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Psychological Health of Young Adults as Measured through Internalising and Externalising Scores of Strength and Difficulty Questionnaire

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Abstract

Uncertainties since COVID-19 outbreak time have affected the mental well-being of almost everyone, including young adults. During the first wave of COVID-19, the unprecedented lockdown affected the mental health of individuals more than the disease itself. This study is meant to identify behavioural and social dysfunction problems in young adults due to COVID-19 disease and its after-effects. An online cross-sectional survey was designed using 17+extended English version of the Strength and Difficulties questionnaire (SDQ) to identify the behavioural and social dysfunction problems in young adults in India due to COVID-19 disease and the consequent lockdown / forced quarantine during the first wave of the pandemic. During the period of May-June 2020, the survey was carried out through Google forms among college/university students. A total of 1020 responses were obtained out of which 772 responses who reported social dysfunction issues were selected. Data was analysed statistically. The four 'Difficulty' scales were grouped into 'Internalizing' and 'Externalising' scores. The effects of gender and chronicity were tested on 'Internalizing', 'Externalizing' and 'Impact' scores. 46.21%, 53.79 %, and 22.30 % of respondents were under significant risk categories for Impact score of social dysfunction, Internalizing, and externalizing scores of behavioural problems respectively. There was a significant difference in observed numbers under all categories, irrespective of gender, from the expected SDQ standards distressed respondents as p value < 0.001. The effect of chronicity is there on Impact scores. Irrespective of gender, the prolonged lockdown due to COVID-19 is affecting the psychological behaviour of young adults.

Keywords: *Chronicity, COVID-19, Lockdown, SDQ, Permutation test.*

1. Introduction

Psychological problems have become a part of the lives of people around the globe. With the emergence of 2019 Corona Virus Disease (COVID-19) pandemic, the problem has worsened. The disease itself and the measures to curb it such as isolation, contact restrictions and economic shutdown affected the psychosocial environment adversely. This effect was more prominently visible in young adults. They faced the problem of anxiety as they could not contact their friends, and had no means to regulate their stress which was caused due to future uncertainty. This situation led to an increase in psychological problems faced by them.

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In order to identify the psychological and behavioural problems, surveys, interviews and self-administered screening tests are implemented along with the pathological tests. They are also used to understand the disorders' dominance [Demetriou et al. 2014]. In particular surveys are used to administer the screening tools when the data is needed to be collected on a large scale. The surveys can be held both in physical mode as well as in online mode [Bennett et al. (2010)].

Among various tools available, the Strength and Difficulty (SDQ) questionnaire is one of the most widely used tools to detect psychological and behavioural problems among adolescents as well as young adults. This self-reporting screening test was developed, validated and first used by the British psychiatrist Robert Goodman [Vazet al. (2016)]. The questionnaire is capable of identifying and assessing the extent of mental health and behavioural disorders [Vostanis (2006)] and it is available in more than 80 languages.

Two versions of this tool are: (i) the basic version (with 25 items in it); and (ii) the extended version with 33 items in it. The first 25 items which are common in the basic as well as the extended version are grouped into five scales: ‘Conduct problems’, ‘Peer problems’, ‘Emotional symptoms’, ‘Hyperactivity- inattention symptoms’, and ‘Prosocial behaviour’. The first four scales measure the difficulty aspects of the psychopathologies of the respondents; whereas the fifth scale measures the personal strength of the individual. Each scale has five items in it. The scores for each item are 0 for "not true," 1 for "somewhat true" and 2 for "certainly true." Scores for each of the five scales (ranging from 0 to 10) are obtained by adding the scores of the individual items. Summary scores for a scale are only calculated if at least three of the five items have been completed. The range of 'Difficulty' scores is from 0 to 40. The "Difficulty" scores are further categorized into three bands: '0-15' denotes 'Normal' band, '16-19' denotes 'Borderline' band; and '20-40' the 'Abnormal' band. The 'Externalizing' and 'Internalizing' scores are calculated by grouping ‘Emotional symptoms’ and ‘Peer problem’; and ‘Conduct problem’ with ‘Hyperactivity-inattention’ respectively [Achenbach et al. (2008); Goodman et al. (2009); Goodman (1997); Goodman (1999); Goodman et al. (2000); Goodman et al. (1999); Klasen et al. (2000); and Goodman (2001)]. Items 27-33 in the extended version of the questionnaire measure the effect of behavioural problems on social dysfunction aspects of the psychopathology of the respondent through 'Impact' scores. These items are answered only if the respondent feels distressed (response to item 26 is ‘yes’ which enquires about any difficulties in areas of emotions, concentration, behaviour or being able to get along with other people). The range of ‘Impact ' scores is between 0 and 10. The SDQ manual specifies three bands of the severity of any scale/score and the proportion of respondents in each band under normal circumstances: 80% of the respondents should lie in the ‘Normal’ band (clinically significant problems in this area are unlikely); 10% in ‘Borderline’ (clinically significant problems), and 10% in the ‘Abnormal’ (substantial risk of clinically significant problems) band.
[https://www.ehcap.co.uk/content/sites/ehcap/uploads/NewsDocuments/236/SDQEnglishUK4-17scoring-1.PDF]. The extended version has been found to be more informative while making diagnostic predictions as compared to the basic version [Goodman et al. (2004)].

With the spread of COVID-19 globally, the World Health Organization declared an international public health emergency on January 30, 2020 [WHO (2020)]. The most commonly used preventive measures were the lockdown and quarantine/isolation of the infected. One of the consequences of these measures was the emergence of mental health problems in people, especially the young adult strata (as diagnosed by DSM IV) [Hossain et al. (2020); Brooks et al. (2020); and Dubey et al. (2020)].

The students, particularly those in higher educational institutions faced another problem of future uncertainty regarding their studies/careers which led to an additional burden on their psychological well-being. With this background, in order to quantify the impact of COVID-19 and the consequent lockdown, an online survey was conducted among undergraduate and graduate students in India. The survey was conducted in the months of May - June,

2020 across educational institutions in India using SDQ 17^+ extended version. A total of 1020 responses were obtained. The 'Internalizing' ('emotional symptoms' and 'peer problem'), 'Externalizing' ('conduct problem' and 'hyperactivity-inattention') and the 'Impact' scores were computed and compared for the groups on the basis of (i) gender; and (ii) chronicity of distress. The relationships between 'Internalising' and 'Externalising' scores have been studied and discussed by authors previously [Goodman, A et al. (2010); and Dray, J et al. (2016)]. We extended the results by including the effect the 'Prosocial' behaviour which indicates the strength of the individual. This is a novelty of this study. Also, observed proportions under each band of severity were compared with the standard proportions of 80%, 10% and 10% for each of the 'Internalizing', 'Externalizing'; and 'Impact' scores. To the best of our knowledge, ours was the first survey conducted to study the effect of COVID-19 on the psychological health of young adults studying in higher educational institutions across India.

The paper is divided into the following sections: introduction, material and methods, results; and, discussion and conclusion.

2. Material and Methods

An online survey was conducted using extended version of 17^+ SDQ questionnaires on the young adults in India pursuing higher education. The survey sought some general information about the respondents such as: (1) Name (2) Gender (4) Age (5) fields of study and (6) Multiple choice questions from 17^+ SDQ questionnaires.

Inclusion criteria for the study were: (i) more than 70% completed responses (which is the requirement of SDQ manual); (ii) Response to item number 26 to be 'yes'. Out of a total of 1020 complete responses, 772 had answered 'yes' to item number 26 and were included in the study.

Cronbach alpha [Tavakol and Dennick (2001)] has been used to test the reliability of data. The observed values are compared with the standard proportions using the Permutation test or randomization test [Good (2013)].

3. Results

3.1 Data Description

An online survey was held in the months of May- June 2020 among college/university students in India when the effect of the disease was not very severe but the precautionary lockdown was there since March 2020. A total of 1020 responses were obtained and scored according to the SDQ manual. Among these, 772 responses that who had shown social dysfunction problems were selected for this study. Among these 772 respondents 337(43.65%) were males and 435 (56.35%) females. Mean age of the participants was 19.75 years with the age range 17-23 years. All the five scales of the SDQ manual along with the Impact scores for all the participants were valid scores. The values of Cronbach alpha and Guttman lambda were respectively 0.80 and 0.83. The average inter-item correlation was 0.14.

The Table 1 below presents the descriptive statistics of all the items of SDQ, the 'Difficulty' scores and the 'Impact' scores for all the 772 respondents stratified gender-wise. For 'Prosocial' behaviour, females performed better than males and the mean of all respondents was also above the cut-off of 6, i.e. in the 'Normal' band of scores. For other scales also, the mean scores were less than or equal to '4'. Mean impact scores were also close to '2', which is the starting value of 'Abnormal' band for impact scores. However, the maximum value of Impact score was 7 thus indicating that the maximum number of distress areas had never exceeded 3 under great deal level.

Table 1: Descriptive statistics of 772 students on the five scales of behavioural problems viz., prosocial behaviour, hyperactivity-inattention, emotional symptoms, conduct Problem and peer Problem, and impact scores for two groups i.e. male and females

Scale (Items)	Gender	Total	Mean	Sd	Minimum	Maximum
Prosocial behaviour (1, 4, 9, 17, 20)	Male	337	7.643	1.812	1	10
	Female	435	8.082	1.557	2	10
	Total	772	7.891	1.686	1	10
Hyperactivity (2, 10, 15, 21, 25)	Male	337	4.216	2.088	0	9
	Female	435	4.018	1.989	0	10
	Total	772	4.104	2.034	0	10
Emotional (3, 8, 13, 16, 24)	Male	337	3.759	2.429	0	10
	Female	435	4.528	2.416	0	10
	Total	772	4.193	2.450	0	10
Conduct Problem (5, 7, 12, 18, 22)	Male	337	3.011	1.546	0	9
	Female	435	2.875	1.380	0	9
	Total	772	2.935	1.456	0	9
Peer Problem (6, 11, 14, 19, 23)	Male	337	3.124	1.819	0	10
	Female	435	2.731	1.607	0	8
	Total	772	2.902	1.713	0	10
Impact Score (28, 29,30,31,32)	Male	337	1.421	1.658	0	7
	Female	435	1.611	1.765	0	7
	Total	772	1.528	1.721	0	7

3.2 Frequency Distributions of Four Scales Signifying the Behavioural Problems among the Respondents

Figure 1 below presents the frequency distribution of the scores of the respondents on the four scales of difficulty score in SDQ. The concentration of the respondents in 'Normal' category for each scale is identified by the 'hump' of the curve and tapering tail. However, tails of hyperactivity-inattention and emotional symptoms are thicker as compared to tails of peer problem and conduct problems.

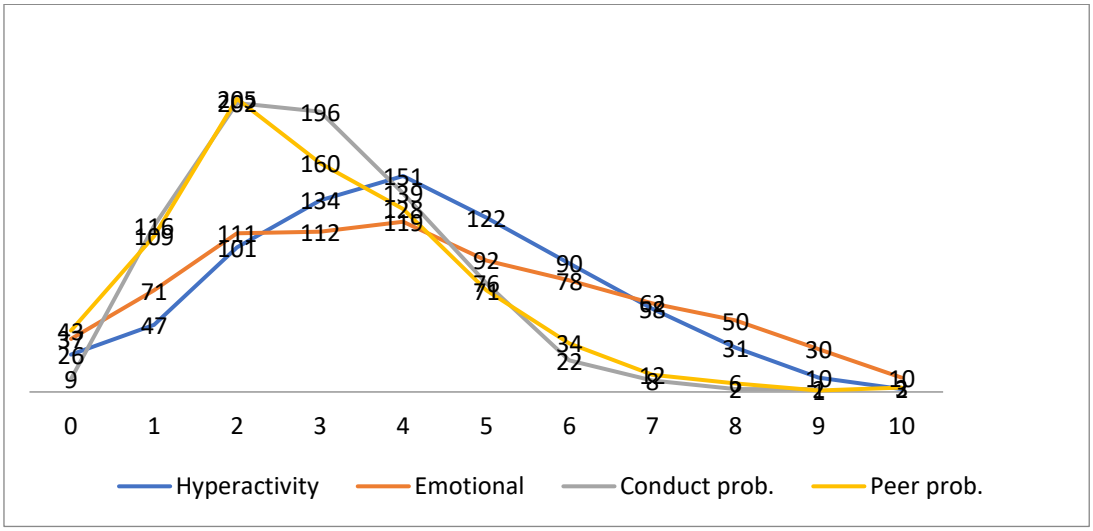

Figure 1:Frequency distribution of the 772 respondents for the four scales of behavioural Problems in SDQ

Figures 2 & 3 below present the relative frequency distributions of females and males for the 'Internalizing', 'Externalizing' and 'Impact' scores of SDQ according to the three score bands respectively. For female respondents, although the proportions of all the three scores in 'Abnormal' band are high and deviated from the standard proportion of 10%, the proportion for the 'Internalizing' score was 53.79%. Only 34.25% of the females were in the normal band of 'Internalizing' score. Similar was the trend with the 'Impact' scores where 46.21% of the female respondents were in the 'Abnormal' band of scores.

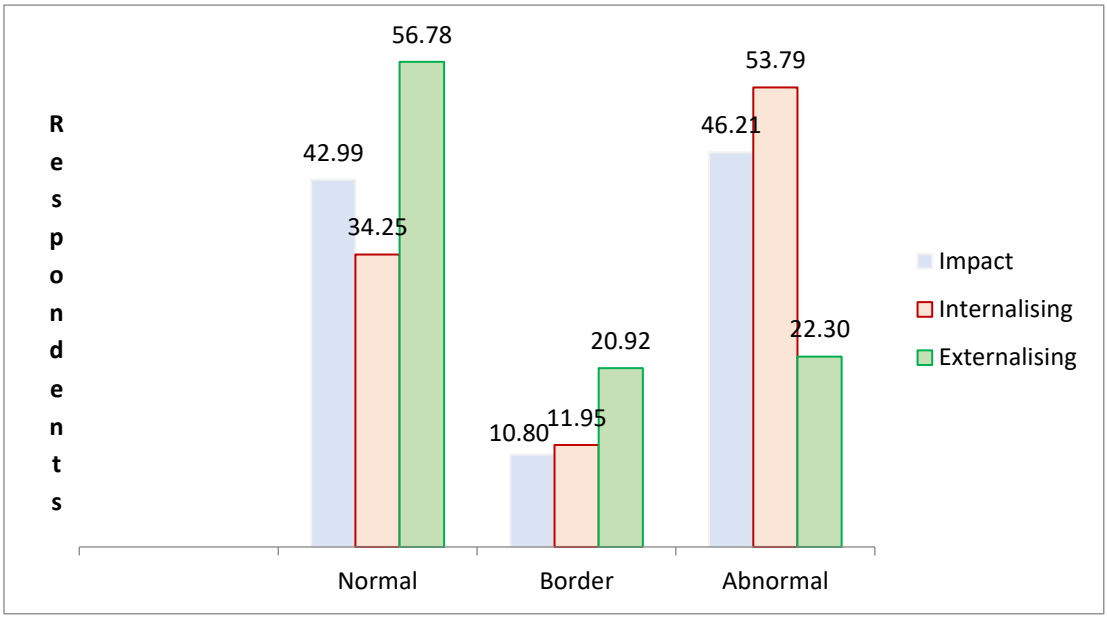

Figure2: The Relative frequency distribution of Female respondents for Internalizing, Externalizing and Impact Score

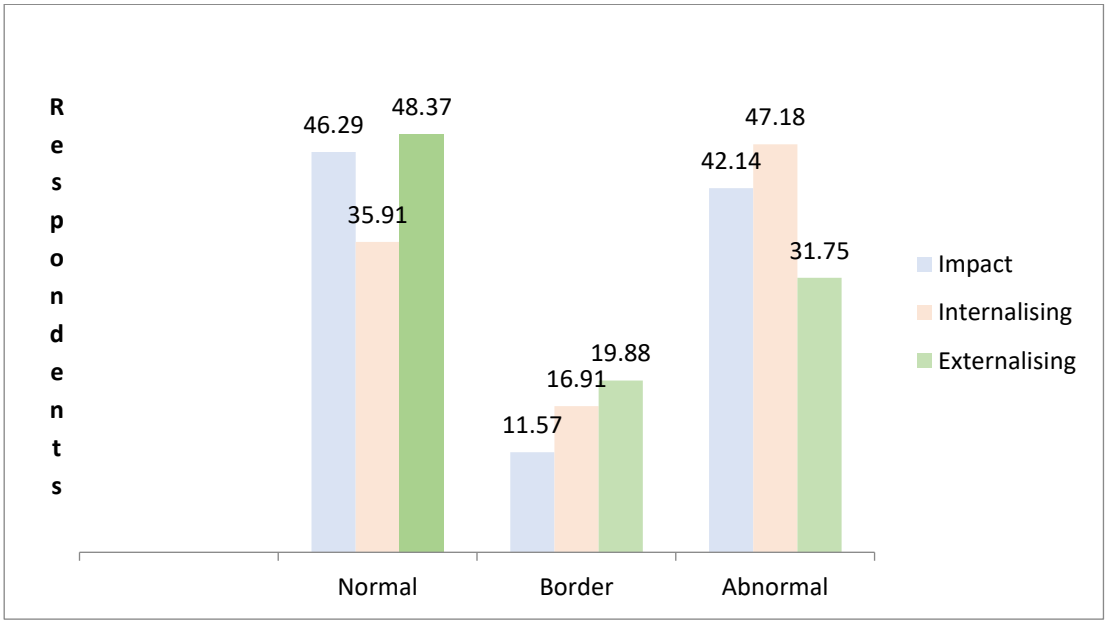

Figure3: The Relative frequency distribution of Male respondents for Internalizing, Externalizing and Impact Score

3.3 Estimating ‘Externalizing’ Scores with ‘Internalizing’ Scores

Behavioural genetics models have suggested that a substantial portion of the correlation between externalizing and internalizing disorders is accounted for by a common genetic component [Victoria et al. (2011); and Benjamin et al. (2011)]. In view of this finding, we estimated the 'Externalizing' scores with the 'Internalizing' scores and the 'Prosocial' behaviour scores (as it was the only indicator of mental strength) by applying multiple linear regression. The normality of the response variable was tested. Both the input variables were found to be significant for estimating the 'Externalizing' score. The negative sign of the coefficient of ‘Prosocial' behaviour indicated that young adults having higher 'Prosocial' scores were less susceptible to 'Externalizing' behaviour problems. The results are presented in Table 2 below:

Table 2:Estimating 'Externalizing' scores with 'Internalizing' scores and the 'Prosocial' behaviour scores

	Coefficients	S.E.	t Stat	p-value
Intercept	6.4468	0.4830	13.34	<.001
Inter	0.3087	0.0260	11.84	<.001
Proscoial	-0.2024	0.0527	-3.83	<.001

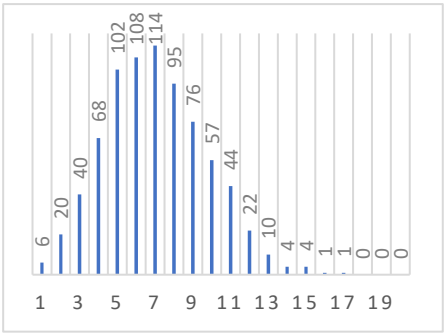

Figure 4: Testing the normality ofexternalising score

Fitted model:

Externalizing Score= 6.4468+0.3087* Internalizing Score-0.2024 Prosocial

3.4 Chronicity

The term ‘chronicity’ refers to the course or rate of onset and development of illness/problems. Out of 772 respondents, 36.09% of females and 30.56% of males faced behavioural and social dysfunction problems for five months or less. This period corresponded to the period of the spread of the disease and consequent lockdown.

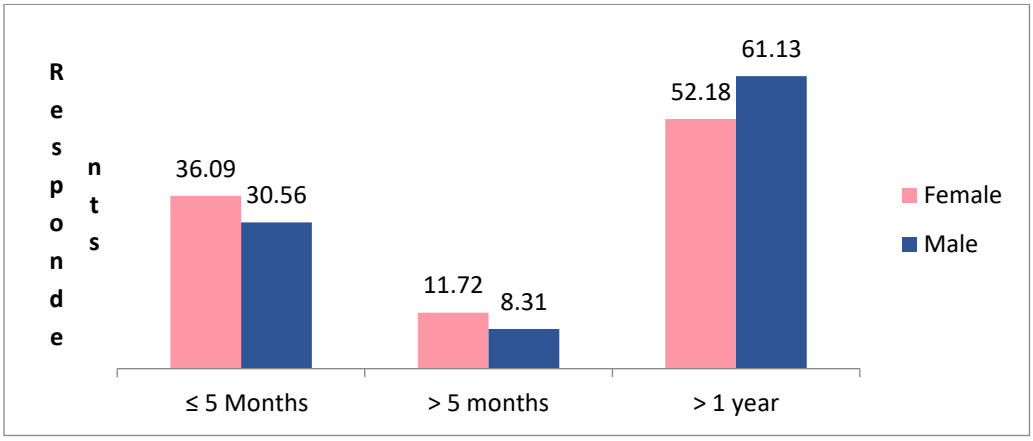

Figure 5: Relative frequency distribution of 'Chronicity' for females and males

3.5 Testing the Effect of Gender and Chronicity of Distress on the Psychological Behaviour Statistically

To check the effect of gender and chronicity of the problems on the psychological health of respondents, we tested: (i) if there was any significant difference between male and female students in respect of any of the 'Internalizing', 'Externalizing' and the 'Impact' scores; and (ii) if the lockdown affected the psychological health of college/university students, where 'Chronicity' was a proxy variable for the 'impact of lockdown'.

The following hypotheses were set:

H_{0i}: There is no significant difference between the two groups of students based on the SDQ scale i;

H_{1i}: There is a significant difference between the two groups of students based on SDQ scale i.

i = Internalizing score; Externalizing score; Impact score.

Grouping variables were gender and chronicity.

A permutation test (using coin-packaging module in R) was carried and the following results were obtained:

Table 3: Comparison by Permutation Test Statistic for Internalizing (emotional and peer problem) , Externalizing(hyperactivity and conduct problem) and Impact score by grouping variable (i) Gender (ii) Chronicity of distress (less than or equal to five months and more than five months)

Grouping Variable	Permutation Test Results at α =0.05			
		Statistic	p-value	Decision
Impact Score	Gender	-1.0771	0.2815	Fail to Reject H_0
	Chronicity	1.8345	0.0665	Fail to Reject H_0
Internalizing	Gender	-1.5158	0.1296	Fail to Reject H_0
	Chronicity	6.1909	<0.0001	Reject H_0
Externalizing	Gender	1.7026	0.0886	Fail to Reject H_0
	Chronicity	5.7412	<0.0001	Reject H_0

There was no effect of gender on the three psychological scales as the p-value was greater than 0.05. Chronicity did not affect 'Impact' scores but both the behavioural scores were affected by chronicity.

3.6 Effect of Lockdown on Psychological Distress in Terms of Deviation from Standard Proportions

The Chi-square test for independence of attributes was used to test if the proportions in the three severity bands were statistically different from the standard proportions. The following hypotheses were set:

H_0: There is no deviation from the standard proportions of 80%, 10% and 10%.

H_1: There are deviations from the standard proportions

The results are presented in Table 4:

Table 4: Overall Comparison of Internalizing, Externalizing and Impact scores proportions under the three severity bands with the standard proportions of 80%, 10% and 10%

Group		Internalizing			Externalizing			Impact		
		Normal	Border	Abnormal	Normal	Border	Abnormal	Normal	Border	Abnormal
Female	Observed	149	52	234	247	1	97	187	47	201
	Expected	348	43.5	43.5	348	3.5	43.5	348	43.5	43.5
	Test Statistic	949.715			146.979			645.025		
	p-value	<0.001			<0.001			<0.001		
Male	Observed	121	57	159	163	7	107	156	39	142
	Expected	269.6	33.7	33.7	269.6	3.7	33.7	269.6	33.7	33.7
	Test Statistic	563.893			234.487			396.738		
	p-value	<0.001			<0.001			<0.001		

As p-value is less than 0.001, we reject the null hypothesis and the observed proportions were significantly different from standard proportions for both grouping variables.

4. Discussion and Conclusion

Studies have shown that young adults are facing mental health problems globally which affect their ability to deal with their social and personal challenges [Gustavson et al. (2018)]. With the emergence of the pandemic COVID-19, these behavioural problems have been aggravated [Harris (2000)].

With the first case of COVID-19 reported in February 2020 in India a lockdown of 21 days was imposed on March 25, 2020 in order to control the spread of the disease at a community level, which was increased for three more periods. The disease with unknown consequences and subsequent preventive measures such as lockdown, social distancing and quarantine (in case of infection) affected the masses at large psychologically, especially the young adult stratum. This was due to uncertainties with regard to their studies/ examinations and their future careers. This situation motivated this study to examine the effect of the disease and consequent lockdown using reliable psychometric and behavioural screening tools.

A total of 1020 responses were obtained from regular college/university students out of which 558 (54.70%) were females and 462 (45.30%) were males with a mean age of 19.75 years. Significant correlations exist among internalizing items (0.768) and externalizing items, (0.798) with $p < 0.001$.

The effect of lockdown was observed on behavioural problems as there was a significant difference between scores of durations of 'less than five months and 'five months and more'. However, this did not contribute to social dysfunction as there was no significant difference between the scores of the two duration categories.

The 46.21%, 53.79 %, and 22.30 % of female respondents are under significant risk categories for Impact, Internalizing and externalizing scores respectively. There is a significant difference in observed numbers under all categories from the expected SDQ standards with p- value < 0.001.

In all, there were 44.43% of students under 'Abnormal' category of 'Impact' scores and were in distress indicating everyday life difficulties in the areas of family, friends, study and hobbies. 53.79% and 22.30% of females were in the 'Abnormal' category of 'Internalizing' and 'Externalizing' scores respectively. The corresponding numbers for males were 47.18% and 31.75%. These deviations from the standard proportions, along with the observation that there was a significant difference between the behavioural scores before the onset of the pandemic and afterwards (Table 3), may be on account of imposed restrictions and their after-effects. Further, the study suggests that there has been an increase of 11.47% in students who are facing psychological behaviour problems during the nationwide lockdown.Our results are in accordance with the coronavirus pandemic American news according to which psychological trauma and mental health viz. depression, substance abuse, post-traumatic stress disorder and suicide problems are on the rise [https://www.washingtonpost.com/health/2020/05/04/mental-health-coronavirus/].

Limitation of the study

The study was conducted over a group of young adults enrolled in higher educational institutions in India and as such may not be representative of the young adult population.

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