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A follow-up study on treatment effects of cognitive-behavioral therapy on social anxiety disorder: Impact of COVID-19 fear during post-lockdown period

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A B S T R A C T

There is a paucity of research on the role of COVID-19 related fear and lockdown on social anxiety disorder (SAD). In a follow-up study during post-lockdown period, we compared social anxiety of individuals with SAD who received cognitive-behavioral therapy (CBT) versus psychoeducational-supportive therapy (PST) before the COVID-19 pandemic, and the impact of COVID-19 related fear. Social anxiety severity was rated by the Social Phobia Inventory (SPIN) at pre-intervention, post-intervention, and post-lockdown periods. Fear of COVID-19 was assessed during the post-lockdown period. The treatment effects in the CBT group ($n = 33$) were significantly better than the PST group ($n = 32$) at post-intervention; this was maintained at 14-months following intervention despite COVID-related lockdown. In the PST group, there was no change following the intervention; and the social phobia increased after lockdown. The CBT group had significantly less COVID-19 related fear than the PST group. Social anxiety was positively correlated with fear of COVID-19; and individuals with comorbidities had significantly more fear. Using the hierarchical multiple regression, SPIN post-intervention, COVID-19 fear, and duration of SAD predicted social anxiety severity during the post-lockdown period. In conclusion, the effect of CBT for SAD was maintained through lockdown and was associated with significantly less COVID-19 related fear.

1. Introduction

The novel coronavirus (COVID-19) pandemic outbreak has forced the introduction of social restrictions and lockdowns as containment measures. Mental health repercussions of these stressful situations have been reported in the general population, including evidence that the student population being highly vulnerable (Kar et al., 2021), experiencing more anxiety and stress than others (Odriozola-González et al., 2020; Rehman et al., 2021).

Recent commentaries expressed concern that individuals with pre-existing mental health conditions may further deteriorate during COVID-19 compared to those without mental health problems (Chatterjee et al., 2020; Yao et al., 2020). However, the empirical research on this topic is comparatively narrow (Asmundson et al., 2020; Taylor et al., 2020). Likewise, studies on student populations with a pre-existing social anxiety disorder (SAD) are scarce, even though it is

remarkably prevalent and disabling in the student population worldwide (Jaiswal et al., 2020; Reta et al., 2020).

Some of the maintaining factors of SAD include avoiding social situations, or facing them with safety behaviors. During exposure treatment, a commonly used technique in cognitive-behavioral therapy (CBT), individuals with SAD are encouraged to confront their feared social situations. This leads to cognitive change and attenuation of anxiety concerning the imagined negative consequences (Heimberg et al., 2014). However, lockdowns prevent such exposure and can reinforce avoidant behaviors. Prior studies show spontaneous recovery and return of extinguished fear in the absence of exposure following treatment completion (Craske et al., 2018). Hence, the lockdowns might be detrimental to socially anxious individuals who have or have not received an intervention. Despite this evidence, to the best of our knowledge, no prior studies have been done exploring the role of COVID-19 fear and lockdown periods on the severity of social anxiety

comparing treated and untreated individuals by CBT.

Studies have demonstrated that treatment effects of CBT are maintained for an extended period after the therapy sessions (Fogarty et al., 2019; Leichsenring et al., 2014). A recent study comparing CBT with psychoeducational-supportive therapy (PST) on medical students with SAD was completed just before the COVID-19 pandemic (Samantaray et al., 2021). The results suggested that the CBT group had a better outcome than the PST group. We hypothesized that the CBT group's differential improvements would continue despite the pandemic and subsequent social isolation. To that effect, in this follow-up study, we sought to establish whether treatment effects of CBT were still maintained given the social restrictions during the lockdown, compared to the PST. Studies have suggested the presence of comorbid conditions as a negative contributing factor to SAD treatment outcome (Eskildsen et al., 2010; McMahon, 2014). Hence, we further wished to study the influence of comorbidity on the outcome of social anxiety in both groups post-lockdown. As we had pre-COVID-19 social anxiety assessments of the sample, it presented a unique opportunity to study the influence of COVID-19 related fear on the social anxiety level in the post-lockdown period. In addition, we explored the difference of COVID-19 related fear in the individuals who received or did not receive CBT for SAD before the COVID-19 pandemic.

2. Method

2.1. Design

This was a single-center cross-sectional observational study.

2.2. Participants

The sample for this study included 65 medical college students with a primary SAD diagnosis. The exclusion criteria were current severe depression and substance dependence. We assessed the clinical diagnosis and comorbidities using the Mini International Neuropsychiatry Interview (MINI) (Sheehan et al., 1998). All the students received either CBT ($n = 33$) or PST ($n = 32$) as an intervention.

2.3. Interventions

CBT: The protocol included six CBT sessions, each conducted weekly for two hours. It was adapted from Heimberg and Becker's protocol (Heimberg and Becker, 2002), which is usually conducted over 12 weeks. The current abbreviated protocol for six sessions aligns with suggested modifications (Herbert et al., 2002); and it consists of treatment conceptualization, the rationale of treatment using a metaphor (Samantaray et al., 2019; Singh and Samantaray, 2021), cognitive restructuring (CR), in-session exposures, and home tasks.

PST is described and used as a credible placebo to control non-specific factors in group psychotherapy (Heimberg et al., 1990). It includes six sessions of psychoeducation about SAD; discussion on common problems encountered, and rendered support, but did not communicate any specific advice on exposures.

All the interventions were carried out by a clinical psychologist with over five years of experience in CBT supervision, supported by two advanced master level trainees in clinical psychology as co-therapists.

2.4. Assessment measures

The Social Phobia Inventory (SPIN) is a self-reported measure of social anxiety severity (Connor et al., 2000). It assesses the fear, avoidance, and physical signs of social anxiety. The scale has 17 items, each rated on a 5-point scale of 0 to 4. The maximum score is 68; a higher score indicates a greater severity of social anxiety. It has well-established psychometric properties (Antony et al., 2006). The participants rated themselves at pre-intervention, post-intervention and post-lockdown (14 month after the intervention) periods.

The Fear of COVID-19 (F-COVID-19) scale is a self-reported measure which was used to rate the fear of COVID-19. It consists of seven items, each rated on a 5-point Likert scale; and a higher total score (range 7 to 35) suggests greater fear of COVID-19. It has well-documented psychometric properties (Ahorsu et al., 2020). The F-COVID-19 scale was used during post-lockdown period only.

To assess the post-intervention exposure attempts, we asked the following to each participant in the CBT group during the post-lockdown assessments, "During the lockdown of your college or from the last week of March 2020 to December 2020, did you continue in-vivo or face-to-face exposure to the social situations where you have/had anxiety? If yes, was that a) inside the residence, b) outside the residence, or c) both inside and outside the residence?"

The Institutional Ethics Committee of SCB Medical College, Cuttack, India approved the\074br/\076study. The study was explained to all the students with SAD, notably that participation was voluntary\074br/\076and anonymous, and that they would have the option to withdraw at any time without the need to give a reason. Following this, we obtained written informed consent from all participants who are included in this study.

2.5. Data analysis

There were 33 participants in the CBT group, 29 of them were available for the post-lockdown assessment after 14 months of CBT intervention. Out of the 32 participants in the PST group, 27 were available for the post-lockdown assessment. We used simple mean imputation to handle missing data (Dziura et al., 2013). Our primary outcome variable was SPIN at post-lockdown, and we intended to find out how it persisted in the two intervention groups and how COVID-19 fear influenced it. To study the inter-and intra- group changes in the two groups at the different periods, we used one-way analysis of variance (ANOVA) and repeated measures ANOVA. Pearson's correlation was used for evaluating the relationship between different variables. We used the hierarchical multiple regression method to assess the influence of contributing factors on social anxiety severity at post-lockdown. Analyses of covariance (ANCOVAs) were carried out to control the effects of covariates. Statistical significance was set at $p<0.05$. We completed the analyses using SPSS version 25.0.

3. Results

The sample included 65 students: 46.2% male and 53.8% female. 76.9% were undergraduate and 23.1% were postgraduate students. There was no difference between genders in mean age, SAD duration, SPIN pre-intervention, SPIN post-intervention, SPIN post-lockdown, and F-COVID-19.

There were 33 (50.8%) participants in the CBT group and 32 (49.2%) in the PST group. Both groups were similar in their composition of gender, education, and comorbidity (Table 1). The mean age ± SD of participants in CBT (21.48 ± 2.64 years) and PST (22.06 ± 2.7 years) groups were comparable.

3.1. Inter-and intra-group changes

Change in SPIN scores at different periods are given in Table 2. The CBT treatment group had significant treatment effects than the PST group at post-treatment (Welch's $F (1, 50.56) = 10.18$, $p = 0.002$) and post-lockdown (Welch's $F (1, 52.75) = 11.83$, $p = 0.001$) on the SPIN using ANOVA.

We used one-way repeated measures ANOVA to analyze symptom change within each intervention group across the studied periods. For the CBT group analysis, Mauchly's test of sphericity was significant. Hence, a Greenhouse-Geisser correction was applied ($\varepsilon = 0.71$). The CBT group reported a significantly lower level of SAD severity based on SPIN

Table 1

Sample characteristics.

		CBT($n = 33$)		PST($n = 32$)		Total	
		N	%	N	%	N	%
Gender	Male	15	45.5	15	46.9	30	46.2
	Female	18	54.5	17	53.1	35	53.8
Education	Postgraduate	7	21.2	8	25	15	23.1
	Undergraduate	26	78.8	24	75	50	76.9
Comorbidity	No	24	72.7	21	65.6	45	69.2
	Yes	9	27.3	11	34.4	20	30.8

Note: CBT= Cognitive behavioral therapy; PST = Psychoeducational-supportive therapy.

Table 2

SPIN at different time periods.

		SPIN pre-treatment		SPIN post-intervention		SPIN post-lockdown	
	n	Mean	SD	Mean	SD	Mean	SD
CBT	33	38.67	6.21	28.91	10.52	30.69	10.52
PST	32	36.72	7.09	35.63	5.89	38.07	6.33

Note: SPIN = Social Phobia Inventory; CBT= Cognitive behavioral therapy; PST = Psychoeducational-supportive therapy.

at different periods, {F (1.43, 45.73) = 18.63, p <0.0005} with SAD severity decreasing from 38.67 ± 6.21 (mean SPIN ± SD) at pre-intervention, to 28.9 ± 10.52 at the post-intervention, and 30.68 ± 10.52 at post-lockdown. Post-hoc analysis with a Bonferroni adjustment revealed that the SAD severity in the CBT group decreased significantly from pre-intervention to post-intervention {9.76 (95% CI, 4.63 to 14.89), p <0.0005}, and from pre-intervention to post-lockdown {7.98 (95% CI, 3.26 to 12.69), p <0.0005}, but not from post-intervention to post-lockdown {1.78 (95% CI, −0.87 to 4.43), p = 0.299}.

In the PST group, one-way repeated measures ANOVA suggested a significant change in the severity of SAD based on SPIN, {F (2,62) = 4.37, p = 0.017}, with mean SPIN ± SD decreasing from 36.72 ± 7.09 at pre-intervention to 35.63 ± 5.89 at the post-intervention and increasing to 38.07 ± 6.33 at post-lockdown. The posthoc analysis with Bonferroni adjustment revealed no statistically significant decrease in the SAD severity either from pre-intervention to post-intervention {1.09 (95% CI, −0.78 to 2.96), p = 0.453}, or from pre-intervention to post-lockdown {1.36 (95% CI, −3.53 to 0.82), p = 0.374}; however, there was a statistically significant increase in the SAD severity from post-intervention to post-lockdown {2.44 (95% CI, 0.22 to 4.67), p = 0.027}.

3.2. Comorbidity

The majority (69.2%) of the sample had no comorbidity. Amongst the participants with comorbidity ($n = 20$, 30.77%), most had generalised anxiety disorder ($n = 11$, 16.92%), 5 (7.7%) had agoraphobia, 2 (3.07%) had obsessive-compulsive disorder, and 9 (13.85%) other specific phobias. Comorbidity did not differ between genders, education, or treatment groups.

In the CBT group, there was no difference in SPIN pre-intervention between those with or without comorbidity; and there was a trend towards significance (F = 4.1, p = 0.053) between the groups at post-intervention; whereas, at post-lockdown, the ones with comorbidity (38.0 ± 11.1) had significantly (p<0.05) higher SPIN than those without (28.0 ± 9.1). In the PST group, there was no significant difference in SPIN in participants with or without comorbidity, pre-intervention, post-intervention, or post-lockdown.

There was a significant difference in F-COVID-19 {F (1,63) = 8.84, p = 0.004} between SAD individuals with (18.66 ± 4.73) or without (14.94 ± 4.62) comorbidity suggesting that SAD individuals with comorbidity had significantly more COVID-19 related fear. After adjusting for post-lockdown social anxiety severity using ANCOVA, the difference

in post-lockdown COVID-19 fear between SAD individuals with or without comorbidity was maintained ($F = 4.5$, p = 0.038).

3.3. Correlation between social anxiety and COVID-19 fear

We examined the correlations of different variables studied (Table 3), especially the social anxiety severity and fear of COVID-19, along with age and duration of SAD. Age and duration of SAD were positively correlated, as was SPIN pre-intervention with post-intervention and post-lockdown. Fear of COVID-19 was correlated with SPIN at all the periods studied; suggesting fear was positively correlated with social anxiety.

3.4. Factors predicting social anxiety at the post-lockdown period

During the pandemic, the fear of COVID-19 contributed to anxiety. This is a possible confounding factor influencing the long-term outcome of intervention in the post-lockdown period. We used the hierarchical multiple regression method to assess the influence of contributing factors for SPIN at post-lockdown (Table 4). The possible confounding factor of COVID-19 fear was controlled for; while age, duration of SAD, SPIN pre-intervention, and SPIN at post-intervention were independent variables. COVID-19 fear accounted for 49.6% variability in the outcome. The predictor variables (age, duration of SAD, SPIN pre-intervention, SPIN post-intervention) described an additional 28.3% of variance in the outcome when the confounding variable of COVID-19 fear was controlled for (p<0.001). In summary, while controlling for the COVID-19 fear factor, the model significantly [ANOVA sig is p<0.001] predicted SPIN post-lockdown.

The independent variables which predicted SPIN at post-lockdown were: SPIN post-intervention (standardized coefficient Beta 0.61, p<0.001), COVID-19 fear (Beta 0.3, p<0.01), and duration of SAD (Beta −0.172, p<0.05), suggesting that the largest contribution came from the SPIN post-intervention.

3.5. Fear of COVID–19

The CBT group had a significantly lower score of fear related to COVID-19 compared with the PST group {14.6 ± 4.4 v 17.6 ± 5.1, F(1, 63) = 6.73, p = 0.012} in the post-lockdown period.

3.6. Post-intervention exposure attempts in cbt group

In the CBT group, when asked about their exposure to social situations during the lockdown period; out of 29 participants available11 (37.93%) reported that they were continuing the exposures; three inside their residence, six outside, and two maintained social exposure both inside and outside their residence. There were no significant difference of social anxiety severity, between those who continued social exposure and those who did not in the lockdown period.

4. Discussion

This study intended to assess whether the improvement of CBT in

Table 3

Correlations of different variables studied.

	Age	Duration of SAD	SPIN pre-intervention	SPIN post-intervention	SPIN post-lockdown	Fear of COVID
Age	1					
Duration of SAD	.361**	1				
SPIN pre-intervention	−0.042	−0.134	1			
SPIN post- intervention	−0.137	−0.255*	.269*	1		
SPIN post-lockdown	.023	−0.298*	.337**	.824**	1	
F-COVID-19	.134	−0.044	.409**	.601**	.704**	1

Note: SAD = Social anxiety disorder; SPIN = Social Phobia Inventory; F-COVID-19 = Fear of COVID-19
*Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed).

Table 4

Hierarchical multiple regression predicting SPIN post-lockdown.

Model		UC B	Std. Error	SC Beta	T	p
1	(Constant)	12.7	2.87		4.43	.000
	F-COVID-19	1.34	.17	.7	7.88	.000
2	(Constant)	−3.61	6.36		−0.57	.572
	F-COVID-19	.57	.16	.3	3.53	.001
	SPIN post-intervention	.63	.08	.61	7.48	.000
	Duration of SAD	−0.75	.29	−0.17	−2.55	.014
	SPIN pre-intervention	.04	.09	.03	.48	.635
	Age	.46	.24	.13	1.92	.06

Note: SPIN = Social Phobia Inventory; UC = Unstandardized coefficients; SC= Standardized coefficients; SAD = Social anxiety disorder; F-COVID-19 = Fear of COVID-19; SAD = Social anxiety disorder.

individuals with SAD continued long-term through social restriction and lockdown, and the influence of COVID-19 related fear on social anxiety. Our findings showed that the treatment effects of CBT for SAD were maintained over a 14-month follow-up period despite the disruptions in social interactions during the COVID-19 related lockdown. The fear of COVID-19 significantly predicted social anxiety severity at post-lockdown. Other factors that significantly predicted social anxiety levels at the post-lockdown period were social anxiety severity at post-intervention and SAD duration. We also found that the social anxiety severity was positively correlated with the fear of COVID-19. Individuals with SAD who received PST were more afraid of COVID-19 than those who received CBT. SAD individuals with comorbidity had significantly more COVID-19 fear than individuals with no comorbidity.

Our findings of the long-term benefits of CBT for SAD are consistent with other studies (Benbow and Anderson, 2019; Fogarty et al., 2019), although these studies have reported follow-up effects over 4.5 years compared to 14 months of follow-up in our study. We have not been able to study treatment effects specifically on cognitive biases as in Benbow & Anderson's study.

CBT focuses on addressing the maladaptive behaviors of avoiding social situations as maintaining factors of SAD. The lockdown possibly reduced the opportunity of continuing exposures to the feared social situations after the intervention. This might lead to re-emergence of conditioned fear due to the lack of practice over time since extinction (Craske et al., 2018; Rescorla, 2004). However, it is probable that the treatment effect of CBT continued for the duration of follow-up in this study; another explanation could be that some form of social exposure continued in vivo, imaginal or through exposure to media.

Our study finding of fear of COVID-19 significantly predicting social anxiety severity at post-lockdown highlights the observations of pandemic severity and lockdown measures being linked to anxiety (Zheng et al., 2020). In the framework of Stimulus-Organism-Response, Zheng et al. explained that pandemic severity and lockdown are environmental factors at the regional level which changed the perception of psychological distancing at the personal level, escalating individuals' anxiety. Another possibility is that the lockdown reinforced avoidant behaviors to social situations, promoting negative learning, and not allowing the corrective understanding that feared social situations

might be less threatening. Considering the vulnerability of individuals with SAD for anxiety and the perpetuating role of lockdown related to COVID-19, our study findings indicate the need for continued intervention measures for these patients, exploring appropriate methods to provide such intervention in the changed circumstances of remote consultations and interventions.

The findings of our study support the existing notion that comorbidity is a hurdle to effective treatment (McMahon, 2014). Most previous studies have found comorbid depression to predict poor SAD treatment outcomes (Eskildsen et al., 2010). Our study supports a piece of inadequate but increasing evidence that comorbidity, even with other anxiety disorders, is also associated with poor SAD management outcomes (Mululo et al., 2012). In addition, our study confirmed that comorbid mental illness was a risk factor for COVID-19 related fear.

A study on COVID stress syndrome suggested that stress severity is correlated with preexisting psychopathology (Taylor et al., 2020). There is further confirmation specific to individuals with anxiety disorder having particular vulnerability of stress related to COVID, as they might be more susceptible to negative information related to the pandemic and may adhere to increased maladaptive coping, such as excessive avoidance during isolation (Asmundson et al., 2020).

Furthermore, studies on SAD in university students (Baltacı and Hamarta, 2013) and elsewhere (Singh et al., 2020) have found that increased social support was associated with reduced symptoms. Although the individuals with SAD fear negative scrutiny in specified social situations, the lockdown might have affected the needed social and community support important in balancing out the psychological harm from such stressful life conditions.

There are several limitations to this study. We have used only self-rated measures, which could result in response bias (Sato and Kawahara, 2011); using clinician-rated measures in parallel might be helpful in future studies. The study participants were students from a medical college, who were in close proximity to frontline health workers of COVID-19; hence, the results may not be generalizable to all socially anxious college students of different courses. Finally, apart from assessing the exposure activities, we did not assess the other possible therapeutic activities that individuals might have carried out during the lockdown period, like support from family members or the use of written/online resources. These could be significant in understanding the reasons behind the maintenance of CBT treatment effects.

Conclusions

Treatment effects of CBT for SAD were maintained long-term despite the disruptions in social interactions during the COVID-19 related lockdown. In contrast, PST did not have therapeutic benefit for SAD patients in this study. Individuals with SAD who received CBT experienced substantially less fear of COVID-19 than those who did not; at the same time, the fear of COVID-19 significantly predicted social anxiety severity at post-lockdown. The presence of comorbidity along with SAD was associated with significantly more COVID-19 fear and higher social anxiety specifically at post-lockdown.

As CBT remains effective, there is a need to adapt cognitive restructuring and exposure techniques for individuals with SAD

especially during pandemic related changes of remote assessment and interventions. There is also an increasing need to explore evidence-based trans-diagnostic treatment approaches to manage multiple mental health conditions at one time, given the poor treatment outcomes associated with comorbidities.

Authors contribution

Dr. Narendra nath Samantaray, Ph.D* (Corresponding Author): Conceptualization; Data curation; Formal analysis;; Investigation; Methodology; Project administration; Resources; Software; Validation; Roles/Writing - original draft; Data analysis; Writing - review & editing. Dr. Nilamadhab Kar: Conceptualization; Data Analysis; Writing - review & editing. Subhransu Ranjan Mishra: Investigation and data collection.

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