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The COVID-19 Pandemic and its Effect on Learning: A Study on Academic Anxiety and Online Education in Kashmir: Review Article

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ABSTRACT

Since its discovery in 2019, the highly contagious COVID-19 pandemic caused by the SARs-CoV-2 virus has infected millions of lives worldwide. This respiratory illness of varying severity has led to the overpopulation of healthcare systems, the disruption of economic activities, and damage to societal routines. COVID-19 is a contagious virus that is primarily spread through cough droplets or contact with unsterilized surfaces. The public's response to the disease, vaccinations, and research efforts greatly helped reduce the virus's wrath. The issues we face now are inequitable distribution of vaccines, new variants of the virus, and the untreated effects on health in the future. There are higher risks with this pandemic; that is why unification around the globe, together with technological research, is essential to mitigating the risk.

BARDA has developed, together with partners, over 45 different medical devices and treatments as well as tests, pharmaceutical biological, and vaccine products for the purpose of responding to healthcare emergencies. The pandemic acts as a health emergency on a global magnitude and has shifted dramatically the healthcare technology sector leading to the birth of many new organizations with groundbreaking devices and innovations aimed at overcoming dynamic challenges arising in healthcare.

Keywords: COVID-19, SARS-CoV-2, pandemic, global health crisis, vaccination, Academic Anxiety and Mode of Instruction amid covid19 Study Area and Rationale behind Selecting the Kashmir as a study area

INTRODUCTION

Coronaviruses are a heterogeneous category of viruses capable of infecting various animal species and inducing respiratory ailments in humans, which can vary from minor to severe. In the early 21st century, two highly pathogenic coronaviruses of zoonotic origin, severe acute respiratory syndrome coronavirus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV), emerged in human populations in 2002 and 2012, respectively, resulting in lethal respiratory illness. This underscored the considerable public health risk presented by these viral infections (Cui et al., 2019). COVID-19, caused by the novel severe acute respiratory syndrome coronavirus 2, has arisen as a major public health concern of the modern era, significantly affecting individuals, communities, and nations globally. The International Committee on Taxonomy of Viruses (ICTV) designated the novel coronavirus 2019 as SARS-CoV-2 on 11 February 2020 (Gorbalenya et al., 2020). The WHO identified the novel coronavirus infection as 2019-nCoV and termed the disease "COVID-19," where CO represents corona, VI denotes virus, D signifies disease, and 19 indicates the year of the initial epidemic (WHO, 2020a). The World Health Organisation (WHO) declared the COVID-19 outbreak a Public Health Emergency of International Concern (PHEIC) on January 30, 2020 (WHO 2020b). The elevated transmissibility of SARS-CoV-2 and the ubiquity of international travel enabled the swift spread of COVID-19 globally, leading the World Health Organisation to officially classify the epidemic as a pandemic on 11 March 2020 (WHO, 2020c). This highly transmissible virus has proliferated globally, exceeding prior coronavirus outbreaks like Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) in both the number of infected individuals and the geographic extent of the epidemic (Hu et al., 2020). By August 16, 2020, the COVID-19 pandemic has disseminated to 213 countries and territories (Rostami et al., 2021). As per the World Health Organization's Situation Report-152 issued June 20, 2020, the total number of confirmed global cases has exceeded 8.5 million, with the death toll exceeding 5.5 million (WHO, 2020d). As of 1 January 2023, COVID-19 instances had risen dramatically to over 656 million confirmed cases, with the death toll exceeding 6.6 million (WHO, 2023e). As of June 1, 2024, over 1.2 million individuals have succumbed to COVID-19 in the United States (CDC, 2024).

In December 2019, a new pneumonia outbreak with an unidentified causal agent emerged in Wuhan, China. Of the first 27 recorded hospitalised patients, most cases were epidemiologically linked to the Huanan Seafood Wholesale Market, a "wet market" located in central Wuhan, which offered not only seafood but also live animals, including poultry, bats, marmots, and other wildlife (Jiang et al. 2020). On December 8, 2019, the inaugural case of the new coronavirus was documented in Wuhan, Hubei province, China (Wu, Z., & McGoogan, J. M. 2020). In late December 2019, multiple healthcare institutions in Wuhan, China, documented clusters of individuals exhibiting pneumonia of indeterminate origin (Zhu et al., 2020). On 31 December, the Wuhan Municipal Health Commission alerted the public to a pneumonia outbreak of unknown aetiology and notified the World Health Organisation (Wu, Z., & McGoogan, J. M. 2020).

The coronavirus, called for the crown-like projections on its surface (Latin: corona = crown), constitutes a substantial family of single-stranded RNA viruses, as illustrated in figure 1. The viral envelope encompasses the spike glycoprotein (S), which extends from the surface and imparts a characteristic crown-like look to the virion when observed under an electron microscope. The membrane glycoprotein (M) and envelope protein (E) constitute the ring-like structure encircling the interior of the virion. This interior area contains a helical nucleocapsid, formed by the nucleocapsid protein (N) that encases a single, positive-sense RNA genome roughly 30 kilobases long (Gralinski and Menachery, 2020). On 7 January 2020, Chinese authorities announced whole genome sequencing indicating that SARS-CoV-2 exhibits 79% genomic sequence identity with SARS-CoV and 50% with MERS-CoV (Lu et al., 2020).

Transmission of COVID-19

Evidence suggests the human-to-human transmission of COVID-19 (Jin et al., 2020). This transmission technique is seen as the principal method by which the COVID-19 pandemic disseminated (Jalava, K., 2020). Patients displaying COVID-19 symptoms typically transmit the virus to individuals in close proximity (She et al., 2020). Many persons with COVID-19 are asymptomatic and may unknowingly serve as carriers, disseminating the virus (Rothe et al., 2020). This may elucidate the substantial increase in COVID-19 cases in communities where isolation and social distancing protocols were not rigorously adhered to (Phan et al., 2020), as well as among families with asymptomatic infected members (Respiratory Therapy Group, Chinese Medical Association, 2020). Human-to-human transmission of COVID-19 encompasses:

Horizontal Transmission

Based on the guidelines from Chinese health authorities, there are 3 main transmission routes for the COVID-19 virus in humans (Yan et al., 2020), namely direct contact, aerosol, and droplets.

Direct Contact Transmission

Direct contact with virus-contaminated objects or surfaces can facilitate transmission, leading to infection through the oropharyngeal and ocular routes (e.g., mouth, nose, or eyes) (Koenig et al., 2020). To minimize the transmission of COVID-19, regular hand hygiene should be maintained using an alcohol-based hand rub or soap and water. Additionally, avoiding contact between contaminated hands and the eyes, nose, and mouth can help mitigate the spread of COVID-19 (Singhal, T., 2020).

Aerosol Transmission

While the COVID-19 virus is not primarily an airborne pathogen (Wong et al., 2020), it can spread through aerosol transmission via respiratory droplets expelled through coughing, sneezing, and breathing, which can contaminate the immediate surroundings (Koenig et al., 2020) and facilitate the spread of the virus. Notably, aerosol transmission is not limited to individuals exhibiting symptoms; even asymptomatic individuals who test positive for COVID-19 can transmit the virus (Zhou, C., 2020). In enclosed spaces, virus-laden aerosols may remain suspended in the air for extended periods and at high concentrations, thereby increasing the likelihood of transmission. Research shows that the virus remains viable in aerosols for at least three hours and can persist on stainless steel and plastic surfaces for 48 to 72 hours (Van Doremalen et al., 2020).

Droplet Transmission

Respiratory air commonly comprises a significant quantity of microscopic droplets, less than 5 micrometers in size. When a person coughs or sneezes, there is an increased expulsion of these droplets from the mouth and respiratory tract. In patients with COVID-19, these droplets can contain the virus, which can potentially be inhaled, ingested, or deposited on mucous membranes, thereby transmitting the disease to others (Liu et al., 2020).

Vertical Transmission

The COVID-19 pandemic poses an infection risk for pregnant women and their unborn children, as there is a possibility of vertical transmission of the virus. Similar to SARS, COVID-19 can potentially be transmitted vertically from mother to fetus (Li et al., 2020). The first reported case of possible vertical transmission of COVID-19 was documented in March 2020. In this case, the newborn infant of a COVID-19-positive mother showed elevated levels of IgM antibodies and cytokines in the blood just two hours after birth (Dong et al., 2020). Additional cases have also demonstrated that neonates can test positive for the COVID-19 virus shortly after delivery (Alzamora et al., 2020).

Symptoms of the COVID-19

Individuals infected with COVID-19 display symptoms akin to those of SARS and MERS, suggesting viral pneumonia. Typical manifestations encompass pyrexia, cough, and thoracic pain. In extreme instances, patients may encounter dyspnoea and bilateral pulmonary infiltration (Gralinski & Menachery, 2020). The infection may result in varying degrees of symptom severity, with certain instances culminating in death (Liu et al., 2020). The most commonly

reported symptoms include lower respiratory tract infections, pneumonia, dry cough, fever, shortness of breath, dyspnoea, and myalgia. Additional infrequent symptoms may encompass headache, disorientation, sore throat, haemoptysis (coughing up blood), rhinorrhea (runny nose), chills, myalgia and thoracic pain, as well as gastrointestinal disturbances including diarrhoea, nausea, and vomiting (Huang et al., 2020). Individuals may potentially be infected with the virus while remaining asymptomatic. Nonetheless, the majority of COVID-19 cases exhibit a positive prognosis, characterised by moderate symptoms that generally subside after 7 to 10 days of supportive care during hospitalisation (Tian et al., 2020). In severe instances, patients may experience consequences including pulmonary oedema, acute respiratory distress syndrome (ARDS), or multiple organ failure, potentially resulting in mortality (Chen et al., 2020).

Variants of the COVID-19

The World Health Organization's classification of the COVID-19 outbreak as a global public health emergency marked its sixth declaration, succeeding prior public health crises related to H1N1 (2009), polio (2014), Ebola in West Africa (2014), Zika (2016), and Ebola (2019) in the Democratic Republic of Congo (Nii-Trebi et al., 2023). Genetic changes in the SARS-CoV-2 genome have resulted in the creation of several viral strains. Diverse environmental elements, including UV light, metal ions, and endogenous cellular components, have influenced the genetic evolution of the virus over time (Sanjuán & Domingo-Calap 2016). Consequently, numerous clinically relevant variants have emerged, indicating the vulnerability of the SARS-CoV-2 genome to various mutations. The variant lineages encompass B.1.1.7 (Alpha), B.1.351 (Beta), B.1.617/B.1.617.2 (Delta), P.1 (Gamma), and B.1.1.529 (Omicron).

Academic Anxiety and Mode of Instruction amid COVID-19

The initial confirmed case of the Novel Coronavirus 2019 (2019-nCoV/SARS-CoV-2) was documented on 30 January 2020 in Thrissur, Kerala, involving a 20-year-old individual. An elderly female presented to the Emergency Department at General Hospital, Thrissur, after returning to Kerala from Wuhan City, China, on January 23, 2020, due to the COVID-19 outbreak in that region (Rahim et al., 2021). As of 25 March, the Government of India has implemented containment efforts through a statewide lockdown (Madan et al., 2021). The COVID-19 epidemic constitutes the greatest significant interruption to educational systems in more than a century, with certain countries implementing total school closures for the whole academic year (Brown et al., 2023). Nationwide school and college closures have adversely affected more than 90% of the global student population, with over 168 million children unable to attend school during the initial year of the COVID-19 pandemic (UNICEF, 2022). A study revealed that pupils experience anxiety with disruptions to school routines, examination cancellations, exchange programs, and academic events (Lee, 2020). The closure of educational institutions and the shift of curricula to an online format posed new problems for students and necessitated a swift adaptation of their study habits (Schmits et al., 2021). Numerous enduring mental health challenges among students, associated with academic demands in secondary and tertiary education, existed prior to the COVID-19 pandemic, encompassing depression, anxiety, and stress arising from various factors including familial backgrounds, student lifestyle habits, and both physical and psychological health concerns (Jamal et al., 2022). The onset of COVID-19 exacerbated these issues (Li et al., 2020). Anxiety is a primary human emotion marked by fear and uncertainty, frequently accompanied by feelings of unease, troubled thoughts, and physiological reactions (American Psychiatric Association 2013). Valiante and Pajares (1999) characterise academic anxiety as a condition of stress and apprehension encountered by students, frequently arising from expected academic difficulties. Feelings of trepidation and anxiety can substantially hinder a student's capacity to execute assignments and activities in academic environments. The COVID-19 epidemic has resulted in increased academic stress among secondary school pupils due to the interruption of standard learning practices. The shift to remote learning has intensified existing mental health issues for secondary school students, with a meta-analysis indicating that the prevalence of anxiety, depression, and stress among these students during the COVID-19 pandemic reached 58%, 50%, and 71%, respectively (Xu & Wang, 2023). The significant transformation in the education system has imposed a substantial strain on the mental health of secondary school students, especially concerning heightened anxiety levels (Bussières et al., 2021). The shift to online learning during the COVID-19 epidemic had considerable negative impacts on students' mental health. A primary factor in this fall was the decrease in significant interactions between teachers and students, as well as among peers, which are vital for academic engagement and emotional support (Fruehwirth et al., 2021). The lack of in-person communication fostered a feeling of isolation and diminished prospects for collaborative learning, essential elements of conventional classroom environments (Mollenkopf et al., 2020). This transition not only impeded students' social development but also intensified emotions of stress, anxiety, and disengagement, so adversely affecting their overall academic and emotional well-being (Hu, T. 2021). The COVID-19 pandemic has profoundly affected the academic welfare of secondary school students. The abrupt transition to distant learning and social distancing protocols has intensified academic anxiety and many psychological issues for numerous pupils (Hertz et al., 2022). Under these circumstances and expectations, students frequently experience adverse feelings, such as academic anxiety, characterised by an emotional state in which the individual is unable to surmount challenges or achieve their objectives. In 2020, during the COVID-19 pandemic, schools in numerous areas were unable to operate normally, necessitating that senior high school students engage in online learning at home. This was primarily due to physical distancing and other public health measures implemented to mitigate the spread of COVID-19 and safeguard the health of individuals and communities. Nonetheless, these approaches may have inadvertently affected students' mental health, leading to heightened isolation, loneliness, and difficulties with self-regulation and academic performance (Cockerham et al., 2021; Wu et al., 2022). The pandemic's psychological impact is notably alarming, with recent research indicating that the most affected demographics include young adults, women, persons with prior mental health diagnoses, and those at elevated risk from COVID-19 (Godoy et al., 2021). The data indicate that the interruption of schooling and social assistance during the epidemic has disproportionately affected the student demographic specifically.

Objectives of study

To study the relation between COVID-19 and academic anxiety of secondary school students

To study the impact of COVID-19 on the Mode of Instruction of secondary school students

To suggest and recommend the measures for combating pandemics like COVID-19

Hypothesis 1: There is no significant relation between COVID-19 and academic anxiety of secondary school students

Hypothesis 2: There is no significant impact of COVID-19 on the Mode of Instruction of secondary school students.

Study Area and Rationale behind Selecting the Kashmir as a study area

Kashmir, a region known for its unique geographical, socio-political, and economic conditions, has faced significant disruptions in the education sector due to the COVID-19 pandemic. The region's educational institutions were already experiencing challenges due to intermittent internet shutdowns, political instability, and natural calamities, making the impact of the pandemic even more severe. With the sudden shift from traditional classroom learning to online education, secondary school students in Kashmir had to adapt to new modes of instruction, which contributed to increased academic anxiety.

The rationale for selecting Kashmir as the study area lies in the region's distinct educational challenges. Unlike other parts of India, students in Kashmir encountered frequent connectivity issues, limited access to digital resources, and psychological stress due to prolonged lockdowns. These factors compounded the academic anxiety among secondary school students, making it crucial to assess how COVID-19 influenced their learning experiences. Additionally, understanding the impact of the pandemic on the region's mode of instruction provides insights into the effectiveness of online education and the potential need for alternative learning strategies.

By focusing on Kashmir, this study aims to highlight the unique struggles faced by secondary school students and propose measures to mitigate academic anxiety and improve the resilience of the education system in the face of future crises.

Study Population

The study population for this research comprises secondary school students in Kashmir, who were directly impacted by the shift in the mode of instruction during the COVID-19 pandemic. This group includes students enrolled in various government and private secondary schools across the region. Secondary school students were selected as the primary respondents because they experienced a critical transition in their academic journey during the pandemic, facing challenges such as adapting to online learning, dealing with technological constraints, and coping with increased academic anxiety. Given their stage of education, these students were at a crucial developmental phase where disruptions in learning could significantly affect their academic performance, mental well-being, and future aspirations. By studying their experiences, this research aims to assess the extent of academic anxiety, evaluate the effectiveness of online instruction, and provide recommendations to enhance the resilience of the education system in Kashmir.

Sampling Technique

The study employs convenience sampling to select secondary school students from various schools across Kashmir. Convenience sampling was chosen due to its practicality in accessing respondents who were readily available and willing to participate in the study. Given the disruptions caused by the COVID-19 pandemic and the challenges of reaching students across different locations, this non-probability sampling method allowed the researcher to gather data efficiently. Secondary school students who had experienced online learning during the pandemic were included in the sample to ensure relevant insights into academic anxiety and the effectiveness of the mode of instruction. While convenience sampling may have limitations in generalizability, it provides valuable first-hand perspectives from students who directly faced the academic challenges imposed by COVID-19 in Kashmir.

Sample Size

For this study, a sample size of approximately 250 secondary school students was selected to ensure a comprehensive understanding of the impact of COVID-19 on academic anxiety and mode of instruction in Kashmir. This sample size was deemed appropriate to capture diverse perspectives from students enrolled in different schools, including both government and private institutions. Given the constraints of accessibility and the challenges posed by the pandemic, a balanced yet manageable number of respondents was chosen to facilitate meaningful data analysis while maintaining feasibility. A sample of 250 students provides sufficient statistical power to identify trends and patterns related to academic anxiety and online learning experiences. Additionally, this number allows for a reasonable representation of the student population, ensuring that the findings reflect the broader challenges faced by secondary school students in Kashmir during the pandemic.

Research Instrument

Post instrument refinement, the final research instrument prepared and inviting the respondents to participate in the study. Some basic information was shared with them-the purpose of the study, the approximate time taken to complete the questionnaire and the assurance that the responses would be used for academic purposes only. The instrument was divided into 6 sections, each consisting of a number of items. The division of items under different sections was as given in table number

Analysis of the Relationship between COVID-19 and Academic Anxiety among Secondary School Students

The COVID-19 pandemic brought unprecedented disruptions to the education system, shifting students to online learning and altering academic schedules. This sudden transition led to significant academic anxiety among secondary school students. The study examined various factors contributing to students' anxiety levels, including online learning challenges, uncertainty about exams, lack of social interaction, technical difficulties, and fear of falling behind in studies. The responses were measured using a 5-point Likert scale ranging from Strongly Agree (5) to Strongly Disagree (1). The following section presents an analysis of each factor affecting academic anxiety.

Impact of Online Learning on Academic Anxiety

The transition to online learning was a major stressor for students. The statement "The shift to online learning during COVID-19 increased my academic anxiety" (AA1) received a mean score of 4.12 (SD = 0.407), indicating a high level of agreement among students. A combined 65.2% of students strongly agreed or agreed that online learning contributed to their academic anxiety, highlighting the challenges of adapting to a new mode of instruction.

Uncertainty of Exams and Academic Schedules

One of the most significant sources of academic stress during COVID-19 was the uncertainty surrounding exams and academic schedules. The statement "I felt overwhelmed by the uncertainty of exams and academic schedules during the pandemic" (AA2) had the highest mean score of 4.59 (SD = 0.766), indicating extreme anxiety among students. Nearly 69.2% of students strongly agreed or agreed with this statement, showing that the lack of clarity on exams and grading created major distress among students.

Lack of Face-to-Face Interaction

Social interaction is a crucial aspect of the learning experience, and its absence during the pandemic increased academic anxiety. The statement "Lack of face-to-face interaction with teachers and classmates made me feel more anxious about my studies" (AA3) had a mean score of 4.08 (SD = 0.679), with 81.6% of students strongly agreeing or agreeing. This suggests that online learning led to feelings of isolation and reduced academic engagement, further intensifying students' anxiety.

Technical Difficulties and Academic Stress

Technical issues, particularly internet connectivity problems, were another key factor contributing to academic anxiety. The statement "Technical issues such as internet connectivity problems added to my academic stress during online learning" (AA4) had a mean score of 4.12 (SD = 0.976). Around 78.8% of students strongly agreed or agreed that unreliable internet and other technical difficulties made learning more stressful, emphasizing the digital divide's impact on education.

Fear of Falling Behind in Studies

The most significant contributor to academic anxiety was the fear of falling behind in studies due to school closures and disruptions (AA5). This statement recorded the highest mean score of 4.68 (SD = 0.456), with 87.6% of students strongly agreeing or agreeing. The overwhelming concern about academic progress reflects how the pandemic severely disrupted students' ability to keep up with coursework, leading to heightened stress levels.

Conclusion

The findings indicate a strong relationship between COVID-19 and academic anxiety among secondary school students. The lack of stability in academic schedules, challenges of online learning, absence of social interaction, technical difficulties, and fear of academic setbacks were the primary drivers of increased anxiety. The results highlight the need for better online learning infrastructure, mental health support, and clear academic guidelines to mitigate anxiety and ensure more effective learning experience in future educational disruptions.

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