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Development and Validation of Pandemic Stressor Scale for Students

Waqar Ali[*]
Rubina Hanif [**]
Ayesha Saeed Butt[***]

Abstract

The current study aims to develop and validate the Pandemic Stressor Scale through Exploratory Factor Analysis (EFA) and the factors explored is confirmed through Confirmatory Factor Analysis (CFA). EFA sample comprised of university students (*n* = 300) in which male (*n = 195*) and female (*n = 105*) age ranged 18 to 28 years (*M= 21.84* and *SD =1. 88)*. A factor loading of.30 was established as the standard for choosing an item for the scale. Direct oblimin rotation method was used, as a result EFA presented four meaningful factors for Pandemic Stressor scale and factors named as Online learning stressor (9 items), Goal Achievement Hassles (8 items), Academic Hassles (10 items), and Mental Health Issues (12 items). For CFA total sample of university students (*n* = 300), male sample (*n =108*) and female sample (*n =192*) age ranged 18 to 26 years (*M=21* and *SD =1.54)* were taken and confirmed the factors structure of Student Stressor Scale. Alpha reliability for the Pandemic Stressor Scale was calculated, it was .92. Overall Pandemic Stressor Scale for Students emerges as reliable and valid measure to assess the Student Stressor during the pandemic in Pakistani culture.

Keywords*:* Student Stressor, Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), pandemic COVID-19.

[*] Affiliation: National institute of psychology (NIP) Quaid-I-Azam University Islamabad Email: Waqarali0340@gmail.com
[**] Affiliation: Director National Institute of Psychology (NIP) Quaid-I-Azam University Islamabad. Email: drrubinahanif@nip.edu.pk
[***] Affiliation: National Institute of Psychology (NIP) Quaid-I-Azam University Islamabad. Email : ayeshasaeedbutt@yahoo.com

Introduction

In 21st century there has been growing attention in investigating stress among university students, stress has been part of student life because there are many things which act as a stress catalyst and COVID-19 pandemic is one of the stressors which increase the risk of stress in students (Yasmin, Khalil, & Mazhar, 2020). Stress can be defined as "mismatch between demands and the perceived ability to cope with these demands (Nivetha, Ahmad, & Prasantha, 2018). Both internal and external factors play role in student stress. Studies shows that common stressor for students is academic challenges, adjustment to a new environment, personal issues such as relationship problems, financial strain, and changes in the social and cultural aspects all effect student adjustment (Bedewy & Gabriel, 2015).

The COVID-19 pandemic is playing a catalyst role in stressor students face different stressor like online classes, lockdown, and fear of been infected, study from home etc., student increasingly suffered from stress and anxiety during the COVID-19 (Charles et al., 2021; Son et al., 2020). No proper interaction with teachers and other class fellow and not having conventional classroom like environment is another obstacle for student (Zhong, 2020). Study in Pakistan shows that challenges faced by students like lack of campus socialization, group study issues and instructor's response time these types of stressor face by students (Adnan & Kainat, 2020).

University students report different stressors such as academic pressure related with study, workload, meeting deadlines, financial pressure balancing private and university life (Stallman and Hurst, 2016; Misra and McKean, 2000). These stressors linked with distress and reduced academic achievement (Ryan, Shochet, & Stallman, 2010).

Educational system also plays important role in increasing student stress level. Some of sources included semester grading system, inadequate resources, and facilities (Awing and Agolla, 2009), vast syllabus (Agrawal & Chahar, 2007), and long hours of class lectures (Deb et al., 2015). Study also found that high level of expectation is responsible for increase stress level in students (Ang & Huan, 2006). So it is important to assess the student stressor to resolve and overcome the stressor. So insights can lead us to the identification of stressor and help to used preventive interventions

(Othman, Ahmad, El Morr, & Ritvo, 2019). There are many instrument to assess the student stressor in university level.

Literature showed a bulk of tools to measure stress in multiple situations like, Student-Life Stress Inventory (Gadzella, 1991), The University Stress Scale (Stallman, & Hurst, 2016), Students Stress Rating Scale (SSRS) (Balamurugan & Kumaran, 2008), and The Perceptions of Academic Stress Scale (PAS) (Bedewy1 & Gabriel, 2015) for students. Although, standardized measures are available for students' life even in Pakistan such as Perceived Stress Scale (Cohen. 1983), Student-Life Stress Inventory (Gadzella,1991), Perception of Academic Stress Scale (Bedewy1 & Gabriel, 2015) but considering the COVID-19 phenomenon, we assumed that there must be some new experiences of stress by students during the pandemic. As we know student face different challenges during this COVID-19 outbreak like lack of resources (internet, computer etc), connectivity problem, distracting in home during online classes or study (Son et al., 2020). Student also reported the symptoms anxiety, depression even suicidal attempt due to online classes and academic stress (Fegert et al., 2020). During this pandemic source of stress is also fear of been infected, frustration, inadequate information, and lack of private space at home (Wang, Zhang, Zhao, Zhang, & Jiang, 2020).

COVID-19 pandemic is distressing students' health either social or psychological. The suffering areas for the students are their academic, goal settings, and making tangible career plans (Li, Hafeez & Zaheer, 2021). This pandemic provoked the illness and stress among the students as they have many hurdles to accomplish their academic goals. And the consequences of this stress have long lasting impacts on mental health (Aqeel, et. al., 2021). Mental wellbeing is beyond the absence of mental illness, mental wellbeing includes psychological functioning, life satisfaction, and the ability to build and maintain healthy relationships (Tennant, et. al., 2007). Increased stress is thought to be a significant factor in poorer mental health, as persistent stress is link with an higher risk of mental disorders, a lower quality of life and lower the academic accomplishment (Ribeiro, et. al., 2018). Increasing our knowledge of how stress, underlying sources of stress, and elements that can mitigate the impact of stress on mental wellness and what

important steps towards solving the issue and enhancing students' mental wellbeing. So it is important to assess the student stressor to resolve and overcome the stressor .These understandings may help identify key areas for preventive measures (Othman, Ahmad, El Morr, & Ritvo, 2019).

There are many scales to measure the university student's stressor but there is no proper scale to measure the student's stressor in present pandemic situations and there is no ingeniously measure to assess the student stressor in this pandemic and there is also shift in the educational system like going online and hybrid which is challenge for the students as well for the teachers. Scarcity of literature on the student stressor in the present situation qualitatively study was conducted, and findings were utilized to develop reliable and valid scale on Student Stressor during the COVID-19 pandemic and the main aim of the current study is to develop and validate the Student Pandemic Stressor Scale.

Method and Result

Current study was carried out in two phases. In phase 1 Pandemic Stressor Scale for Students (PSSS) was developed and in the next phase Exploring and validate the factors of Pandemic Stressor Scale through Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (EFA) and also psychometric properties of the scale.

Phase 1: Development of Pandemic Stressor Scale for Students (PSSS)

Step 1- Qualitative Exploration. The first step of development of the scale was with qualitative exploration. Five focus group discussions with BS (Hons) and MSc students (N = 40) from various departments were conducted as part of a qualitative investigation. Four interviews of university students of two BS (Hons) and one MSc student and some Question related to student stressor during pandemic were posted on social media (WhatsApp & Facebook). Major themes were identified by utilizing systematic content analysis technique.

Step-2 Generation of item pool. Literature on Student Stressor was also explored In addition to get the indigenous understanding regarding the phenomenon,. 41 Items pool for Student Stressor Scale was generated related types of hassles/ stressors students' face, which obstacles students face during this pandemic, which problem students have during the study in pandemic and how they feel when they face the stressor. Students reported multiple stressors like online classes, lack of concentration, work from home, distraction in home, not conventional classroom, disturb sleep, teacher student communication gap, family problems, and internet connectional problem etc.; they also reported the reaction like fear of infection, anxiety, sleeplessness, depress and sad etc.

41 Item pool of 5-point Likert type scale ranging from 1 = Never to 5 = Very often for Student Pandemic Stressor Scale was generated. High score reflect high level of stress by summing all items.

Step 3- Evaluation of Items from Experts. Expert feedback and opinion was taken after generation of item pool. We contacted three Ph. D. scholars (including a Ph. D. professor) and four M. Phil. scholars in Psychology to request them to thoroughly review each item for overlapping, language appropriation, face validity, construct relevance and identify ambiguous items. As result of experts opinions 39 items were retained out of 41 items.

Phase 2 - Factor Structure and Validation of Pandemic Stressor Scale for Students

Step 1- Exploratory Factor Analysis (EFA). In EFA, factor structure and psychometric properties of Student Stressor Scale were determined through EFA.

Sample. University students sample (n = 300) in which male (n = *195*) and female (n = *105*) with range of 18 to 28 years (M= *21.84* & *SD =1. 88)* with education of BS (Horn) and MSc from Quaid- A-Azam University Islamabad, University of Swat, Peshawar University and Malakand University. For collection of data convenient sampling technique was used for.

Procedure. Data was collected from universities students through online google form. Google form link was share with students through WhatsApp in which first of all inform consent was taken. Instructions were given after receiving the informed consent of the participants, i.e., to carefully read each statement (item) and respond honestly. The participants were assured that their data will be kept confidential and used only for research purpose.

Result. To explore the factors structure of the Pandemic Stressor Scale, Principal Component Analysis with direct Oblimin Rotation was performed. The number of factors was determined based on scree plot and Eigen values greater than 1 (Kim & Mueller, 1978). Kaiser Myer Olkin's (KMO) value of.86 indicated that the sample was adequate. The value of Bartlett test of Sphericity was $\chi 2 = 3053.750$ and significant at $p < .001$ which shows enough correlations to generate distinct factors. Initially Principal Component Analysis was performed with six factor solutions, however ended with four meaningful factor solutions. Item total correlation were also computed and all items shows good correlation.

Table 1

Factor loadings based on a principal component's analysis with oblimin rotation for Pandemic Stressor Scale (N= 300)

Items	Factors			
	1	2	3	4
34	**.765**	.031	.054	-.171
32	**.732**	-.016	.097	-.113
35	**.731**	-.029	-.070	.158
33	**.703**	-.035	.161	-.171
31	**.687**	.078	.014	-.029
30	**.669**	.137	-.138	.054
39	**.646**	.097	.165	-.089
36	**.624**	-.148	-.024	.089

37	**.618**	-.052	.138	.180
38	**.597**	.134	-.053	.135
28	**.472**	.222	-.017	.153
24	.018	**.713**	-.117	.120
26	.059	**.686**	.077	-.039
22	.032	**.659**	.151	-.129
23	.013	**.656**	.083	-.020
21	.210	**.645**	.148	-.168
25	-.051	**.558**	.070	.242
29	.389	**.463**	-.188	.184
10	.268	**.396**	.271	-.008
27	.060	**.361**	.054	-.171
7	-.066	-.065	**.704**	.015
8	-.055	.032	**.648**	-.006
9	-.062	-.005	**.564**	-.082
18	.038	.161	**.550**	.086
16	.092	.254	**.531**	-.043
17	.023	-.111	**.502**	.296
14	.248	.135	**.487**	.045
6	.202	-.004	**.485**	.118
13	.062	-.063	**.438**	.346
15	.160	.233	**.432**	-.137
11	.276	.084	**.347**	.153
4	.125	-.041	.140	**.707**

1	.312	-.069	-.153	**.629**
20	.097	-.033	.223	**.554**
2	.100	-.192	.172	**.548**
12	.075	.058	.074	**.484**
3	-.106	-.035	.240	**.428**
19	-.159	.220	.140	**.374**
5	.225	.308	-.153	**.352**
Eigen value	19.71	4.72	4.01	2.58
% Of variance	28.68	6.86	5.84	3.77
Cumulative %	28.68	35.54	41.39	45.16

Note: Factor loadings on respective factors appear in bold.

Table 1 show that 39 items which was loaded on four factors for Pandemic Stressor Scale (PSS). Loadings <.30 are supressed. Items with a loading of.30 or higher were kept, whereas those with a loading of less than.30 were excluded. Pandemic Stressor Scale explained 45 % variance. After the EFA Items no 15, 28 and 29 were deleted after the expert opinion. Item 29 loaded on 3 factors that's why deleted and item 15 and 28 was not good representative of the respective factors and with the help of four experts (Ph.D.) four factors were labelled as Online Learning Stressor, Goal Achievement Hassles, Academic Hassles and Mental Health Issues.

Step -2 Confirmatory Factor Analysis. For the confirmation of the proposed factor structure of the Student Stressor Scale through CFA was carried out.

Sample. Independent Sample of 300 university students in which male (*n =108*) and female (*n =192*) age ranged 18 to 26 years (*M=21* and *SD =1.54)* with education BS (Hon) and MSc from Quaid- A- Azam University Islamabad, Swat University, Peshawar University and Malakand University. The convenient sampling technique was used for collecting data.

Procedure. Data was collected from universities students through online google form. Google form link was share with students through WhatsApp in which 1st of all taking the inform consent and instruction were given to carefully read every statement and respond honestly to all items of the scale. The participants were assured that their data will be kept confidential and used only for research purpose and at the end the thanked note for their time and cooperation. Confirmatory Factor Analysis was carried out with Amos 23 version.

Table 2 shows the results of CFA. Factors loading on all items of Pandemic Stressor Scale are greater than above .30 loading on four factors.

Table 2

Factor Loading of CFA for Pandemic Stressor Scale (N= 300)

Item no	Items	Loadings
	Goal related Achievement	
1	I have faced delays in achieving my goals.	.42
2	I have experienced daily challenges in my student life.	.46
3	I have not sufficient funds to reach my goals	.32
4	I have experienced failures in most of my plans	.50
5	I have pressures of workload.	.57
12	I have experienced pressures of high performance	.54
18	I have lost control on my circumstances.	.52
20	I have faced unexpected changes in my university	.68
	Online Learning Stressor	
10	I have experienced emotional distress in academic life.	.67
21	I have experienced frustration due to online classes	.58
22	I have experienced frustration due to internet connections.	.58
23	I have experienced stress due to hassles in online submission of Paper, Assignment etc.	.69
24	I have experienced pressures due to distraction during online class.	.72

25	I have experienced poor concentration in my study.	.69
26	I have experienced irritability due to timetable of online classes	.70
27	I have experienced worry regrading my study and future	.61
	Academic Stressor	
6	I have experienced interpersonal conflicts in my relationship.	.54
7	I faced disruptions in completing my assignments.	.68
8	I have been frustrated due to vague assignments.	.58
9	I have experienced pressures due to deadlines.	.50
11	I have failed to do multiple tasks at a time.	.56
13	I have failed to show required potentials in university life	.65
14	I have felt inferior to see resourceful students around me.	.43
16	I have experienced irritability due to many things around me.	.55
17	I have failed to handle problems in my student life.	.64
	Mental Health Issues	
19	I have experienced inability to control my anxiety	.62
30	During this pandemic, I have experienced Depression	.37
31	During this pandemic, I have experienced Sleep problems	.59
32	During this pandemic, I have experienced Nervousness	.74
33	During this pandemic, I have experienced Somatic complaints	.65
34	During this pandemic, I have experienced Fear of uncertainty	.74
35	During this pandemic, I have experienced Helplessness	.80
36	During this pandemic, I have experienced Excessive anger	.72
37	During this pandemic, I have experienced Guilt	.68

38	During this pandemic, I have experienced Suicidal ideation	.51
39	During this pandemic, I have experienced Loneliness.	.57

Table 2 show factor loadings of pandemic Stressor Scale items. All the items have loading above .30.

Confirmatory Factor Analysis was carried out with Amos 23 for the Pandemic Stressor Scale confirmed the four-factor solution which was obtained in EFA. Initially the CFA of the Pandemic Stressor Scale $\chi 2(df) = 1189.62(588)$, the model fit indices i.e., CFI = .790, GFI = .743, TLI = .775, RMSEA = .072, were obtain. The values were lower than the required criteria initially. After the covariances were added, the values of $\chi 2(df) = 365(27)$, the model fit indices i.e., CFI =.91, GFI = .90, TLI = .90, RMSEA = .049, was improved. As a result, model 2 provided stronger support for PSS.

Step -3 This step was carried out for the convergent, divergent validity and reliability of the Pandemic Stressor Scale for Students. For this purpose, data was collected on Perceived Stress Scale (Cohen, 1983) and Adjustment Scale (Weber & Kaya, 2003). Literature shows that stress and adjustment have massive impact on individuals. In stressful situations coping strategies is important to regulate their emotions and adopted and adjust to the situations; while using adaptive strategies to function better in stress situations. The social adjustment of university students is directly related to their overall adjustment (Raju & Rahamtulla, 2007). Students at university are expected to adapt to academic pressures such as long class durations, different techniques of teaching and learning (in present time online learning), workload, assignments (Round, 2005). Students need new relationship to meet the academic demands (Monroe, 2009). Study found that use of adaptive emotional regulation helps individual function successfully in their environment and maladaptive emotional regulation will lead to difficulties in functioning (Bridges, et al., 2004). When a person faces difficult circumstance and used of adaptive emotional regulation handle emotion experiences properly/adequately (Gratz & Tull, 2010).

Table 3

Correlation of Pandemic Stressor Scale (N=600)

Variables	Perceived stress	Adjustment
Pandemic stressor	.39**	-.32**

**p*<.05. ***p<.01. ***p < .001.*

For the Convergent validity of Pandemic Stressor Scale for Students correlation with same construct like Perceived Stress Scale were carried out. The result shows the positive correlation between Pandemic Stressor Scale for Students (PSSS) and Perceived Stress Scale which give the evidence of the convergent validity.

For the Divergent or Discriminant validity of the Pandemic Stressor Scale correlation with different construct like Adjustment was carried out. The result shows that Adjustment negative correlated with Pandemic Stressor Scale which shows the evidence of Discriminant validity.

Table 4

Descriptive Statistics for Pandemic Stressor Scale (N= 600)

Variables	*k*	α	*M*	*SD*	*Range*		*SKEW*	*KUR*
					Potential	*Actual*		
PSS	36	*.92*	103.84	24.77	36-180	42-171	.16	-.04
GOAL	8	*.71*	23.59	5.86	8-40	8-39	.09	-.29
ACADEMIC	9	*.79*	24.47	7.04	9-45	9-45	.29	-.11
ONLINE	8	*.81*	25.93	6.92	8-40	8-40	-.01	-.64
MIH	11	*.86*	29.85	10.46	11-55	11-54	.41	.54

Note. PSS = Pandemic Stressor Scale; k = no of items; α = alpha coefficients of reliability; M = Mean; SD = Standard Deviation; SKEW = Skewness; KUR = Kurtosis.

Table 4 illustrates the Pandemic Stressor Scale's Mean, Standard Deviation, Range, Skewness, Kurtosis, and Cronbach's alpha values. The result shows that Pandemic Stressor Scale as having .92 alpha reliability coefficient; showing good internal consistency.

Discussion

The aimed of present research to develop and validate the scale to assess the Pandemic Stressor for students in the current pandemic situation. Stress has been part of student's life in the present COVID-19 pandemic, the students' stressor increase, and COVID-19 pandemic is one of the stressors which increase the risk of stress in students (Yasmin, Khalil, and Mazhar, 2020).

There are many instruments which assess the student stressor but there no such proper instrument which assess the student stressor in the current pandemic situation. Some instruments assess student stressor in the pandemic situation like COVID-19 Student Stress Questionnaire (CSSQ) which is a brief one and cover one aspect of student stressor in the present situation focus on the relationship with other (Zurlo, Cattaneo Della Volta, & Vallone, 2020). There is scarcity of literature in Pakistan while assessing the student stressors in pandemic and no indigenous measure to assess the student stressor in the present pandemic situation. Hence, the present study aimed to develop measure to assess the student stressor in current pandemic situation.

For Pandemic Stressor Scale for Students items pool of 41 was generated after taking expert opinion 39 items was retained and EFA was carried out on sample of 300 universities students to explore the factors. Factor analysis revealed 4 factors solution for the 39 items of pandemic stressor scale and explained 45% of the variance. Items with factor loading of .30 and above were retained and 3 items was removed, and at the end 36 items were retained. Those factors with Eigen value greater than 1 will retain (Field, 2005). It was found that pandemic stressor construct is multidimensional in nature. One factor was "Online learning stressor" reflecting the student stressor related to the online study like online classes, exams, assignment, and other stressor related to the online learning. In the COVID-19 pandemic lockdown drastically impaired the student life such

academic study shifted to online also fear of delays in their study, difficulties in finding appropriate spaces and low concentration (Cao et al., 2020; Lee, 2020; Sahu, 2020). The second factor was "Goal Achievement Hassles" which assess the student facing obstacle related to achieving their goal. The third factor was "Academic Hassles" which are related to the academic stressor/ obstacles faces by the student and fourth factor was "Mental Health Issues" in which items is related to the reaction to the stressor and the psychological reaction due the stressor face by the students during the current pandemic situation.

With the help of Amos 23 Confirmatory Factor Analysis was carried out for the Pandemic Stressor Scale and confirmed the four-factor solution which was obtained in EFA. The model fit indices criteria was up to the acceptable range and give better evidence for pandemic Stressor Scale (PSS).

Reliability estimate was also computed and the result shows the alpha coefficient reliability for the pandemic stressor scale .92 which shows a satisfactory internal consistency. For the subscales reliability ranges from .71 to .86 which also in acceptable range and subscales shows satisfactory internal consistency.

Concerning for the convergent validity; the Pandemic Stressor Scale for Students show a positive significant correlation with a same construct as Perceived Stress Scale which evidence of convergent validity.

Concerning for the Divergent or Discriminant validity of the Pandemic Stressor Scale for Students correlation with different construct like Adjustment. The result show that Adjustment negative correlated with Student Stressor Scale which shows the evidence of Discriminant validity.

Conclusion

In conclusion, this study demonstrates that Pandemic Stressor Scale (PSS) is a 36-item multidimensional scale with good psychometric properties. Moreover, it is a good instrument to be used in assessing the university student stressor in the COVID-19 pandemic situation. Which are helpful students as well for teacher's giver information about the student's stressor during the pandemic.

Limitations and Future Research

Despite the strength of the study some limitations of the study need to be address. Firstly, the questionnaire was administered online, which may limit the number of people who could participate in the study if they did not have access to the Internet. Secondly, many of the participants came from Punjab and KPK, therefore more research on larger and more representative samples is needed. Thirdly, Because the study depends on self-reports, the results may be influenced by the risk of social desirability bias.so future studies could also adopt the newly student stressor scale and related instruments to test concurrent validity. Finally, cultural, and social variables also the development of the country could influence the construct of the scale. Further applications of this instrument in different countries and culture are needed in order to learn more about the stressful events during the pandemic that affect students.

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Appendix

Measurement Model of Pandemic Stressor Scale for Student