

Emotion Regulation and Psychological Impact of COVID-19 among Post-Graduate University Students

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ABSTRACT

Background: In early 2020, The COVID-19 became a global public health concern. After the first report of three known cases on 8 March 2020, Bangladesh went on lock-down, and also, educational institutions have been put on an extended lock-down. As a consequence, it put a pause on the students' academic activity. **Aim:** The present study aimed to investigate the state of mental health of the postgraduate students in a tertiary educational institution in Bangladesh and the role of emotion regulation strategies they use in managing their well-being. **Methods:** The present study was designed as a cross-sectional online survey covering 206 young adults. Participants completed questionnaires of Emotion Regulation, Generalized Anxiety Disorder, Depression, COVID-19 concern ratings, and provided demographic information. **Results:** Students used Cognitive Reappraisal strategy while they were feeling anxious and depressed with Expressive Suppression more often to regulate their depressive state. Both current students and graduates were worried about their future career, and students still studying were highly anxious regarding their academic future. Moreover, not knowing virus infection status made them highly anxious and depressed. **Conclusions:** The psychological impact of COVID-19 on postgraduate students has been found significantly higher. The trend is somewhat not unexpected as social and daily life functioning has changed remarkably due to COVID-19 pandemic. The present study opens a door for mental health professionals in terms of assessment, points of collaboration, providing intervention and support where needed.

Keywords: Emotion regulation, COVID-19, depression, anxiety, mental well-being, university students

The novel coronavirus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) which causes coronavirus disease cited as COVID-19, first emerged in December 2019 in China and within a few months, it had been declared as a pandemic (WHO 2020). After three known cases reported on 8 March 2020, Bangladesh went on lock-down to lessen the infection from March 26, 2020 (Dhaka Tribune 2020). In addition, educational institutions have been put to an extended lock-down till 31st August 2020 (Dhaka Tribune 2020) which as a consequence puts a pause on the students' academic activity.

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Emotion Regulation and Psychological Impact of COVID-19 among Post-Graduate University Students

People are continuously exposed to hundreds of stimuli but only a handful of them would elicit emotional reactions. These reactions are monitored, evaluated, and modified by extrinsic and intrinsic emotion regulation which is a complex process of human behavior in situations that include initiation, inhibition, and modulation of those behaviors (Thompson 1994). It can be a conscious or unconscious, automatic, or controlled process that uses several cognitive strategies to manage an individual's experience of emotions, thoughts, and negative experiences (Gross 1998; Gross and John 2003).

Cognitive reappraisal and expressive suppression are the most common internal strategies of emotion regulation. As reappraisal defines the assessment of something or someone in a different way, cognitive reappraisal refers to the alteration or reinterpretation of the meaning of any events in our thought process (Gross 1998) and is a useful adaptive emotion regulation strategy. It involves cognitively engaging with, reaffirming, and reframing of negative stimuli for mitigation of aversive emotional outcome (Gross and John 2003; Marroquín and Nolen-Hoeksema 2015). Expressive suppression involves the inhibition of emotional expression (Gross and John 2003). It is correlated with several psychological disorders and with reduced social and interpersonal support networks (Butler et al. 2003; Sloan et al. 2017).

According to DSM-5, Generalized anxiety disorder (GAD) refers to the excessive, often irrational and uncontrollable worrying about events and activities of life and these symptoms are needed to persist for some time, approximately 6 months. These particular attributes interfere with one's daily life functioning leading to difficulties in working, restlessness, irritability etc. (Torpy et al. 2011). Depression, also known as major depressive disorder or clinical depression is a common but serious form of mood disorder. According to DSM-5 if someone is in a depressed mood or loses interest and pleasure in regular life within 2 weeks' time can be diagnosed as a depressed individual. Loss of appetite, trouble sleeping, and hopelessness are the most common symptoms of depression (de Zwart et al. 2019).

A study on Philippine's students found that the majority of them displayed anxiety while being in lockdown due to COVID-19 pandemic (Baloran 2020). Another study on midwifery students in Turkey found that anxiety levels were higher among individuals working in a hospital and had relatives with chronic conditions which has worsened the effect of coronavirus (Sögüt et al. 2020). In a large-scale study with 7143 students in China, 24.9% students showed some level of anxiety (Cao et al. 2020). In another study with 3881 Chinese college students it was found that 25.97% of the students showed some level of anxiety whereas 21.16% showed some level of depression (Chang et al. 2020). A research with 2530 members of a Spanish university found that 21.34% and 34.19% showed different levels of anxiety and depression respectively (Odriozola-González et al. 2020). University students in Greece showed elevated levels of anxiety (42.5%) and Depression (74/3%) with various other issues (Kaparounaki et al. 2020). In Jordan, anxiety was most prevalent among university students (21.5%) (Naser et.al 2020).

A novel situation like COVID-19 lockdown has been troublesome for people all over the country, especially for students as extended lockdown for educational institutes not only puts a pause on the students' academic activities but also creates a state of uncertainty regarding their future career plans. Thus, the present study intends to investigate their state of mental health (e.g. depression, anxiety) and to understand the role of factors (demographics) and emotion regulation strategies contributing to their mental well-being.

MATERIALS AND METHODS

Participants and Setting

The present study was designed as a cross-sectional survey covering young adults (18 to 30 years old) of Bangladesh. The target population consisted of master's students from a reputed university who are continuing their degree or passed right before or during the COVID-19 lockdown period. Both cluster sampling technique and snowball sampling techniques were used to get online responses for the questionnaires prepared through Google forms. The link for the survey was distributed through social media (e.g. Facebook, WhatsApp), and emails. The composite online survey took around 10 minutes to finish.

Rating Instruments

The Google form consisted of a demographic section, the Emotion Regulation Questionnaire (ERQ), the Generalized Anxiety Disorder Scale (GAD-7) and the PHQ-9 (depression segment) from the Patient Health Questionnaire (PHQ). The demographic section included questions such as age, gender, current academic status, job placement, living arrangement, knowledge and rating of the level of worriedness referring to contraction of coronavirus, and about future academic and career plans.

The ERQ is a self-report Ten item questionnaire designed to measure an individual's propensity of emotion regulation on Seven points Likert scale, where a score of 1 meaning strongly disagrees to 7 meaning strongly agree. Of the ten items, 6 of them measure the level of cognitive reappraisal strategy (items- 1, 3, 5, 7, 8, 10) and 4 of them measure the expressive suppression strategy (item- 2, 4, 6, 9). The coefficient alpha for cognitive reappraisal strategy is .79 and for expressive suppression is .73. The test-retest reliability was .69 for both of the subscale (Gross and John 2003). Cronbach's alpha was .66 and .77 for the cognitive reappraisal strategy and the expressive suppression strategy of emotion regulation respectively of the present study's population.

The GAD-7 consists of seven items rooted in the core symptoms relating to anxiety which the respondent suffered during the last two weeks (Toussaint et.al 2020). The scores ranged from '0' (meaning not at all) to '3' (meaning nearly every day) in a Likert scale form (Toussaint et al. 2020). The GAD has internal consist of .91 (Cronbach's α) (Toussaint et al. 2020). The present study population's Cronbach's alpha was .92 for this rating scale.

From the Patient Health Questionnaire (PHQ) the PHQ-9 is the depression segment which measures nine of the DSM-IV criteria ranging from '0' (meaning not at all) to '3' (meaning nearly every day). Cronbach's alpha of .89 was found as the reliability of the PHQ-9 on primary care patients. The correlation value was found to be 0.84 during the test-retest reliability within in-person and phone interviews (Kroenke et. al 2001). Cronbach's alpha of .94 was found for the present study's population.

Statistical analysis

Data were analyzed by using SPSS V-23 (IBM SPSS, statistics, New York, USA). Descriptive statistical analysis, The Pearson product-moment correlation coefficient, Hierarchical regression analysis, and Analysis of covariance was computed.

RESULTS

A total of 206 master's students ($M = 24.04$ years, $SD = 1.059$) completed the questionnaire.

Table 1 Demographics of the respondents (n =206)

	Statistics
<u>Gender (n, %)</u>	
Male	87 (42.2%)
Female	119 (57.8%)
<u>Education status (n, %)</u>	
Currently studying in MSc	165 (80.01%)
Passed MS	41 (19.09%)
<u>COVID-19 status (n, %)</u>	
Infected with Coronavirus (yes)	21 (10.2%)
Infected with Coronavirus (no)	104 (50.5%)
Infected with Coronavirus (don't know)	81 (39.3%)
<u>COVID-19 impact on career (M, SD)</u>	
Worried about COVID-19 impact on career (strongly disagreed) (n, %)	2 (1%)
Worried about COVID-19 impact on career (disagreed) (n, %)	7 (3.4%)
Worried about COVID-19 impact on career (neutral) (n, %)	13 (6.3%)
Worried about COVID-19 impact on career (agreed) (n, %)	49 (23.8%)
Worried about COVID-19 impact on career (Strongly agreed) (n, %)	135 (65.5%)
Cognitive Reappraisal (CR) (M, SD)	30.47 (5.80)
Expressive Suppression (ES) (M, SD)	20.36 (4.16)
Anxiety (GAD) (M, SD)	12.49 (5.68)
Depression (M, SD)	15.46 (7.51)

Table 1 shows that of the 206 participants 57.8% (n=119) were female and 42.2% were male (n=87). Majority of them are still studying in the current master's academic year (80.01%). Although the rate of already infected with the virus is low (10.2%), worry regarding the impact of COVID-19 on their future academic and career plan was too intense (65.5%). Furthermore, Cognitive Reappraisal (CR), Expressive Suppression (ES) had mean and standard deviation scores of ($M=30.47$, $SD=5.80$) and ($M=20.36$, $SD=4.16$) respectively.

Emotion Regulation and Psychological Impact of COVID-19 among Post-Graduate University Students

Whereas, Anxiety and Depression had mean and standard deviation scores of ($M=12.49$, $SD=5.68$) and ($M=15.46$, $SD=7.51$) respectively.

Table 2 The Pearson product-moment correlation Coefficient among the variables (N=206)

Variable's Name	1	2	3	4	5	6	7
1. CR	-						
2. ES	.558**						
3. GAD	.316**	-.378**					
4. DEP	.294**	.325**	.850**				
5. CAREER	.256**	.120	.415**	.427**			
6. A.S.	.035	.020	-.182**	-.128	-.131		
7. C.I.	.165*	.127	.212**	.224**	.157*	.088	-

* $p < .05$. ** $p < .01$. ns= non-significant. (2-tailed)

Note. CR= Cognitive Reappraisal, ES= Expressive Suppression, GAD= Generalized Anxiety Disorder (Anxiety), DEP= Depression, Career= COVID-19 impact on career, A.S.= Current Academic Status, C.I.= COVID-19 Infection status.

Results from Table 2 yields that the more anxious ($r = .316$; $p < .01$) and depressed ($r = .294$; $p < .01$) the students are, the more they are using Cognitive reappraisal (CI) strategy to alleviate and regulate their emotional burden. Students are also using the CI strategy more when they are thinking about their current situation in terms of whether they contracted the COVID-19 infection ($r = .165$; $p < .05$), and the impact of COVID-19 on their career ($r = .256$; $p < .01$). In addition, students are also using Emotion Suppression strategy but in lower rate to inhibit their emotional response when they are anxious ($r = -.378$; $p < .01$) as in this Pandemic, they are more actively engaged in thinking and reevaluating their situation in order to re-adjust their planning of the study, career, etc. which rather falls under the cognitive reappraisal domain described above. Nonetheless, they use more of the ES strategy, when thinking about the current uncertain and unpredictable Pandemic situation takes a toll on their mind causing a feeling of hopelessness leading to depression ($r = .325$; $p < .01$). Students were less anxious regardless of their academic status ($r = -.182$; $p < .01$) but whether they were infected by COVID-19 or not caused high level of anxiety ($r = .212$; $p < .01$) and depression ($r = .224$; $p < .01$) among them. Similar correlation was found for the concern about their career being affected by COVID-19 Pandemic, higher anxiety ($r = .415$; $p < .01$) and depression ($r = .427$; $p < .01$). Thus, supporting previous literature on psychological well-being (Odriozola-González et al. 2020; Naser et.al 2020), anxiety and depression have higher positive correlation ($r = .850$; $p < .01$) of occurring together.

Table 3 Hierarchical Regression to explore factors associated with poor mental health (N = 206)

	B	95% CI LB UB	SE (B)	β	R ²	A R ²	F
Anxiety (GAD)					.319	.295	13.28**
<i>Step 1: control variables</i>							
Age	.06	-.57 .71	.32	.01 ^{ns}			
Gender	.48	-.86 1.83	.68	.04 ^{ns}			
<i>Step 2: Demographics</i>							
Education status	-2.11	-3.80 -.41	.86	-.14*			

Emotion Regulation and Psychological Impact of COVID-19 among Post-Graduate University Students

	B	95% CI		SE (B)	β	R²	A R²	F
		LB	UB					
COVID-19 infection status	1.15	.08	2.22	.54	.13*			
<i>Step 3: Rating items</i>								
Impact of COVID-19 on career	2.20	1.37	3.03	.42	.32**			
Cognitive Reappraisal	.04	-.09	.18	.07	.04 ^{ns}			
Emotion Suppression	.41	.22	.60	.09	.30**			
Depression						.304	.280	12.37**
<i>Step 1: control variables</i>								
Age	-.25	-1.11	.61	.43	-.03 ^{ns}			
Gender	1.96	.16	3.77	.91	.13*			
<i>Step 2: Socio-demographics</i>								
Education status	-1.50	-3.77	-.76	1.14	-.08 ^{ns}			
COVID-19 infection status	1.73	.31	3.16	.72	.14*			
<i>Step 3: Rating items</i>								
Impact of COVID-19 on career	3.05	1.94	4.16	.56	.34**			
Cognitive Reappraisal	.06	-.12	.25	.09	.05 ^{ns}			
Emotion Suppression	.44	.19	.70	.13	.24**			

* $p < .05$. ** $p < .01$. *ns*= non-significant. Durbin-Watson Value = 1.67 of Anxiety (GAD), 1.59 of Depression.

Table 3 represents the hierarchical multiple linear regression which was conducted to determine the predictors of anxiety and depression among students after controlling for age and gender demographics. It was found that anxiety (Adjusted $R^2 = .295$, $F_{7,198} = 13.28$, $p = .01$) was independently predicted by status of education (currently studying or passed MS), whether infected with COVID-19, concern about the impact of COVID-19 on their career, and emotion suppression strategy of emotion regulation. Depression (Adjusted $R^2 = .280$, $F_{7,198} = 12.37$, $p = .01$) was predicted by all aforementioned variables as well except for the education status.

We used ANCOVA to gain further understanding on whether respondents' academic status had any effect on their concern about their career being impacted by COVID Pandemic, and which group (studying vs. passed) had a higher level of depression and anxiety. Respondent's current academic condition was used as a fixed factor with age and gender as covariates in both analyses. Whether respondents are still studying or passed MS did not have any effect on their concern for their career to be affected by the COVID-19 situation ($F_{1,205} = 2.93$, $p = .09$, partial $\eta^2 = .01$) but a significant main effect of academic status was found for anxiety ($F_{1,205} = 5.99$, $p < .05$, partial $\eta^2 = .03$). Respondents who are still studying MS had higher anxiety levels ($M = 12.98$, $SE = .42$) compared to those who recently passed their MS ($M = 10.53$, $SE = .89$). No significant effect of educational status was found for depression ($F_{1,205} = 2.22$, $p = .12$, partial $\eta^2 = .01$) although students studying MS scored higher in depression ($M = 15.85$, $SE = .58$) than those who already passed ($M = 13.88$, $SE = 1.18$). We also looked into the level of anxiety and depression for the COVID-19 infection status with infection status being a fixed factor and age and gender as covariates in the ANCOVA model. Having the COVID-19 infection or not had a highly significant main effect on their anxiety ($F_{2,205} = 11.55$, $p < .001$, partial $\eta^2 = .10$) and depression ($F_{2,205} = 18.29$, $p < .001$, partial $\eta^2 = .15$) level. Participants who don't know whether they have contracted the virus or not had a higher level of anxiety ($M = 14.60$, $SE = .61$) and depression ($M = 18.72$, $SE = .77$) compared to the two other groups: those who had been infected and those who did not. On the side, people already infected with the coronavirus had higher anxiety ($M = 13.06$,

Emotion Regulation and Psychological Impact of COVID-19 among Post-Graduate University Students

$SE= 1.19$) and depression ($M= 17.04$, $SE= 1.5$) level than people who are not infected yet ($M= 10.73$, $SE= .53$), ($M= 12.60$, $SE= .68$).

DISCUSSION

Public health emergencies such as the COVID-19 pandemic have a significant negative psychological impact such as depression and anxiety on their emotional health. The prolonged lockdown of educational institutes due to COVID-19 is an unprecedented situation faced by all levels of students, but as our present research was limited to postgraduate students, our findings would be discussed in light of the current study sample. Our data showed that Postgraduate students of the current academic year (2020-2021) were significantly affected by this Pandemic which could be due to the fact that they are on the verge of entering the professional job setting and the current COVID situation has created uncertainty with their employment. Objectives of the present study included investigating postgraduate student's mental health status (e.g., depression, anxiety) and the role of emotion regulation strategies in managing their psychological well-being. We also wanted to understand the influence of a couple of demographic factors such as COVID-19 infection status, educational status, contributing to their mental well-being.

Emotion regulation plays a vital role in endurance as it reminds us of what to seek and what to avoid (Wang et. al 2017). Cognitive reappraisal (CR) focuses on restructuring emotional stimuli before eliciting responses pertinent to behavior depending on the circumstances (Cututi 2014) thus calling it an *antecedent-focused strategy*. ES is a *response-focused strategy* that only modifies the behavioral facet, not resolving negative emotional and physiological experiences, occurring late in terms of lingering unresolved suppression of emotions (Cututi 2014). Results of the present study state that the more students are anxious and depressed, perhaps thinking about their future which is undoubtedly in some way has been affected by the COVID-19 Pandemic, the more they are using CR strategy to relieve their emotional thoughts by re-planning their career path alternatives. These findings somewhat contradict with previous literature (Gross and John 2003; Marroquín and Nolen-Hoeksema 2015) and one crucial reason might be that the novel situation such as prolonged lockdown, sense of restriction, social isolation, etc. and the upheaval in financial markets created by this Pandemic might have pushed students to re-evaluate their current condition and think about the unconventional track of starting their career leading them to use CR.

On the other hand, ES strategy was also used by the students to suppress their anxiety symptoms during this pandemic but they use this strategy more when they feel depressed. It partially supports findings from previous studies (Butler et al. 2003; Sloan et al. 2017) that the Expressive Suppression strategy of emotion regulation strengthens the emergence of poor psychological symptoms such as depression. Constant re-assessment of the career plan in order to adjust with the change in economic, and employment setting because of the Pandemic could have put an emotional pressure on them making them use this ES strategy to ease their emotional burden. In addition, whether contracted with the virus or not resulted in a high level of anxiety and depression as the respondents might have been thinking about the outcome of the disease, concerned of getting re-infected, and what impact it could have on their impending career plan. Another interesting finding from the study was that the students who have recently passed their MS and who are still studying, both groups were less anxious possibly because academic activities were put on hold by the educational institutions across the country, and the job market is also in a precarious condition giving them a sense of assurance that the overall situation is the same for their cohort.

Emotion Regulation and Psychological Impact of COVID-19 among Post-Graduate University Students

Predictive analysis revealed a somewhat different scenario from correlation, that is Cognitive Reappraisal does not act as a significant predictor of anxiety and depression. Regardless, this outcome goes in line with previous research findings (Gross and John 2003; Cututi 2014; Marroquín and Nolen-Hoeksema 2015) which explains that CR supports the effective management of mental health and strengthens the positive reframing of negative stimulus. On the other hand, students who are using the Expressive Suppression strategy, are suppressing their emotion rather than sharing with others or expressing it which could easily lead to overwhelming psychological responses such as anxiety and depression that conforms with our findings. One reason could be that students are not expressing their emotions or need completely with their family and close others in terms of monetary and other necessities such as mental support as most of these students could have been facing personal crisis and financial difficulties during this lockdown. Students are also facing difficulties to earn part-time salaries since a huge number of on-campus or off-campus job sites are either permanently or temporarily closed. These situations could be strengthening the occurrence of suppression of emotion leading to poor mental health symptoms. Notably, whether students got passed or still studying, their state of being infected with the virus or not, and concern about their future career being affected by the Pandemic also resulted in a negative psychological outcome (anxiety and depression) among them supporting the previous findings of the mental outcome of this Pandemic (Baloran 2020, Kaparounaki et al. 2020).

On the side, students who are still studying in the MS had higher anxiety and depression than students who recently passed, which could be because their academic activities had been interrupted and it's unknown when it will resume to normal and they would complete their program. On the other hand, students who have passed are at liberty to start their career whenever it's feasible as they have already graduated. Unknown whether people got infected or not also had a negative impact on their mental well-being resulting in elevated anxiety and depression compared to those who already got infected with the COVID-19 virus and those who haven't contracted the virus yet. Not knowing if one has contracted the virus or not could make people more worried about their health status, how they could be infected, and whether unknowingly they could be a potential carrier of the virus thus increasing their anxiety and depression level. Predictably, respondents who have been infected by now were more anxious and depressed than people who haven't been infected yet as infected people could be uncertain about the outcome of the disease, thinking about the worst possible scenario (e.g., Intensive Care Unit).

Limitation of the Present Study

Like any other research, this present study has its limitations. Since data was collected from post-graduate students from a single institution only, generalization to the tertiary student population was not possible. For a broader picture, data from other institutions with all levels of university students should be collected. Socio-demographics such as age and gender were not further analyzed and described in the findings as they were not the point of focus in the current study. Future studies should extend the analysis on age and gender describing the role or impact of these two covariates. Nonetheless, the findings of the present study open up a new dimension of research on emotion regulation and psychological outcome of tertiary level students in a novel scenario such as the present prolonged lockdown due to the Pandemic.

CONCLUSION AND FUTURE RESEARCH DIRECTION

The psychological impact of COVID-19 on postgraduate students from a top tertiary academic institution of Bangladesh has been found significantly higher. The uncertainty has put a pause on academic growth, and future career plans leading to poor mental health (Baloran 2020, Kaparounaki et al. 2020, Naser et al. 2020), and results of the present study also substantiate the same. The trend is somewhat not unexpected as social and daily life functioning has changed remarkably due to COVID-19 pandemic introducing new measures and/or activities such as restriction, distancing, lockdown, etc. Therefore, the present research could act as a reference point for studying in further detail of emotion regulation, anxiety, depression and the COVID-19 Pandemic. Since there is no pre-set schedule when life would go back to the previous normal state, extended research is needed by including nationwide samples, further analysis on age and gender demographics, and adding other socio-demographics such as living status, financial condition, etc. to assess more in-depth findings of the psychological effect of COVID-19. The present study opens a door for mental health professionals in terms of assessment, providing intervention and support where needed. Collaboration between academics, government agencies and professionals is necessary to research further in order to develop a need-based intervention and provide a tailored service to the population who require it.

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Emotion Regulation and Psychological Impact of COVID-19 among Post-Graduate University Students

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Emotion Regulation and Psychological Impact of COVID-19 among Post-Graduate University Students

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Conflict of Interest

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