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Research Paper

A correlational study of cognitive flexibility and response styles in depression

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ABSTRACT

Background: Depression is the leading cause of disability worldwide and a concern for global burden of diseases. Despite such prevalence rate and debilitating nature of depressive illness, factors contributing to the severity of depression require much attention. Given the scope of research, the present study aimed to assess the relationship between cognitive and behavioral factors with depression. ***Material and Methods:*** For this purpose, 101 participants within the age range of 20-55 years diagnosed with depression were assessed for cognitive flexibility, response styles (rumination, distraction, problem solving) and severity of depression using Cognitive Flexibility Inventory, Response Styles Questionnaire and Beck Depression Inventory-II respectively. ***Results:*** The data was normally distributed and the frequencies of the sociodemographic variables were assessed. The correlation was studied using Pearson's r. The results revealed that participants were cognitively flexible but this cognitive flexibility had no significant relationship with severity of depression. Further, it was found that distraction and problem solving had a significant negative relationship and rumination has a significant positive relationship with the severity of depression. ***Conclusion:*** The severity of depression is related to the response styles but not with cognitive flexibility.

Keywords: *Cognitive Flexibility, Rumination, Distraction, Problem Solving, Depression, Correlation*

Depressive disorders are one of the top three leading causes of years lived with disability (YLDs) across all age groups from 2007 to 2017.[1] In fact, it has persistently been in that position for the 28-year period of the Global Burden of

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Diseases (GBD) study.[1] The recurring nature of depressive episodes, amounting to 75% of persons with depression having multiple episodes, relapsing within two years of remission suggests that there are factors responsible for recurrence.[2]

For depression, cognitive rigidity has been associated with maintenance of beliefs and interpretations,[3] presence of cognitive deficits,[4] specific difficulty in emotional control tasks,[5] primary target and outcome measure of therapy for depression,[6][7][8] attention and non-planning impulsivity,[9] poor sleep pattern,[10] predictor of depression [11] and symptom exacerbation.[12][13] If one has the ability to switch between thoughts according to the surroundings, he is more likely to deal with depression.[2] Recent researches on cognitive flexibility or rigidity have shown that rigidity has a direct relationship with depressive symptoms. [14][15][16][17][18][19]

One's response to stressful situations, if based on cognitive rigidity, is rumination. This also serves as a vulnerability factor for depression.[20] The response style theory proposed by Susan Nolen-Hoeksema states that there are three major responses to depression, namely rumination, distraction and problem solving. The research on these response styles and depression have shown that ruminations increase depression severity; problem solving and distraction decrease depressive symptoms.[21][22][23]

Previous literature has focused on severity of depression and cognitive and behavioral aspects. In fact, cognition and emotional and behavioral components have been important themes to be studied in depression. Unfortunately, the relationship between cognitive flexibility and response styles with the severity of depression have not received much attention collaboratively and the present study aimed to understand their relationship in an Indian set up.

MATERIAL AND METHODS

Study Design and Participants

We did a single group, cross-sectional study on persons diagnosed as having depression by mental health professionals at the outpatient departments of Psychiatry and Neurology as well as Emergency services at a state government hospital in Delhi through regular intimations. The prospective participants were explained about the study and referred to the Clinical Psychology department at the hospital. Sometimes, the mental health professional would contact the researchers on the patient's behalf. Once the prospective participant reached the department, a member of the study team would then assess for the eligibility of the patient to be a study participant based on the inclusion and exclusion criteria. They were included if they met the full diagnostic criteria of a depression episode at that time according to the ICD-10 diagnostic classification within the age range of 20-55 years and could speak in Hindi or English or both. They were excluded if they could not speak in any of the two languages or/and had a significant psychiatric or physical illness hindering the assessment process. Recruitment began in February 2018 and ended in June 2018. Following an initial screening through face-to-face interaction with 256 persons, 142 individuals fulfilled the criteria. For those fulfilling the criteria, the details of the study were discussed and a written informed consent was presented to them; this was followed by an appointment for a separate assessment session for some individuals due to prior commitments or conveyance schedules. Some of them refused to sign the consent form and some did not turn up for the assessment session scheduled at a later date. Eventually, 101 participants (35 males, 66 females) were included in the study (Figure 1). All the participants provided written consent forms and received contact information of the study team in case they wanted to withdraw their participation at a later date. The study was approved by the Research Ethics Committee

comprising of Clinical Psychologists, a biostatistician and a neurologist of the state government hospital in which it was conducted.

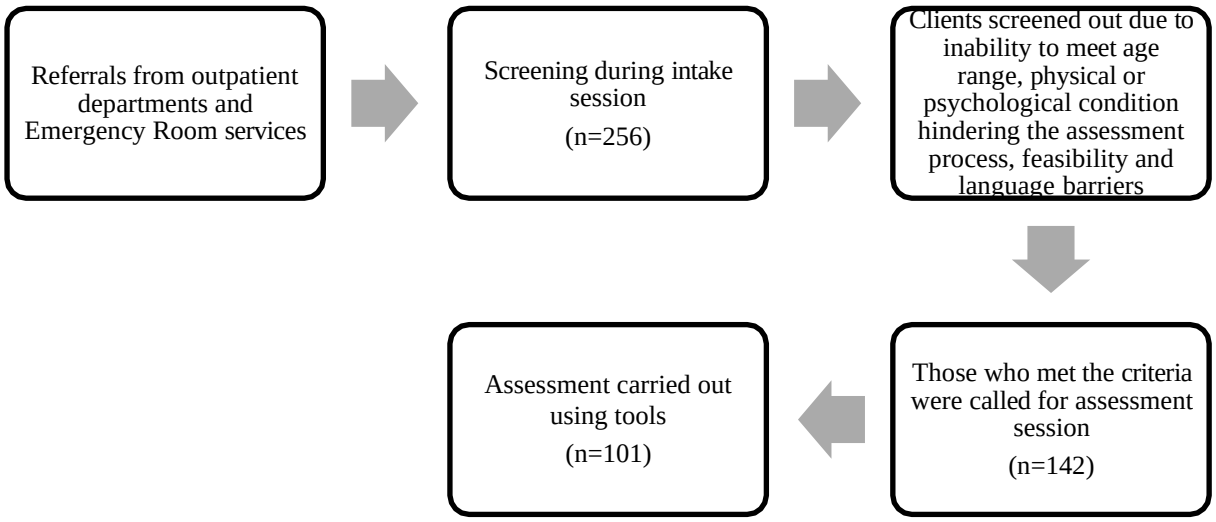

Figure 1. Study flow and participation

Procedure

Once the written informed consent was received, the participant's demographic details were taken and the verbal instructions followed by item-wise presentation of each tool was carried out by the researcher. A pilot study was carried out. The presentation of tools was reviewed and the items were divided into small tables with five items in each table for the convenience of verbally presenting the items and to avoid any error in marking the responses. Post revision, the data collection was completed and the participants' results of their assessment were shared with them. Once the data for all the participants were collected, a handwritten master sheet was prepared with columns for demographic details as well as tool items and rows for responses of each participant, item-wise. Each participant's entry took 5-6 minutes. Then, the data was entered into IBM Statistical Package for the Social Sciences 22.0 (SPSS 22.0) from the master sheet to avoid any data entry error. The time taken to enter each participant's responses into the data sheet on SPSS 22.0 took the same amount of time while nullifying the chances of data entry errors. The variable view consisted of all the details related to the tools as well as coding of entries. The categories of demographic details were created on the basis of literature available and later on, reviewed according to the data collected to facilitate the analysis.

Tools

Apart from the demographic details of the participants (name, age, gender, education, occupation and family background), this study had three tools.

1. **Cognitive Flexibility Inventory (CFI):** Developed by Dennis and Wal, three aspects of cognitive flexibility were hypothesized to be necessary for this: (a) the tendency to perceive difficult situations as controllable; (b) the ability to perceive multiple alternative explanations for life occurrences and human behavior; and (c) the ability to generate multiple alternative solutions to difficult situations.[24] It consists of 20 items measured on a 7-point scale.
2. **Response Styles Questionnaire (RSQ):** It was developed by Nolen Hoeksema [25] to assess the extent to which one engages in ruminating, problem solving or distracting

behavior when feeling sad or depressed.[26] The RSQ has been shown to have good internal consistency, with alphas greater than 0.80.[26] The RSQ consists of 71 items measured on a 4-point scale.

3. **Beck Depression Inventory-II:** Developed by Beck et al., [27] it is a 21-item self-administered scale on depressive symptoms. It categorizes the severity of depression into four ranges: minimal (0-13), mild (14-19), moderate (20-28), severe (29-63).

Statistical Analysis

With the help of IBM SPSS Statistics 22.0, the analyses of the data were conducted. It was seen that the data was normally distributed, standard deviation being less than one-third of the mean. The mean and standard deviation of all the outcome measures and the demographic details (age and duration of illness) was derived. The frequencies of responses to gender, occupation, marital status, number of children, monthly family income and educational qualification were derived and the categories were formulated or reformulated. The mean cognitive flexibility, response styles and severity of depression of males and females was calculated. Pearson's correlation coefficients to determine the relationship between the primary outcome measures was analysed.

RESULTS

Demographic Data

Table 1 demonstrates the sociodemographic details of the participants. The number of participants screened and giving consent as well as appearing for the assessment session were 101 (35 males, 66 females). The mean age of the participants was 33.96 years with standard deviation of 8.73 with mean duration of illness as 18.67 months or 1 ½ years and standard deviation of 29.59.

Table 1. Demographic details of the Sample.

		Participants (n=101)
Age (mean age in years)	*33.96*	
Gender	Male	35
	Female	66
Marital Status	Married	76
	Unmarried	22
	Divorced	3
Income (family monthly income in rupees)	*Unstated*	12
	Less than Rs.10,000	14
	Rs.10000-25000	45
	Rs.25001-50000	27
	Rs.50001-75000	1
	More than Rs.75000	2
Education	Illiterate	8
	Till 12th standard	61
	Above 12th standard	32
Occupation	Self employed	9
	Service	24
	Student	8
	Homemaker	50
	Unemployed	10
Total duration of illness (mean duration in months)	18.67	

There was a greater preponderance of females (65.34%) over males (34.65%). Most participants were working in some capacity.

In terms of marital status, 75.24% of them were married. Majority of the participants had a monthly family income lying between Rs.10,000-Rs.25,000. In educational terms, 60.4% of the participants had studied at most till 12th standard.

On an average, the severity of depression is more for females (33.95) as compared to males (30.20). However, the difference between the two means is insignificant ($t=2.02$, $p<0.01$).

Females (100.01) had higher cognitive flexibility as compared to males (98.65). In terms of response styles, males used distraction (42) and problem solving (18.34) more frequently as compared to females. Further, females used rumination (106.68) more frequently as compared to males (102.31).

Cognitive Flexibility, Response Styles and Severity of Depression in Our Sample

The mean cognitive flexibility was 99.56 units (SD 17.72), mean problem solving was 18.23 units (SD 4.12), mean rumination was 105.17 units (SD 21.83) and mean distraction was 41.12 units (SD 9.54). The mean severity of depression was 32.65 units (SD 12.68).

Relationship of Depression Severity with Cognitive Flexibility and Response Styles

Table 2 represents that cognitive flexibility had an insignificant relationship with severity of depression ($r=0.026$, $p<0.01$), distraction ($r=-0.219$, $p<0.05$) and problem solving ($r=-0.021$, $p<0.01$) had a significant negative correlation with severity of depression and rumination had a significant positive correlation with depression severity ($r=0.521$, $p<0.01$). The secondary outcomes were that the three response styles, namely rumination, distraction and problem solving have a significant positive correlation ($p<0.01$) with each other. Also, cognitive flexibility has a significant positive correlation with the three response styles ($p<0.01$).

Table 2. Correlation among cognitive flexibility, response styles and depression severity.

	Cognitive Flexibility	Depression Severity	Problem Solving	Distraction	Rumination
Cognitive Flexibility	-				
Depression Severity	.026	-			
Problem Solving	.399**	-.021	-		
Distraction	.373**	-.219*	.676**	-	
Rumination	.303**	.521**	.646**	.448**	-

***. Correlation is significant at the 0.01 level (1-tailed).*
**. Correlation is significant at the 0.05 level (1-tailed).*

DISCUSSION

Our present study recruited this high-risk group of persons with depression contributing to years lived with disability. We found that our sample of participants with depressive illness were cognitively flexible. This could be explained by the less severe mean severity of depression of our sample. Persons with low cognitive flexibility report more depressive symptoms [16] highlighting that the participants who were able to complete the assessment process were mostly not severely depressed that is, their functioning was not highly impaired. Further, it may be suggested that their cognitive measures were not much impaired.[28] In addition, the participants were managing on an outpatient basis and did not require admission, further supplementing to the less impaired overall functioning.

We also found that participants with depression applied rumination more than distraction and problem solving. These results suggest that our sample involved in repetitive thoughts about one's illness and utilized distraction and problem solving minimally. This might be because of the nature of depressive illness in which negative cognitions play a significant role in maintaining the episode. Ruminations serve as a vulnerability factor for depression.[20]

When the relationships were analysed, we found that cognitive flexibility did not have a significant relationship with severity of depression. It suggests that as their depression severity varied, their cognitive flexibility did not vary significantly and vice versa.

Furthermore, as distraction and problem solving independently varied, the depression severity also significantly varied inversely and vice versa. When the person is engaging in another activity, it will enhance one's functioning and the depressive symptoms will deteriorate. Further, when the person focusing on the problem deals with it as an external factor and moves through it in a stepwise manner, he/she will be able to overcome the problem or find alternative ways of viewing the problem. Items such as, "concentrate on your work" and "make a plan to overcome a problem" were responded to for distraction and problem solving.

In terms of ruminations, we saw that there was a direct correlation with the depression severity and as one increased or decreased, the other also increased or decreased. Items such as "think about how alone you feel", "think about your feelings of fatigue or achiness" were responded to approvingly. This might be due to the ruminative nature of negative cognitions as a part of this illness. Rumination intensifies depression. [25][29][30][31][32][33]

Further, it was found that when cognitive flexibility increases (or decreases), rumination, distraction and problem solving also increase (or decrease) and vice versa. In our sample, it was seen that the participants were highly cognitively flexible enabling them to think of alternatives during problem solving or other tasks during distraction. Ruminative thinking can be brooding type or reflective type;[25] repetitively thinking about the problem could also provide reflections and hence, enable the person to think more flexibly.
Additionally, the strongest relationship was seen between problem solving and distraction. This could be because distraction moves a person away from the affect associated with the problem, hence lowering depressed mood. When the person feels better, he/she is able to focus on the problem, without one's mood affecting the problem-solving process. Distraction leads to improvement in mood, increasing problem solving. [21][30][34]

The sample consisted of mostly female homemakers, suggesting expected adequate functioning despite depressive symptoms to meet the Indian household needs and this could explain our results.

The key strengths of our present study are the intensive selection process and focus on a small group of participants with a detailed interview. The limitations of our study are the limited sample size and no comparison or control group. Future studies may involve case-control studies with a larger sample size. There is also a need to assess these variables using performance tasks to corroborate the findings of the tools used in our study.

CONCLUSION

Our study indicated that persons with depression could be cognitively flexible, functioning on a daily basis. They applied rumination more frequently as compared to problem solving and distraction. Further, rumination had a direct relationship with severity of depression and distraction and problem solving had an inverse relationship with severity of depression.

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Conflict of Interest

The author declared no conflict of interest.

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