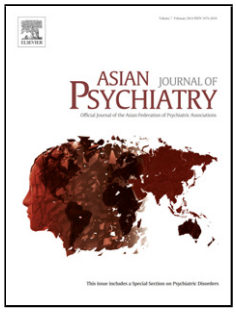

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EFFICACY OF AN INDICATED INTERVENTION PROGRAM FOR INDIAN ADOLESCENTS WITH SUBCLINICAL DEPRESSION

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Highlights

- Indicated school-based programs for adolescent subclinical depression have yielded positive results worldwide; in the present study such a program was devised and implemented in the Indian context.
- Significant reductions in depressive symptoms, negative cognitions, and academic stress were found among children in the intervention group. Significant improvements in social problem solving and coping skills were also evidenced.
- That the results were positive at follow-up and not just at post-intervention suggests that findings were more robust and more strongly indicative of a treatment effect, rather than some transient or time-specific effect.
- The results are encouraging in terms of demonstrating the value of running an indicated school-based program for early intervention in depression in high-risk adolescents. Mental health professionals need to collaborate with schools to increase the visibility, availability, acceptance, and evaluation of school-based programs for at-risk students.

1. Introduction

It is being increasingly recognised that depression constitutes a substantial problem among adolescents in India (Nair et al., 2004). Even subclinical depression has been

found to have a high prevalence (Singhal et al., 2016), bringing with it impairments in academic, social, and familial arenas, as well as cognitive and emotional difficulties for the adolescent. Subclinical depressive symptoms constitute a significant risk factor for adult depression (Fergusson et al., 2005). Thus, the treatment of depressive symptoms, even at subclinical levels, is a worthwhile goal with important clinical implications. It will also help bridge the treatment gap that exists, given that a majority of depressed adolescents do not receive treatment (Weersing and Weisz, 2002) because their symptoms are attributed to mood swings, or they do not know where or how to find appropriate help, or are reluctant to seek help due to social stigma and peer rejection (Crisp et al., 2006).

Numerous school-based cognitive-behavioural indicated programs have been devised for adolescents with elevated depressive symptoms to overcome many of these obstacles. These 'early intervention' programs support reducing the risk of further depressive episodes (e.g., Arnarson and Craighead, 2011; Garber et al., 2009; Stice et al., 2008), as well as producing positive outcomes in coping (e.g., Lowry-Webster et al., 2001), attributional style (e.g., Horowitz et al., 2007), personal adjustment (sense of inadequacy and self-esteem; e.g., McCarty et al., 2013), problem solving (e.g., Spence et al., 2003), and anxiety (e.g., Lowry-Webster et al., 2001).

Although indicated programs have been found to reduce depressive symptoms, it is important to test whether the effects vary across cultures. Indicated programs may be more effective in the Indian context because Indian adolescents report higher scores of depression than their Western counterparts (Upmanyu et al., 2000) and depression prevention programs typically produce larger effects for higher-risk participants (Horowitz and Garber, 2006; Stice et al., 2009).

The present study, therefore, aimed to evaluate a school-based cognitive-behavioural indicated program for adolescents with subclinical depression in the Indian context.

Apart from the risk factors that have been addressed in the Western studies, we also included 'academic stress' due to its salience in the Indian context (Deb et al., 2010, Singhal et al., 2016).

2. Method

2.1 Study design and sample

The study had two-fold objectives: (1) to examine the efficacy of a school-based group coping skills program for adolescents with subclinical depression on depressive symptoms, negative cognitions, academic stress, social problem solving, and coping skills; and (2) to examine the role of the following in moderating the outcome of the intervention: initial levels of depressive symptoms, parental depression, gender, and homework completion.

A two-group comparison design with repeated baseline assessments was used. Schools were randomly assigned to intervention or control group, to avoid contamination effects.

Grade 8, 9, and 11 students (ages 13-18 years) belonging to English-medium co-educational schools of a large metropolitan Indian city were included in the study. One hundred and twenty students across two schools identified as having sub-clinical depression (within the range 14-24 on CDI; see Singhal et al., 2016) comprised the intervention (n=65) and control (n=55) groups.

2.2 Procedure

The study was carried out from January 2012 to December 2013. The students of the school assigned to the intervention condition were divided into ten same-gender groups of 4-8 students each and administered pre-intervention assessments (T1). Each group was then delivered the 8-weekly intervention called the Coping Skills Program

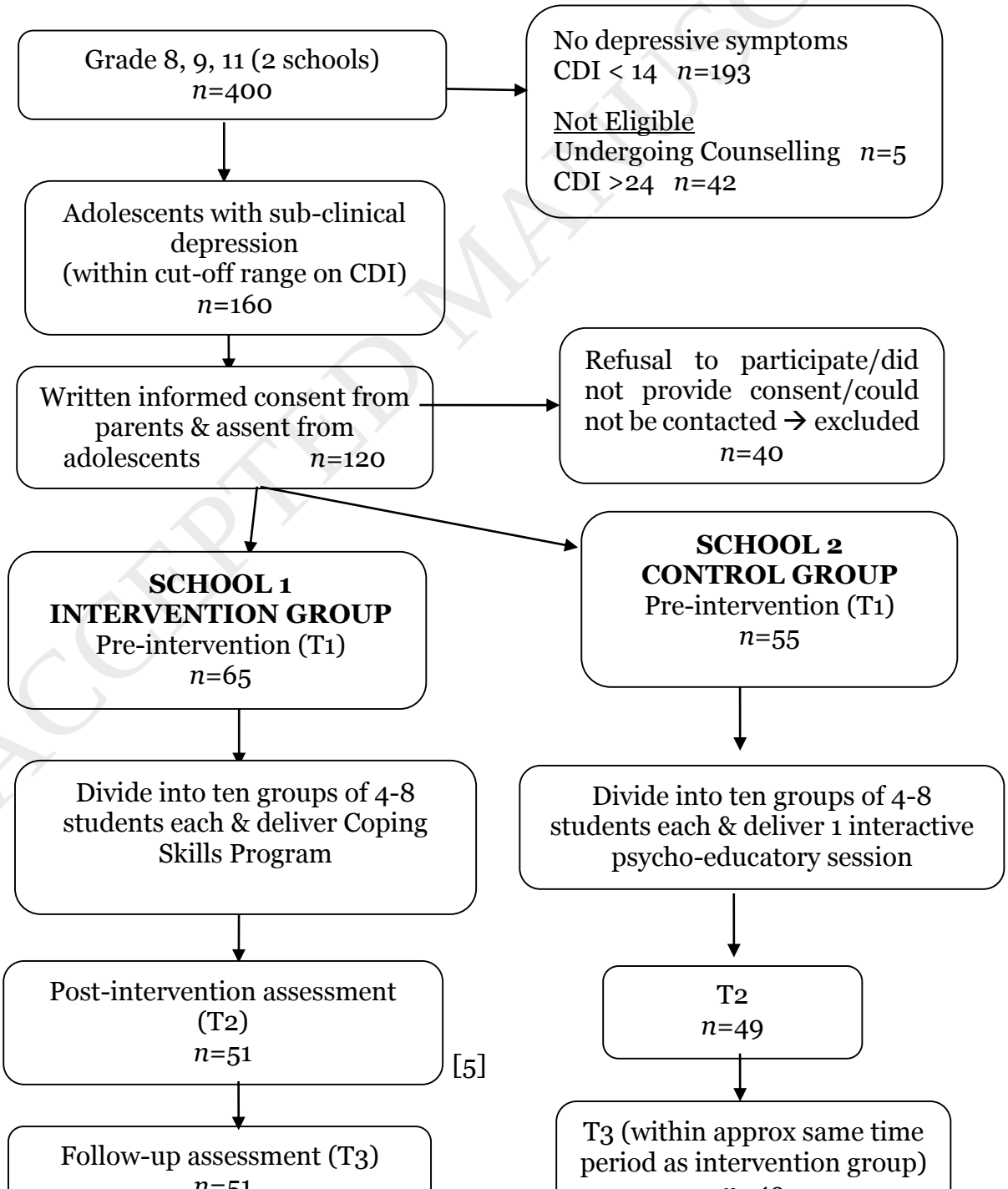
devised by the authors (see Singhal et al., 2014). The students of the school assigned to the control condition were, for ethical reasons, engaged in one 40-45 minutes (one free period) of interactive psycho-educatory session in ten groups of 4-8 students each. At completion of the program, the intervention group was assessed (T2), and again after a 3-month no-contact interval (T3). The control group was similarly assessed within the same period as the intervention group.

The following measures were employed: (1) Sociodemographic Data Sheet (SDS): This tool was developed by the researcher for the purpose of the present study and included information about socio-demographic characteristics, such as birth date, gender, family set-up, etc. as well as items eliciting information about the exclusion criteria; (2) Children's Depression Inventory (CDI; Kovacs, 1992): It is the most commonly used self-report measure of intensity of depressive symptoms for individuals aged 7-17 years. The Cronbach's alpha of CDI for our sample was high (α=0.81), indicating a high level of internal consistency for this scale for the current sample; (3) Centre for Epidemiological Studies- Depression Scale for Children (CES-DC; Weissman et al., 1980): It assesses frequency of depressive symptomatology experienced over the past week; (4) Children's Automatic Thoughts Scale (CATS; Schniering & Rapee, 2002): It is a developmentally sensitive, self-report measure of negative self-statements across both internalising and externalising problems; (5) Scale for Assessing Academic Stress (SAAS; Sinha et al., 2001): Developed for grade 8-12 students of English-medium schools with students belonging to middle to higher socio-economic background, this scale assesses five major indicators of academic stress; (6) Social Problem Solving Inventory (SPSI-R; D'Zurilla et al., 2002): It assess functional and dysfunctional cognitive and emotional orientations toward solving life problems; and (7) Adolescent Coping Orientation to Problems Experienced Inventory (ACOPE; Patterson & McCubbin, 1991): it requires adolescents to indicate how often they use a specified

coping behaviour when they 'face difficulties or feel tense'. For details of the measures and the intervention program, see Singhal et al. (2014). The flowchart for the procedure is provided in Figure 1.

Figure 1

Flowchart of procedure for the study



3. Results

3.1 Comparison on socio-demographic and baseline variables

The intervention and control groups did not differ in their composition by grade [$\chi^2(2)= 0.18$, $p= 0.91$], gender [$\chi^2(1)= 0.04$, $p= 0.84$], birth order [$\chi^2(2)= 3.99$, $p= 0.13$], and age [$t(118)= -0.24$, $p= 0.81$]. They also did not differ by fathers' age [$t(100)= 1.42$, $p= 0.15$] and mothers' age [$t(103)= 0.80$, $p= 0.42$].

The intervention group had significantly more fathers educated up to Grade 12 and control group had significantly more fathers educated up to graduation [$\chi^2(2)= 10.22$, $p= 0.006$]. There was no difference between the intervention and control groups by family type (nuclear and joint/extended) [$\chi^2(1)= 1.63$, $p= 0.20$], and by parents' depressive symptom scores [fathers $t(58)= -1.4$, $p= 0.16$, and mothers $t(94)= 1.2$, $p= 0.23$].

Comparison between intervention and control groups at T1 indicated that the two groups did not differ significantly on each of the measures at baseline.

3.2 Comparison between intervention and control groups on outcome measures

Comparison between the intervention and control groups at post-intervention (T2) and follow-up (T3) assessments was done using repeated measures analysis of covariance (ANCOVA), with father's education level as covariate (Table 1). However,

the pattern of results did not change even when fathers' education level was not included as a covariate. Table 1 also displays the partial eta squared values for each variable.

Table 1

Comparison between intervention and control groups on outcome measures

Outcome measures	T1 (pre-intervention) Mean (S.D.)		T2 (post-intervention) Mean (S.D.)		T3 (follow-up assessment) Mean (S.D.)		Between groups F (df= 1, 90)	ηp^2
	I	C	I	C	I	C		
CDI	22 (4.3)	21.8 (3.5)	10.3 (3.2)	19.9 (3.1)	5.1 (2.3)	22.2 (3.6)	**234.2*****	0.72
CES-DC	29.4 (6.4)	29.5 (5.3)	15.9 (4.9)	28.4 (5.3)	9.4 (3.3)	29.4 (4.6)	**132.5*****	0.59
CATS	58.1 (22.8)	54.9 (16.3)	22.5 (8.4)	52.9 (14)	12.8 (4.3)	51.5 (11.8)	**69.25*****	0.44
SAAS	18 (4.6)	18.3 (4.5)	6.5 (2.4)	17.7 (4)	6.2 (2.3)	19.9 (3.3)	**143.3*****	0.62
SPSI[a]	91.6 (14.7)	86.9 (11.7)	104.5 (8.7)	87.9 (10.7)	111.8 (8.8)	85 (9.8)	**56.87*****	0.39
ACOPE[a]	163.2 (17.8)	161.5 (17.9)	181.2 (14.5)	161.4 (18)	190.5 (11.8)	159.1 (17.4)	**24.46*****	0.21

I= Intervention group, C= Control group, ***p<0.001, **p<0.01

CDI= Children's Depression Inventory, CES-DC= Centre for Epidemiological Studies-Depression Scale for Children, CATS= Children's Automatic Thoughts Scale, SAAS= Scale for Assessing Academic Stress, SPSI= Social Problem Solving Inventory, ACOPE= Adolescent Coping Orientation to Problems Experienced Inventory

[a] Increase in means reflect greater social problem solving ability and better coping respectively

3.3 Effect Size

All the variables were found to display large effect sizes (ESs) at both post- and follow-up assessments (Table 2). Also, Cohen's d increased from T2 to T3 for all the measures, indicating an increase in treatment effect from post to follow-up assessment for the intervention group.

Table 2

Cohen's d effect sizes for intervention group

	Post-intervention (T2)	Follow-up (T3)
CDI	2.75	3.97
CES-DC	2.09	3.05
CATS	1.56	1.98
SAAS	2.84	1.37
SPSI	0.87	1.53
ACOPE	1.01	2.55

3.4 Analysis of clinical significance

Analysis of clinical significance was calculated using a two-step criterion by Jacobson and Truax (1991). Table 3 shows the percentage of adolescents in intervention and control groups who fulfil Reliable Change Index (RCI) criterion at the post-intervention and follow-up assessments.

Table 3

Reliable Change Index

Tools	Intervention (n=49)		Control (n=51)	
	Post-intervention n (%)	Follow-up n (%)	Post-intervention n (%)	Follow-up n (%)
CDI	47 (95%)	18 (37%)	3 (6%)	0 (0%)
CES-DC	43 (87%)	16 (33%)	2 (4%)	0 (0%)
CATS	44 (90%)	17 (35%)	3 (6%)	0 (0%)
SAAS	42 (85%)	12 (25%)	4 (8%)	0 (0%)
SPSI	45 (92%)	19 (39%)	5 (10%)	0 (0%)
ACOPE	44 (90%)	15 (31%)	2 (4%)	0 (0%)

The percentages of adolescents in intervention and control groups who fell in each of the clinical change categories are presented in Table 4. A majority of adolescents in the intervention group (75-80%) achieved recovery on all measures. 13-63% evidenced improvement and 3-22% achieved a functional status in the intervention group. None of the adolescents showed clinically significant deterioration in either group. A majority of participants in the control group remained unchanged (90-97%). Chi-square analyses for individuals meeting criteria for reliable change shows the superiority of intervention group in comparison with the control group on indices of recovery, improvement, and functionality (Table 4).

Table 4

Analysis of Clinical Significance

		Recovered	Improved	Functional	Unchanged	Deteriorated	$\chi^2(3)$	p
CDI	Intervention	80%	16%	4%	0	0	**182.5*****	0.001
	Control	0	6%	0	94%	0		
CES-DC	Intervention	77%	20%	3%	0	0	**184.76*****	0.001
	Control	0	3%	2%	95%	0		
CATS	Intervention	78%	13%	9%	0	0	**185.56*****	0.001
	Control	0	5%	0	95%	0		
SAAS	Intervention	79%	18%	3%	0	0	**191.6*****	0.001
	Control	0	0	7%	93%	0		
SPSI	Intervention	75%	14%	11%	0	0	**172.86*****	0.001
	Control	0	8%	2%	90%	0		
ACOPE	Intervention	76%	15%	9%	0	0	**178.08*****	0.001
	Control	0	0	3%	97%	0		

***p<0.001

3.5 Moderator Analysis

The following were hypothesized to be predictor variables: pre-intervention depressive symptoms, parental depression, gender, and homework completion.

3.5.1 Pre-intervention depressive symptoms

This was defined in two ways: (a) T1 CDI scores, and (b) CDI scores categorised into low (range 14-18) and high (range 19-24). Percentage improvement on the self-report measures was calculated using the formula: [(T1-T3)/T1] X 100. Improvement was defined to be ≥20% change in pre-intervention scores. Accordingly, improvement was categorised as improved (yes) or not improved (no). The percentages of adolescents falling in the 'low' and 'high' categories were 52% and 48%, respectively.

The correlations between T1 CDI scores and percentage improvement on all the measures are presented in Table 5. Higher baseline depressive symptoms showed reduction with improvements in social problem solving.

Table 5 shows the association between CDI scores (categorised as low vs. high) and percentage improvement on all measures (categorised as yes vs. no). Higher baseline depressive symptoms showed reduction with improvements in social problem solving and in coping. Improvement in depressive symptoms showed a trend of significance.

3.5.2 Parental depression

Parental depressive symptoms were assessed using Beck's Depression Inventory I (BDI; Beck et al., 1961). The correlations between mothers' BDI scores and percent improvement on all the measures are displayed in Table 5. None of the correlations were significant, however, only CES-DC showed a trend of significance.

Table 5 also shows the correlations between fathers' BDI scores and percent improvement on all the measures. Adolescents with fathers having low BDI scores showed greater improvement in coping.

3.5.3 Gender

The association between gender (males vs. females) and improvement (yes vs. no) on all the measures shows that none of the relationships are significant (Table 5).

3.5.4 Homework completion

Homework completers were defined as those adolescents in the intervention group who complete 5 out of 7 home tasks. The association between homework (HW) completion and improvement on all the measures shows that adolescents who completed HW showed improvement on challenging negative cognitions, social problem solving, and coping (Table 5).

Table 5

Moderator Analysis

	Baseline CDI scores		CDI scores (High/Low)		Mothers' BDI scores		Fathers' BDI scores		Gender (Male/Female)		HW completion (Yes/No)	
	r	p	χ^2 df=1	p	r	p	r	p	χ^2 df=1	p	χ^2 df=1	p
CDI	0.11	0.28	3.43	0.06	0.17	0.12	-0.05	0.72	0.03	0.86	0.45	0.22
CES-DC	0.04	0.69	1.02	0.31	0.19	0.09	-0.14	0.31	0.02	0.90	1.52	0.18
CATS	0.10	0.30	0.67	0.41	0.15	0.16	-0.10	0.46	0.04	0.84	2.35	0.11
SAAS	0.00	0.99	1.11	0.29	0.17	0.13	-0.91	0.51	0.13	0.72	1.22	0.20
SPSI	**-0.29****	0.003	**8.12****	0.004	0.02	0.83	0.18	0.19	0.25	0.62	**19.39*****	0.001
ACOPE	0.113	0.26	**10.71*****	0.001	0.02	0.83	**-.03***	0.03	0.14	0.71	**4.14***	0.04

*p<0.05, ** p<0.01, ***p<0.001

4. Discussion

This study conducted across English-medium schools of urban Bangalore shows that an indicated program designed to arrest the vulnerability of adolescents dealing with subthreshold depressive symptoms does work. The program evidenced a significant decrease in depressive symptom severity and frequency, negative thinking, and academic stress, and an increase in social problem solving and coping skills.

The decrease in depressive symptoms was significant at both time points for the intervention group, whereas for the control group, there was a significant increase in the depressive scores from post-treatment to follow-up, after an initial decrease from pre- to post-treatment. This initial slight decrease for the control group could be attributed to psycho-education, given the preliminary evidence that brief psycho-educatory interventions for depression can reduce depressive symptoms (Donker et al., 2009). Thus, students may have benefitted from the psycho-educatory session but the benefit was not robust enough to sustain through the no-contact follow-up period. By follow-up depressive scores in the control group were no different from their pre-intervention scores. Alternatively, perhaps the Coping Skills program provided the intervention group with a buffer against increasing levels of depressive symptoms. The results fall in line with previous studies utilising the Adolescent Coping with Stress Course (CWS-A; Clarke et al., 1995, 2001) which forms the core of our intervention program. The results are also consistent with previous studies that have utilised high-risk samples and demonstrated that adolescents with the greatest need on the basis of their initial level of depressive symptoms show the greatest improvement (Horowitz et al., 2007).

With regard to clinically meaningful change, a majority of adolescents in the intervention group (75-80%) achieved recovery on all measures. This promising finding indicates that a large percentage returned to within non-risk levels at the end

of treatment. The intervention group fared significantly better in comparison with the control group on indices of recovery, improvement, and functionality. Although there have been debates about the operationalisation of clinically significant change (e.g., Follette and Callaghan, 1996), the practical utility of this concept is largely uncontested. The present study is one of the few in adolescent depression prevention and treatment literature to incorporate this stringent criterion.

Moderator analyses revealed the following: first, higher baseline depressive symptoms showed reduction with improvements after intervention in only social problem solving and coping. One implication of these findings is that perhaps subclinical depression results in deficits on social problem solving and coping, and thus these were most amenable to intervention effects. Another possibility is that the range of scores on CDI (14-24) which represented 'subclinical depression' in the present study, perhaps do not display large variability in clinical terms, that is, within this range a differentiation of 'low' and 'high' is perhaps clinically meaningless. That is possibly why the intervention was equally beneficial for adolescents with these low and high depressive symptoms. Indeed, all the previous studies that have examined this association have compared universal and indicated samples (e.g., Sheffield et al., 2006), instead of comparing sub-groups within indicated samples.

Second, parental depression did not seem to moderate the effect of the intervention, that is, adolescents with parents reporting higher depressive symptoms did not show a poorer response with intervention. An implication for these findings could be that perhaps only a clinical diagnosis of depression in parents is significant enough to moderate intervention effect. Or it could be that adolescents perceive themselves as more separate from their parents as compared to children. One reason for the non-significant findings could be that in the current sample of parents, the overall BDI scores were in the mild range.

Third, gender did not moderate intervention effects, i.e., both girls and boys equally displayed improvements after intervention. One possibility is that since the Coping Skills program was devised to be gender-sensitive, with separate vignettes and examples for girls and boys, it did not have a differential impact on the two groups. Another possibility is that since the Coping Skills program had an equal emphasis on a logical and systematic approach to dealing with negative emotions (which may appeal more to boys) as much as a social approach in which participants were encouraged to share feelings and experiences (which may better suit girls), it was found to be equally effective for both the genders. This resonates with the research evidence that boys and girls respond differently to different types of interventions (Reivich, 1996). Alternatively, in the sample of adolescents recruited for the intervention study, since the mean CDI scores reported by girls did not differ significantly from those reported by boys, girls did not demonstrate a greater intervention effect. Indeed, it has been speculated that higher levels of depressive symptoms experienced by females relative to males renders the former more motivated to engage in the intervention, whereas the lower levels of depression for males creates a floor effect (Stice et al., 2009).

Fourth, adolescents who completed HW showed improvements on negative cognitions, social problem solving, and coping. One reason for this finding may be that the increased opportunity to acquire intervention skills and apply them in the real world benefitted adolescents, especially on the above mentioned skills. An implication of this is that HW completion is required for there to occur an improvement on negative cognitions, social problem solving, and coping.

5. Limitations

The study had the following limitations: all measures employed were self-report, a longer follow-up was not included, attentional and non-specific factors across the two groups were not equal, and self-selection bias may have been present as only those schools gave permission to carry out the study that did not already have a counsellor.

6. Conclusion

It can be said that the program produced clinically meaningful intervention effects. Also, the fact that results were positive at follow-up and not just at post-intervention suggests that findings were more robust and more strongly indicative of a treatment effect, rather than some transient or time-specific effect. No corresponding changes were found in the control group. Clearly, the depressive symptoms of the adolescents were not transient or likely to remit spontaneously within three months.

Overall, the results are encouraging in terms of demonstrating the value of running an indicated school-based program for early intervention in depression in high-risk adolescents. The present study findings call for future development and implementation of indicated intervention programs to address subclinical psychopathology among adolescents in Indian schools.

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Conflict of Interest

All the authors declare no actual or potential conflict of interests.

Contributors

The first author was involved in planning the study, getting the ethical approval, data collection, analysis of results, and manuscript preparation. The second author was involved in planning the study, getting the ethical approval, data analysis and interpretation, and reviewing the paper. The third author was involved in getting the ethical approval, interpretation of data, and reviewing the paper. The fourth author was involved in analysis of results.

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We give the rights to the corresponding author to make necessary changes as per the request of the journal, do the rest of the correspondence on our behalf and she will act as the guarantor for the manuscript on our behalf.

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