



Pandemic-Related Information Overload and Perceived Stress among University Students: Evidence from an Archival Lockdown-Period Dataset

Ruqia Safdar Bajwa

Assistant Professor, Department of Applied Psychology, Bahauddin Zakariya University, Multan, Pakistan, (Corresponding Author), Email: ruqiasafdar@bzu.edu.pk

Abstract

During COVID-19 lockdowns, university students had to manage a constant flow of pandemic-related information while also adjusting to online learning, social isolation, and uncertainty about health and education. Accurate information was necessary, but repeated updates, conflicting messages, and difficult-to-process information could also become stressful. This study examined whether pandemic-related information overload was associated with perceived stress among university students in Pakistan using an archival lockdown-period dataset. A cross-sectional correlational design was used, and the sample comprised 213 university students. Participants completed a COVID-19-adapted Information Overload Scale and an adapted version of the Perceived Stress Scale-10. The Information Overload Scale had excellent internal consistency, $\alpha = .946$, and the Perceived Stress Scale had good internal consistency, $\alpha = .828$. A significant positive correlation was observed between perceived stress and information overload related to COVID-19. Results of a hierarchical regression analysis revealed that information overload was a significant predictor of perceived stress, after controlling for gender and family structure. The final model accounted for 28.6% of the variance in perceived stress. These findings indicate that students who experienced greater pandemic-related information overload were more likely to report higher perceived stress during lockdown. The study contributes archival evidence from a South Asian university context and highlights the need for public health communication that is credible, clear, and manageable rather than excessive or difficult to process.

Keywords: COVID-19; Information Overload; Perceived Stress; University Students; Lockdown; Pakistan; Infodemic

Introduction

The COVID-19 pandemic caused a public health emergency, which interrupted education, employment, social interactions, travel, and daily life. In addition to the immediate risk of infection, the pandemic had a significant psychological impact, such as stress, anxiety, depression, fear, sleep disturbance, and distress in various groups and settings (Serafini et al., 2020; Wang, Kala & Jafar, 2020). Wang et al. (2020) conducted a systematic review and meta-analysis of 68 studies with a total of 288,830 adults in samples predominantly drawn from general populations, and found that about one-third of these adults exhibited symptoms of anxiety or depression during COVID-19, suggesting that the pandemic had a significant mental health burden globally. Quarantine and lockdown conditions further intensified this burden by

restricting movement, reducing direct social contact, disrupting daily routines, and increasing uncertainty about health, education, employment, and the future (Bonati et al., 2021; Pérez et al., 2021). A defining feature of the COVID-19 crisis was that it unfolded within a highly connected digital information environment. There were regular updates about the pandemic disseminated via TV, online news, official websites, social networking sites, instant messaging, and informal interpersonal networks (Guo et al., 2021; Fan & Smith, 2021). In health emergencies, information plays a crucial role in enabling people to understand the risks, adopt preventive behaviors, and make adaptive decisions (Guo et al., 2021). The pandemic, however, also brought about an infodemic of excessive information, fast updates, misinformation, conflicting messages, rumors and uncertainty about trustworthiness of sources (Fan & Smith, 2021; Guo et al., 2021; Wang, Huang, Wang, Wang, Xu, & Li, 2022). In these cases, information is not only informative, it can be overwhelming to cognitive and emotional processes. Information overload is a situation in which the volume, complexity, velocity, or expectations of information are beyond the recipient's processing, prioritization, and response capabilities (Fan & Smith, 2021; Guo et al., 2021; Wang et al., 2022). This construct becomes especially pertinent in the context of COVID-19 because there was a lot of emotionally charged information, health-threatening information, rapidly changing information, and sometimes contradictory information. Students and the public were frequently inundated with information on symptoms, transmission, mortality, restrictions, treatment, vaccination, and safety behaviors, sometimes in contradictory ways (Fan & Smith, 2021; Wang et al., 2022). However, information overload can lead to uncertainty, threat, hypervigilance, and the sense of being overwhelmed with continuous changes (He et al., 2021; Luo et al., 2021). Information exposure and information overload are not the same. Information exposure refers to the quantity or frequency of information encountered, whereas information overload refers to the perception that information is too much to process, prioritize, or manage (Fan & Smith, 2021; Guo et al., 2021).

Increasing evidence suggests that there is a relationship between information overload during a pandemic and poorer psychological functioning. In China, higher pandemic-related information overload was associated with poorer well-being, including greater stress, anxiety, depression, and negative affect, even after controlling for established predictors of well-being (Fan & Smith, 2021). Similarly, a Hong Kong study found that information overload was associated with psychological distress and mediated the relationship between frequent use of some online information sources and PHQ-4 distress symptoms (Guo et al., 2021). Additionally, Wang et al. (2022) found that information overload was positively related to anxiety, depression, and posttraumatic stress symptoms, indicating that the information overload is related not only with general distress, but also with more severe psychological responses. Related evidence among health care workers also suggests that excessive COVID-19 information exposure may contribute to fatalism, exhaustion, and poorer psychological well-being (Li & Khan, 2022). Together, these studies suggest that overexposure to pandemic information may become psychologically stressful when information exceeds coping and information-processing capacities. Media exposure research also offers a more general basis for the understanding of the potential stress consequences of pandemic media environments. In the early stages of the COVID-19 pandemic in China, increased exposure to the media and social media was related to increased acute stress and likely acute stress disorder (Luo et al., 2021). He et al. (2021) revealed that exposure to COVID-19 in the media was significantly associated with acute stress, and that the influence of COVID-19 media exposure on acute stress was partly mediated by intolerance of uncertainty, indicating that COVID-19 media exposure can exacerbate stress through increasing

uncertainty. Higher levels of stress from media and lower levels of perceived coping have also been associated with COVID-19 related media exposure and distress among students in student samples (Pat-Horenczyk et al., 2021). These findings suggest that the psychological effects of pandemic information may depend not only on the quantity of exposure but also on whether the information is experienced as stressful, uncertain, or overwhelming. University students are an important group for examining pandemic-related information overload and perceived stress. During COVID-19 lockdowns, students experienced sudden transitions to online education, disruption of campus life, reduced face-to-face interaction, concerns about academic progress, and worries about family health and future employment (Hakami et al., 2021; Pat-Horenczyk et al., 2021). Concurrently, students relied heavily on digital technologies in their learning, communication, entertainment and news, and were more likely to come across abundance of information regarding COVID-19 (Li et al., 2020; Lin et al., 2020). Research during the COVID-19 pandemic showed heightened stress, anxiety, depression, health anxiety, and functional difficulties among younger populations, including students and young adults (Gamonal-Limcaoco et al., 2022; Hakami et al., 2021; Li et al., 2020; Pat-Horenczyk et al., 2021). Pandemic information can be repetitive, threatening, hard to assess and counterbalance with students' limited coping mechanisms, which can exacerbate their vulnerability. Perceived stress is a theoretically appropriate outcome for examining the psychological burden of information overload. The Perceived Stress Scale conceptualizes stress as how unpredictable, uncontrollable and overloaded individuals perceive their lives to be (Cohen, Kamarck, & Mermelstein, 1983). This aligns closely with information overload, in which individuals perceive that the information they encounter exceeds their capacity to manage, prioritize, or make sense of it (Fan & Smith, 2021; Williamson, Eaker, & Lounsbury, 2012). Perceived stress was broadly recognized as a measure of psychological stress during the pandemic and across the nation, among women, young adults, and students, there was a higher level of perceived stress (Gamonal-Limcaoco et al., 2022). Therefore, the present study focused on perceived stress as a subjective indicator of psychological burden during the pandemic, rather than relying only on clinical symptom categories.

The present study is also relevant in the Pakistani context. During the pandemic, people in Pakistan relied heavily on social media, electronic news outlets, and interpersonal networks for COVID-19-related information, while misinformation and changing public health guidance added to uncertainty. Evidence from Pakistan suggests that exposure to COVID-19-related information on social media was associated with poorer mental well-being, including depressive and combined depression-anxiety symptoms (Sarwar et al., 2021). Research from Pakistan and the broader South Asian context has more often focused on media exposure, social media use, or general psychological distress, with less attention to perceived information overload specifically. Less is known about whether students who felt overwhelmed by pandemic-related information also reported higher perceived stress during lockdown. This study explored whether information overload and pandemic anxiety were associated with higher levels of perceived stress during locking down. The emphasis on 'information overload' is significant because it goes beyond mere media or social media exposure, to also refer to the subjective sense of information overload, as in too much information to process, evaluate, or control. By using lockdown-period data from university students in Pakistan, the study also adds evidence from a South Asian context where student experiences of pandemic-related information burden remain less visible in the international literature. Higher pandemic-related information overload was hypothesized to be positively correlated with perceived stress among university students. It was also hypothesized

that information overload would significantly predict perceived stress after controlling for gender and family structure.

Method

Research Design

The study used a correlational-cross sectional approach to examine the association between information overload regarding COVID-19 and perceived stress in university students. The data were obtained from a lockdown-period survey data set which was collected during the COVID-19 pandemic as an archive.

Participants

Sample consisted 213 students from university. Of these, 137 participants were female (64.3%) and 76 were male (35.7%). The majority of the respondents were from nuclear families (66.7%) and the remaining 33.3% were from joint families. Academic background 44.1% had social sciences, 37.1% had sciences and 16.0% had arts and humanities. The most common use of the internet was for education/work (49.8%), followed by entertainment/leisure (23.5%). Most frequently used in lockdown was text-based communication (57.3%) followed by voice-based communication (37.6%) and video calls (4.7%). The most popular sources of information about COVID-19 were television/electronic news (35.7%) and social media (34.7%).

Measures

Information Overload

Pandemic-related information overload was measured using a 15-item Information Overload Scale adapted from Williamson, Eaker, and Lounsbury (2012). The original scale assesses the extent to which individuals feel overwhelmed by the amount, speed, and manageability of information in daily life. For the present study, item wording was adapted to refer specifically to coronavirus-related information. Sample items included —I regularly feel overwhelmed by too much information related to coronavirus and —It is sometimes hard for me to concentrate because of all the information related to coronavirus I have to assimilate. Items were rated on a five-point Likert-type scale ranging from 1 = strongly disagree to 5 = strongly agree. Higher scores indicated greater COVID-19-related information overload. Internal consistency in the present sample was excellent, $\alpha = .946$.

Perceived Stress

Perceived stress was assessed using an adapted version of the Perceived Stress Scale-10 (PSS-10; Cohen et al., 1983). The PSS-10 measures the degree to which individuals perceive their lives as unpredictable, uncontrollable, and overloaded. In the present study, items referred to feelings and thoughts experienced during the last month since the lockdown began. Sample items included, “In the last month, how often have you felt nervous and stressed?”, and “In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?” Responses were recorded on a four-point frequency scale ranging from 1 = never to 4 = very often. Items were scored so that higher mean scores reflected greater perceived stress in the present dataset. Internal consistency in the present sample was good, $\alpha = .828$.

Procedure

Data were collected through a self-report survey administered to university students during the COVID-19 lockdown period. The questionnaire included demographic information, internet-use characteristics, communication patterns during lockdown, sources of COVID-19-related information, information overload items, and perceived stress items. Responses were screened for completeness, coding accuracy, and distributional properties before analysis.

Data Analysis

IBM SPSS Statistics was used to analyze the data. Demographic characteristics and the primary study variables were calculated using descriptive statistics. Cronbach's alpha was used to check the internal consistency reliability. The skewness and kurtosis values were used to check the univariate normality. Possible common method variance was evaluated using Harman's single factor test. Pearson product-moment correlation was used to examine the correlation between COVID-19 related information overload and perceived stress. A hierarchical linear regression was then performed to determine if information overload was a significant predictor of perceived stress when the effects of gender and family structure were controlled. Gender was categorized as 0=male and 1=female, and family structure as 0=nuclear and 1=joint family. Diagnostic tests of regression were performed using residual diagnostic and collinearity statistics as well as influence statistics.

Results

Participant Characteristics

The sample consisted of 213 students from university. Of these, 137 participants were female (64.3%) and 76 were male (35.7%). The majority of the participants were from nuclear families (66.7%) and the remaining 33.3% were from joint families. Academically, 44.1% came from social sciences, 37.1% from sciences and 16.0% from arts and humanities. Education/Work was the most frequent use of the internet (49.8%) and Entertainment/Leisure was the second most frequent use (23.5%). The primary mode of communication used during a lockdown was text-based communication (57.3%) which included instant messaging, SMS and chatrooms, and the second most common mode of communication was voice-based communication (37.6%). Television/electronic news (35.7%) and social media (34.7%) were the most prevalent sources of information on COVID-19.

Table 1

Demographic and Background Characteristics of Participants

Variable	Category	f	%
Gender	Male	76	35.7
	Female	137	64.3
Family structure	Nuclear family	142	66.7
	Joint family	71	33.3
Subject group	Social sciences	94	44.1
	Sciences	79	37.1
	Arts and humanities	34	16.0
	Other/unclear	6	2.8
Main purpose of internet use	Education/work	106	49.8
	Entertainment/leisure	50	23.5
	Information/news/searching	27	12.7
	Communication/social networking	26	12.2
	Shopping/product information	4	1.9
Main communication method	Text-based communication	122	57.3
	Voice-based communication	80	37.6
	Video calls	10	4.7
	Other/unclear	1	0.5
Main COVID-19 information source	Television/electronic news	76	35.7
	Social media	74	34.7

Internet/official websites	18	8.5
Mixed sources	11	5.2
None/unclear/other	34	16.0

Note. $N = 213$. Percentages may not total exactly 100 because of rounding. Subject group and COVID-19 information-source categories were collapsed from open-ended responses.

Reliability, Descriptive Statistics, and Common Method Variance

The Information Overload Scale had excellent internal consistency reliability ($\alpha = .946$) and the Perceived Stress Scale had good internal consistency reliability ($\alpha = .828$). Participants reported moderate levels of information overload related to COVID-19 ($M = 2.95$, $SD = 0.89$) and perceived stress ($M = 2.74$, $SD = 0.55$) based on descriptive statistics. The values of skewness and kurtosis for both variables were within acceptable limits. To check for potential common method variance, Harman's single factor test was used. The first unrotated factor explained 39.29% of the total variance, indicating that CMI was not likely to account for all the variance in the observed association between information overload and perceived stress.

Table 2

Reliability, Descriptive Statistics, and Correlation Between Study Variables

Variable	α	M	SD	Skewness	Kurtosis	1	2
1. Information Overload	.946	2.95	0.89	-0.24	-0.60	—	
2. Perceived Stress	.828	2.74	0.55	-0.80	0.97	.464***	—

Note. $N = 213$. *** $p < .001$.

Correlation Analysis

Pearson correlation analysis showed a significant positive association between COVID-19-related information overload and perceived stress, $r(211) = .464$, $p < .001$. This indicates that students who reported higher levels of information overload also tended to report higher levels of perceived stress.

Hierarchical Regression Analysis

A hierarchical regression was conducted to examine whether COVID-19-related information overload predicted perceived stress after controlling for gender and family structure. In Step 1, gender and family structure significantly predicted perceived stress, $R^2 = .099$, adjusted $R^2 = .091$, $F(2, 210) = 11.60$, $p < .001$. In Step 2, information overload was added to the model, significantly improving the explained variance, $\Delta R^2 = .187$, $\Delta F(1, 209) = 54.74$, $p < .001$. The final model explained 28.6% of the variance in perceived stress, $R^2 = .286$, adjusted $R^2 = .276$, $F(3, 209) = 27.96$, $p < .001$. Information overload remained a significant positive predictor of perceived stress after controlling for gender and family structure, $B = .271$, $SE = .037$, $\beta = .436$, $t = 7.40$, $p < .001$, 95% CI [.199, .343]. Gender also remained significant, indicating that female students reported higher perceived stress than male students, $B = .295$, $SE = .071$, $\beta = .256$, $t = 4.16$, $p < .001$, 95% CI [.155, .435]. Family structure was not a significant predictor of perceived stress, $B = -.042$, $SE = .072$, $\beta = -.036$, $t = -0.59$, $p = .556$, 95% CI [-.183, .099]. Regression diagnostics supported interpretation of the model. Tolerance values ranged from .906 to .985, and VIF values ranged from 1.015 to 1.104, indicating no multicollinearity concern. Cook's distance values ranged from .000 to .082 with no case having an undue influence on the model. The residual histogram and Q-Q plot were checked and there was no significant deviation from normality.

Table 3

Hierarchical Regression Predicting Perceived Stress from Information Overload After Controlling for Gender and Family Structure

Predictor	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>p</i>	95% CI for <i>B</i>	VIF
Step 1							
Gender	.359	.079	.310	4.545	< .001	[.203, .514]	1.088
Family structure	-.019	.080	-.016	-0.237	.813	[-.177, .139]	1.088
Step 2							
Gender	.295	.071	.256	4.164	< .001	[.155, .435]	1.104
Family structure	-.042	.072	-.036	-0.590	.556	[-.183, .099]	1.090
Information overload	.271	.037	.436	7.399	< .001	[.199, .343]	1.015

Note. *N* = 213. Gender was coded 0 = male and 1 = female. Family structure was coded 0 = nuclear family and 1 = joint family. Step 1: $R^2 = .099$, adjusted $R^2 = .091$. Step 2: $R^2 = .286$, adjusted $R^2 = .276$, $\Delta R^2 = .187$, $\Delta F(1, 209) = 54.74$, $p < .001$. CI = confidence interval; VIF = variance inflation factor.

Discussion

In the present study, the relationship between information overload and perceived stress in the context of pandemic was investigated in university students during lockdown. As hypothesized in the study, students who said they had a harder time regulating the amount and need for pandemic-related information also experienced higher levels of perceived stress. This association remained strong after accounting for gender and family structure, accounting for an additional 18.7% of the variance in perceived stress. This discovery suggests that pandemic information was not only a context for the lockdown but also was relevantly linked to students' experiences of stress. This result is consistent with studies showing that COVID-19 information overload was linked with poorer psychological functioning, including stress, anxiety, depression, negative affect, psychological distress, and posttraumatic stress symptoms (Fan & Smith, 2021; Guo et al., 2021; Wang et al., 2022). The present study adds to this literature by showing that the same pattern was present in a lockdown-period university student sample, with perceived stress as the outcome.

The findings also support the distinction between information exposure and information overload. Information access is essential in a public health emergency, but issues occur when information becomes too much, too often, contradictory, and hard to prioritize. One of the stress-relevant factors in this context might not be information access, but rather, the perceived overload of information that is available but not available to process and manage (Fan & Smith, 2021). The conceptual consistency between information overload and perceived stress is also consistent. Perceived stress is the extent to which people find situations unpredictable, uncontrollable and overwhelming (Cohen et al., 1983). Information overload involves a similar appraisal: the person feels that available information exceeds the capacity to sort, understand, or use it effectively (Williamson et al., 2012). During lockdown, students were already managing academic disruption, social restrictions, family concerns, and increased digital dependence. Under such conditions, a constant stream of pandemic information could reasonably add to the sense of being overloaded.

The findings are also consistent with broader research on media exposure during COVID-19. Luo et al. (2021) reported increased acute stress during the early COVID-19 outbreak with increased exposure to media and social media. He et al. (2021) also demonstrated that intolerance of uncertainty mediated the relationship between media exposure and acute stress, highlighting that the frequency of pandemic news may boost stress by increasing ambiguity and threat monitoring. Pat-Horenczyk et al. (2021) discovered that the link between COVID-19-related challenges and poorer perceived coping was stronger among students from universities and colleges who also reported media-related stress, but not among those who did not report such stress. The present findings highlight subjective information burden as a stress-relevant experience during lockdown. Gender remained significant in the final model, with female students reporting higher perceived stress than male students. Similar gender differences have been reported in COVID-19 mental health research, where women and young adults often showed higher psychological distress or perceived stress (Bonati et al., 2021; Gamonal-Limcaoco et al., 2022; Wang et al., 2020). The present study did not test why this difference emerged, but it suggests that gender should be considered when examining student stress during crises. The study adds value mainly by focusing on the subjective burden of pandemic information rather than only the amount of media exposure. It also provides evidence from Pakistani university students, a context that is less frequently represented in international work on COVID-19 information overload. The present results indicate that mental health studies among students in times of public health crises need to take into account not only exposure to information, but also students' capacity to cope with information. The results have implications for universities and public health communicators. In future health crises, students might benefit from less and more specific information, uniform messages, and direction to determine the credibility of information. Universities can also minimize information overload by providing a centralized source for students to get updates and not see it spread across several channels. Short advice given on how to authenticate sources, how to "passively" monitor, and establishing boundaries around information exposure can also decrease stress associated with information overload.

There are a few restrictions that must be mentioned. The cross-sectional design does not allow for causal inference, so it is not possible to determine whether information overload led to an increase in perceived stress and/or whether stressed students were more likely to find information overwhelming, nor if both of these factors occurred simultaneously. Second, self-reports may experience response bias and shared method variance, but Harman's single factor test indicated that most of the variance observed was not due to shared method variance. Third, it was data that had been archived and gathered during the lockdown period, thus providing less control over sampling procedures, contextual variables, and measurement decision making. Fourth, the dataset used a 4-option response format for the adapted PSS; thus, stress scores should be interpreted as adapted perceived stress scores and not compared directly with standard PSS cut-off scores. Finally, the study was restricted to university students only, thus limiting generalizability to other age groups or non-student groups. However, the study offers some useful evidence during the lockdown period that there was an association between perceived stress and information overload during the pandemic among university students, despite these limitations. The findings suggest that information environments should be considered when understanding student stress during public health crises. Making information available is important, but making it manageable may be equally important.

Conclusion

There was a strong association between higher perceived stress and pandemic related information overload among university students during lockdown. The results indicate that pandemic information can turn into a psychological burden, when students feel it is 'too much', 'repetitive' and 'overwhelming'. Public health communication in the future should strive to give students credible, manageable and clear information, while assisting them in the regulation of excessive exposure to pandemic-related information.

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