	11.22
	Online viva	177	15.89
	Quizzes	362	32.5
	Assignments/Projects	450	40.39
Satisfaction with the evaluation	Yes	403	36.18
	No	589	52.87
	Don't Know	122	10.95
Comfortable with using online learning websites	Yes	284	25.49
	No	830	74.51
Fear related to the misuse of personal information	Yes	575	51.62
	No	539	48.38
Overall satisfaction from online learning apps	Not satisfied at all	512	45.96
	Just Satisfied	305	27.38

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	Moderately satisfied	241	21.63
	Highly satisfied	28	2.51
	Don't Know	28	2.51
Total		**1,114**	**100**

4.1.5   Opinion of students regarding academic decisions

Table 6 describes the opinion of respondents about different announcements and policies of government regarding academic activities. Out of 1114 respondents, 80.61% thought that the lockdown decision and shut down of educational institutes by the Government of Pakistan was a good decision. While the highest number of students (81.24%) are in favor of the HEC announcement about the opening of educational institutions on 15th Sep 2020. When we asked about the Ministry of Education role played in online classes during the lockdown, they showed mixed opinions as 43.81% said yes and 43.9% said no to the question.

Table 6: Opinion of students regarding academic decisions

Academic decisions and HEC recommendations	Description	Frequency	Percent
Do you think, the lockdown decision by the government was good?	Yes	898	80.61
	No	216	19.39
Are you in favor of the opening of educational institutions on 15th Sep 2020 as announced by HEC?	Yes	905	81.24
	No	140	12.57
	Don't know	69	6.19
Do you think the Ministry of Education Pakistan played its role well during a lockdown?	Yes	488	43.81
	No	489	43.9
	Don't know	137	12.3
Total		**1,114**	**100**

4.1.6   Impact of COVID-19 lockdown on students' life

The last segment of our study is associated with the impact of the COVID-19 lockdown impact on student life. We divide these analyses into three sub-segments; economic impacts, health impacts, and educational impacts. Table 7 reports that a bulk of students (71.01%) were suffering from psychological problems like stress, depression, and anxieties during the lockdown period. When we questioned "Did you get any personal coaching to keep you calm during a lockdown?" then only 15.26% of students reported a yes answer. As far as economic impacts are concerned, 70.65% of students said that the lockdown policy badly damaged their family income and 44% reported that their financial

needs were not fully met during the lockdown. While 40.75% revealed that they need financial support due to low family income effects during the lockdown. According to 47.85% of respondents, financial support in terms of 50% off in educational fees should be given to students due to no on-campus activities. While 26.66% asked for the full fee concession support, followed by 10 to 25% fee waive (13.82%) and no fee reduction (11.67%).

A large number of students (47.94%) claimed that they were studying 3 to 6 hours daily before lockdown and 88.42% reported that the lockdown severely affected their study routines. 71.36% said that their study hours significantly decreased during the lockdown period. When we questioned about the enthusiasm level of study, 76.12% described that the lockdown negatively damaged their enthusiasm level of study. As mentioned earlier, internet connectivity was a major issue that students faced during online classes. Out of 1114 students, only 46.59% had internet access. While 45.87% claimed that they had not a very good but an average kind of internet connectivity. Separate room availability for online classes during the lockdown period was also a serious educational problem faced by the students as 50.54% of respondents said that they had no separate room available for online classes.

Table 7: Impact of lockdown on economic, health, and educational conditions of students

Opinion	Description	Frequency	Percent
Economic Impacts			
Do you think the lockdown affected your family income?	Yes	787	70.65
	No	244	21.9
	Don't Know	83	7.45
Your financial needs are fully met during the lockdown?	Yes	471	42.28
	No	490	43.99
	Don't Know	153	13.73
Do you need financial support due to low family income effects during a lockdown?	Yes	454	40.75
	No	499	44.79
	Don't Know	161	14.45
What financial support should be given to students due to no on-campus activities?	Full fee waiver	297	26.66
	Half fee waiver	533	47.85
	10-25% fee waiver	154	13.82
	No fee reduction	130	11.67

Health Impacts			
Feeling of stress, depression, and anxieties during the lockdown	Yes	791	71.01
	No	235	21.1
	Don't Know	88	7.9
Did you get any personal coaching to keep you calm during a lockdown?	Yes	170	15.26
	No	873	78.37
	Don't Know	71	6.37
Educational Impacts			
Study hours before lockdown	Less than 3 hours	429	38.51
	3 to 6 hours	534	47.94
	More than 6 hours	151	13.55
Did lockdown affect your study routine?	Yes	985	88.42
	No	104	9.34
	Don't know	25	2.24
Did your study hours decrease during a lockdown?	Yes	795	71.36
	No	259	23.25
	Don't know	60	5.39
Did lockdown damage your enthusiasm level of study?	Yes	848	76.12
	No	170	15.26
	Don't know	96	8.62
Internet access	Yes	519	46.59
	No	595	53.41
Internet connectivity	Average	511	45.87
	Excellent	103	9.25
	Good	277	24.87
	No internet access	21	1.89
	Very Poor	202	18.13
Separate room available for classes during the lockdown	Yes	551	49.46
	No	563	50.54
Total		**1,114**	**100**

4.2 Regression and Chi-Square Analysis

In regression analysis, we examine the impact of "Stay at Home" orders on the mental health of the students in Pakistan. The dependent variable of our regression analysis is the mental health score which is measured by the use of the WHO 5-question module. It has been extensively used by researchers in different perspectives (Krieger et al., 2014; Downs et al., 2017). WHO 5-Question Module: "Over the last two weeks ... [Answers on

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a scale from 0 - "At no time" to 5 - "All of the time".] 1) I have felt cheerful and in good spirits, 2) I have felt calm and relaxed, 3) I have felt active and vigorous, 4) I woke up feeling fresh and rested, and 5) My daily life has been filled with things that interest me". An overall mental health score is obtained by summing answers to the 5 questions, with a higher score indicating better mental health. More explicitly, we regress mental health on a dummy variable indicating whether a lockdown was in place as well as a range of individual background characteristics of the students. Cronbach's alpha coefficient is used to check the internal consistency or reliability. The Cronbach's alpha of mental health is 0.725 which is in an acceptable range.

The OLS estimation-based results are reported in Table 8. The lockdown coefficient is estimated to be negative and significant. It indicates that students living in a city that has "Stay at Home" orders in place at the time of the survey is linked with a decrease in mental health by 0.525 standard deviations (p-value=0.0560), suggesting that "Stay at Home" orders have led to a significant reduction in the mental health of the students.

Table 8: Results of Baseline Model

	Dependent Variable= Mental Health Score		
Variables Name	**Coefficient**	**S.E**	**P-Value**
Lockdown	-0.5257**	0.2746	0.0560
Age	0.0088	0.0401	0.8260
Gender Male	0.0402*	0.3158	0.0990
Urban Region	-0.1562	0.3108	0.6150
BS Student	0.7013*	0.3983	0.0790
FA/FSc Student	0.4974	0.8150	0.5420
Master Student	0.9428**	0.4533	0.0380
Hostelite	0.3350	0.3167	0.2900
Lockdown Stay at Home	1.0359**	0.5062	0.0410
Online Video Lectures	-0.1036	0.2856	0.7170
Internet Facility	0.1326	0.2849	0.6420
Constant	5.8798***	1.3684	0.0000
No. of observations	1114	---	---
Adjusted R-Squared	0.15	---	---

Note: * indicates that variable is significant at 10% level of significance, ** at 5% level of significance, and *** at 1% level of significance.

In Table 8, several other patterns are worth mentioning. In line with previous literature (Astbury, 2001; Seedat et al., 2009; Stevenson & Wolfers, 2009; Adams-Prassl et al.,

2020), our results reveal that being male is associated with significantly higher and better mental health. Likewise, being a BS and Master Student of the university is allied with significantly better mental health. However, there is no significant association is observed between mental health and intermediate students. Moreover, students who report being stayed at home during lockdown have significantly better mental health scores. It suggests that staying at home helps the students to improve mental health and cope up better with the COVID-19 pandemic. The other characteristics like age, urban region, being a hostel student, online video lectures, and internet facilities have no statistically significant relationship with the mental health score.

There is a strand of literature available (Chang et al., 2013; Dagher et al., 2015) which postulates that economic downturns or recessions can influence the mental health of males and females differently. In this study, we further examine whether the mental health impact of the "Stay at Home" orders varies by gender. For this objective, we re-estimate our baseline model of Table 8 by introducing an additional interaction term between gender and dummy variable indicating whether the city was in lockdown. The OLS-based estimated results are presented in Table 9. Again, the lockdown coefficient is estimated to be negative and significant. It indicates that students living in a city that has "Stay at Home" orders in place at the time of the survey is linked with a decrease in mental health by 0.8192 standard deviations (p-value=0.0160), suggesting that "Stay at Home" orders have led to a significant reduction in the mental health of the students. As indicated by the significant interaction coefficient, the gender gap is significantly higher in cities that introduced lockdown measures. The estimated gender gap is 0.860 standard deviations larger in cities that had a lockdown in place (p-value=0.0133). The rest of the results of Table 9 are almost in line with the results of Table 8.

Table 9: Results after Incorporating Gender Role

Variables Name	Dependent Variable= Mental Health Score		
	Coefficient	S.E	P-Value
Lockdown	-0.8192**	0.3408	0.0160
Age	0.0078	0.0399	0.8450
Gender Male	0.4255*	0.4261	0.0980
Lockdown * Male	0.8604**	0.5726	0.0133
Urban Region	-0.1526	0.3098	0.6220
BS Student	0.7038*	0.3972	0.0770
FA/FSc Student	0.6260	0.8116	0.4410
Master Student	0.9477**	0.4521	0.0360
Hostelite	0.3492	0.3161	0.2700

Lockdown Stay at Home	0.9598**	0.5029	0.0570
Online Video Lectures	-0.0904	0.2846	0.7510
Internet Facility	0.1517	0.2830	0.5920
Constant	6.3874***	1.3167	0.0000
No. of observations	1114	---	---
Adjusted R-Squared	0.15	---	---

Note: * indicates that variable is significant at 10% level of significance, ** at 5% level of significance, and *** at 1% level of significance.

For the robustness checking of our baseline estimates, we introduced a family of dummy variables related to provinces i.e. Punjab, Sindh, KPK, and Balochistan. Table 10 presented the results of this incorporation. It reports that our baseline findings are not sensitive to the inclusion or exclusion of province-related variables except gender. In other words, all variables report the same results as reported in Table 8 with the gender male variable as insignificant.

Table 10: Results after Incorporating Province Variables

	Dependent Variable= Mental Health		
Variables Name	**Coefficient**	**S.E**	**P-Value**
Lockdown	-0.5275**	0.2748	0.0550
Age	0.0086	0.0401	0.8300
Gender Male	0.0272	0.3187	0.9320
Urban Region	-0.1446	0.3132	0.6440
BS Student	0.7076*	0.3990	0.0760
FA/FSc Student	0.4947	0.8154	0.5440
Master Student	0.9535**	0.4548	0.0360
Hostelite	0.3322	0.3169	0.2950
Lockdown Stay at Home	1.0356**	0.5064	0.0410
Online Video Lectures	-0.0987	0.2862	0.7300
Internet Facility	0.1344	0.2851	0.6370
Punjab	0.4018	0.3514	0.2530
Sindh	0.6773	0.7367	0.3580
KPK	0.1606	0.5154	0.7550
Balochistan	-0.1118	0.7196	0.8770
Constant	5.8485***	1.3681	0.0000
No. of observations	1114	---	---
Adjusted R-Squared	0.15	---	---

Note: * indicates that variable is significant at 10% level of significance, ** at 5% level of significance,

and *** at 1% level of significance.

Table 11 provides the chi-square analysis of our study. It reports the dependence of selective variables with lockdown variables. Some independence-related null hypotheses are rejected and some are accepted. This table helps us to understand how the government decision "Stay at Home" influences the daily lives of students.

Table 11: Chi-Square Analysis

Null Hypothesis	Chi-Square	P-Value	Decision
Feeling of stress/depression and lockdown are independent	3.8765	0.099	Null Rejected
Family income and lockdown are independent	1.2804	0.572	Null Accepted
Difficulty in internet access and lockdown are independent	0.0806	0.776	Null Accepted
Study routine and lockdown are independent	5.7563	0.056	Null Rejected
Enthusiasm to study and lockdown are independent	3.2877	0.193	Null Accepted
Study environment at home and lockdown are independent	0.6029	0.437	Null Accepted
Access to transport and lockdown are independent	7.1759	0.028	Null Rejected
Access to food and lockdown are independent	3.8689	0.049	Null Rejected
Access to finance and lockdown are independent	3.4208	0.181	Null Accepted

5. Concluding Remarks and Policy Implications

This study takes a lead and figures out the key challenges and issues that students across all over Pakistan are facing. In particular, it digs deeps and explores the ways that how COVID-19 lockdown impacted the economic, health and educational conditions of the students. The empirical analysis is carried out based on the survey data collected through a structured questionnaire distributed online to students across Pakistan through different social media platforms. A total of 1,114 responses were received providing information on various aspects of online learning and demographics. In regression analysis, we examine the impact of "Stay at Home" orders on the mental health of the students where mental health is a dependent variable measured by the use of the WHO 5-

question module.

The lockdown coefficient has a negative and statistically significant impact on the mental health of students. It indicates that students living in a city that has "Stay at Home" orders in place at the time of the survey is linked with a decrease in mental health which infers that lockdown orders have led to a substantial decline in the mental health of the students. Our results also conclude that being a BS and Master student of the university and being male is associated with significantly higher and better mental health. Another important finding of the study is that students who report being stayed at home during lockdown have significantly better mental health scores. It proposes that staying at home during lockdown helps the students to improve mental health and cope up better with the COVID-19 pandemic. Robustness analysis indicates that these findings are not sensitive to the inclusion or exclusion of province related variables except gender

Similarly, the key findings of descriptive statistical analysis can be summarized as follows. In more than 48% of cases, the format of the lecture was audio rather than a video lecture, implying that the internet connectivity was poor and thus the audio mode of the lecture was preferred over the video. More than 65% of students said that they are no longer studying regularly. There can be several reasons, one of them can be that 33% of the students do not own the learning gadgets. They either rented out or borrowed from friends and family and since the family income of more than 68% of the students included in the sample is below 60,000 PKR, so it is highly unlikely to afford to buy a new one. Another reason can be that more than 80% of the students don't have any prior experience of online learning. As far as economic impacts of COVID-19 lockdown are concerned, more than 70% of the students reported that the lockdown affected their family income and 44% of them that their financial needs are not being fully met and more than 40% asked for financial support. Around 88% of the respondents are in favor of providing a fee concession to the students with 48% recommending waving off half of the tuition fee while 27% are in favor of giving a full fee waiver to the students. The COVID-19 lockdown has imparted severe health impacts on students' lives with more than 71% responded said that they are in stress, anxiety and depression due to lockdown and the alarming situation is that only 15.26% received any personal coaching.

The unprecedented scale and magnitude of online teaching is an experiment and a learning curve for educational institutions. The closure of educational institutions, schools, colleges, and universities not only interrupt the teaching but also creates massive issues of exams and assessments. The wrong assessment delays the recognition

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of both the extraordinary potential and learning difficulties and its damaging consequences for the future of the students (Burgess, 2020). As almost all universities and colleges replaced the traditional exams with online assessments or some other methods, there was a chance of measurement error. Our study examines the impact of COVID-19 on student education in Pakistan further consolidates the facts established in the literature review section. It shows that educational institute closures caused by the pandemic exacerbated previously existing inequalities and those children who were already most at risk of being excluded from a quality education in Pakistan have been most affected. The empirical results highlight the importance of immediate digital educational reforms in Pakistan and targeted mediations to build a positive environment for online study among students from the vulnerable segment of the public.

References

Adams-Prassl, A., Boneva, T., Golin, M., & Rauh, C. (2020). Inequality in the impact of the coronavirus shock: Evidence from real-time surveys. Journal of Public Economics, 189, 104245.

Astbury, J. (2001). Gender disparities in mental health. In: Mental health. Ministerial Round Tables 2001, 54th World Health Assembly, 2001, Who, Geneva, Switzerland.

Bayham, J., & Fenichel, E. P. (2020). Impact of school closures for COVID-19 on the US health-care workforce and net mortality: a modeling study. The Lancet Public Health, 5(5), 271-278.

Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., & Zheng, J. (2020). The psychological impact of the COVID-19 epidemic on college students in China. Psychiatry Research, 287(1), 112934.

Carlsson, M., Dahl, G. B., Öckert, B., & Rooth, D. O. (2015). The effect of schooling on cognitive skills. Review of Economics and Statistics, 97(3), 533-547.

Castle, S. (2020). Cambridge University Will Hold Its Lectures Online Next Year 2020. Retrieved on 3 September 2020, from: https://www.nytimes.com/2020/05/19/world/europe/cambridge-university-coronavirus.html

Chang, S. S., Stuckler, D., Yip, P., & Gunnell, D. (2013). Impact of 2008 global economic crisis on suicide: time trend study in 54 countries. BMJ, 347.

Dagher, R. K., Chen, J., & Thomas, S. B. (2015). Gender differences in mental health outcomes before, during, and after the Great Recession. PLoS One, 10(5), e0124103.

Davies, D. (2020). This year's A-level results are a fiasco – but the system was already broken | Dan Davies. Retrieved on 3 September 2020, from: https://www.theguardian.com/commentisfree/2020/aug/15/a-level-results-system-ofqual-england-exam-marking

Di Pietro, G., Biagi, F., Dinis Mota Da Costa, P., Karpinski, Z., and Mazza, J. (2020). The likely impact of COVID-19 on education: Reflections based on the existing literature and recent international datasets, EUR 30275 EN, Publications Office of the European Union, Luxembourg, 2020, ISBN 978-92-76-19937-3 (online), doi: 10.2760/126686

DKG. (2020). COVID-19 Regional Safety Assessment 250 Countries, Regions & Territories Retrieved on 3 September 2020, from: https://www.dkv.global/covid-safety-assessment-250-regions

Downs, A., Laura A., Duncan G., & Anita, P. (2017). "Using the WHO5 Well-Being Index to identify college students at risk for mental health problems." Journal of College Student Development, 58(1): 113– 117.

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(1), 67-90.

HEC. (2020). HEC Announcements. Retrieved on 3 September 2020, from: https://www.hec.gov.pk/english/HECAnnouncements/Pages/Why-Online-Education.aspx

Hern, A. (2020). Do the maths: why England's A-level grading system is unfair. Retrieved 3 September 2020, from https://www.theguardian.com/education/2020/aug/14/do-the-maths-why-englands-a-level-grading-system-is-unfair

HRW. (2020). Impact of Covid-19 on Children's Education in Africa. (2020). Retrieved on 3 September 2020, from: https://www.hrw.org/news/2020/08/26/impact-covid-19-childrens-education-africa

Iqbal, M. A., & Younas, M. Z. (2021). Public knowledge, attitudes, and practices towards COVID-19 in Pakistan: A cross-sectional study. Children and Youth Services Review, 120, 105784.

Kapasia, N., Paul, P., Roy, A., Saha, J., Zaveri, A., Mallick, R., & Chouhan, P. (2020). Impact of lockdown on the learning status of undergraduate and postgraduate students during the COVID-19 pandemic in West Bengal, India. Children and Youth Services Review, 116(20), 105194.

Krieger, T., Zimmermann, J., Huffziger, S., Ubl, B., Diener, C., Kuehner, C., & Holtforth, M. G. (2014). Measuring depression with a well-being index: further evidence for the validity of the WHO Well-Being Index (WHO-5) as a measure of the severity of depression. Journal of affective disorders, 156, 240-244.

Kumar, D. N. S. (2020). Impact of COVID-19 on Higher Education. Higher Education Digest. https://www.highereducationdigest.com/impact-of-covid-19-on-higher-education

Lavy, V. (2015). Do differences in schools' instruction time explain international achievement gaps? Evidence from developed and developing countries. The Economic Journal, 125(588), F397-F424.

Onyema, E. M., Eucheria, N. C., Obafemi, F. A., Sen, S., Atonye, F. G., Sharma, A., & Alsayed, A. O. (2020). Impact of Coronavirus Pandemic on Education, 11(13), 108-121.

Saeed, A. (2020). The Impact of COVID-19 on Education in Pakistan - CRSS BLOG 2020. Retrieved on 3 September 2020, from: https://crssblog.com/the-impact-of-covid-19-on-education-in-pakistan/

Sarwar, S., Waheed, R., Sarwar, S., & Khan, A. (2020). COVID-19 challenges to Pakistan: Is GIS analysis useful to draw solutions? Science of the Total Environment, 139089.

Seedat, S., Scott, K. M., Angermeyer, M. C., Berglund, P., Bromet, E. J., Brugha, T. S., ... & Kessler, R. C. (2009). Cross-national associations between gender and mental disorders in the World Health Organization World Mental Health Surveys. Archives of general psychiatry, 66(7), 785-795.

Simon, B., & Hans, H.S. (2020). The impact of COVID-19 on education | VOX, CEPR Policy Portal. (2020). Retrieved on 3 September 2020, from: https://voxeu.org/article/impact-covid-19-education

Stevenson, B., & Wolfers, J. (2009). The paradox of declining female happiness. American Economic Journal: Economic Policy, 1(2), 190-225.

Strielkowski, W. (2020).COVID-19 pandemic and the digital revolution in academia and higher education. Preprints 2020, 2020040290. doi: 10.20944/preprints202004.0290.v1

Tahir, P. (2020). Education and COVID-19. Retrieved on 3 September 2020, from: https://www.dawn.com/news/1568714

UNICEF. (2020). At least a third of the world's schoolchildren unable to access remote learning during COVID-19 school closures. Retrieved on 3 September 2020, from: https://www.unicef.org.au/about-us/media/august-2020/remote-learning-report

Viner, R. M., Russell, S. J., Croker, H., Packer, J., Ward, J., Stansfield, C., ... & Booy, R. (2020). School closure and management practices during coronavirus outbreaks including COVID-19: a rapid systematic review. The Lancet Child & Adolescent Health, 4(5), 397-404.

WHO Timeline - COVID-19. (2020). Retrieved on 3 September 2020, from: https://www.who.int/news-room/detail/27-04-2020-who-timeline---covid-19

Zhong, B. L., Luo, W., Li, H. M., Zhang, Q. Q., Liu, X. G., Li, W. T., & Li, Y. (2020). 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, 16(10), 1745.