

The Mediating Role of Cognitive Flexibility in the Buffering Effect of Resilience against the Symptoms of Depression in Caregivers of Children with Intellectual Disability

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ABSTRACT

Background: The prevalence of intellectual disability (ID) in India is significantly higher compared to the average global prevalence. Parents and family members are generally the primary caregivers for children with ID. Studies have found that caregivers experience significant burden and are vulnerable to psychiatric morbidity, including symptoms of anxiety and depression. It becomes important to understand if psychological factors viz., cognitive flexibility and resilience can buffer the negative impact of caregiving in this population and foster positive mental health. **Method:** The objective of this study was to explore the relationship among cognitive flexibility, resilience, caregiver burden and symptoms of depression and anxiety in parents of children with ID. It was conducted using a cross-sectional single-group research design. Data from 49 such caregivers, recruited through purposive sampling method, was collected using standardized self-report questionnaires. **Results:** Descriptive and inferential analyses of the data was done using SPSS version 28 with the significance level considered at 0.05. Cognitive flexibility, resilience, caregiver burden, and symptoms depression and anxiety, were significantly correlated among each other in parents of children with intellectual disability. Outcomes on these primary variables did not differ significantly by sex or family type. However, socioeconomic status was found to be positively correlated with cognitive flexibility, with higher household income being associated with greater flexibility. Furthermore, the child's IQ was found to be negatively correlated with symptoms of depression, with milder deficits being related to less severe symptoms. Notably, the protective effect of resilience on symptoms of depression is partially mediated by cognitive flexibility. **Conclusions:** Thus, cognitive flexibility and resilience emerge as protective factors against the negative outcomes of caregiver burden and symptoms of depression and anxiety in parents of children with ID. Cognitive flexibility is a significant partial mediating factor in the effect of resilience on symptoms of depression (but not anxiety), shedding light on potential targets for interventions to support this vulnerable population engaged in long-term caregiving.

Keywords: *Cognitive Flexibility, Resilience, Caregiver Burden, Person with Intellectual Disability, Caregivers*

INTRODUCTION

The prevalence of Intellectual disability (ID) in India is significantly higher compared to the average global prevalence. ID impacts an exceptional number of caregivers and families, making it a public health issue of significance (Bunga et al. 2020; Girimaji, 2011). It is well-established that caregivers in this role experience significant burden, and they are also vulnerable to psychiatric morbidity, including symptoms of anxiety and depression. Exploring predictors of positive mental health, such as cognitive flexibility and resilience, can help identify the factors that attenuate the negative impact of caregiving in this population.

Caregivers of Children with Intellectual Disability

Around 31 million people in India are estimated to have intellectual disability (Singh, 2014) and over 35% among this population are children, i.e., under the age of 18 years (Singh, 2014). Parents and family members tend to undertake the caregiving activities for children with ID (Girimaji, 2011; Karabekiroğlu, 2018). Caregivers

tend to deal with immense hardship, evidenced in the domains of physical, economical, emotional, and personal burdens, as they tend to the child with ID throughout their life (Bhatia et al., 2015; Singh et al, 2020). Furthermore, this population is also at-risk of developing psychiatric disorders. For example, Bhatia and colleagues (2015) found in their study that 16% of parents looking after their children with ID were suffering from severe-to-extremely severe depressive symptoms, 23% with mild-to-moderate depressive symptoms, 19% with severe-to-extremely severe anxiety symptoms, and 19% with mild-to-moderate anxiety symptoms. Addressing caregiver burnout and psychiatric symptoms among this community is undoubtedly an important need.

Mental Health Outcomes among Caregivers

The mental health impact, including psychological distress, of caregiving has been extensively studied in past research. Caregivers tend to experience a deterioration in psychological health, and may be

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susceptible to feeling depressed, angry, worried, guilty and anxious (Liu et al., 2020). Higher rates of anxiety and depression in caregivers as compared to the general population, has emerged as a robust finding across a variety of populations (Bhatia et al., 2015; Liu et al., 2020; Song et al., 2011). Thus, symptoms of anxiety and depression can be considered an important outcome measure among this population.

It is of note that positive outcomes of caregiving for children with ID remains an understudied area. Nonetheless, Bunga and colleagues (2020), revealed that parents reported a positive impact of their role as caregivers to their children with intellectual disability; specifically, developing more patience, tolerance, empathy, sensitivity, and better enduring relationships. Studying resilience in this population can pave the way to move away from an illness model and towards a holistic health perspective.

Looking at caregivers tending to cancer patients, low cognitive flexibility predicts higher rates of depression and anxiety (Karabekiroglu et al., 2018). Cognitive flexibility is the capacity to adapt cognitive processing strategies in the face of novel, unexpected conditions in the environment. It consists of the following three components – an awareness of other alternatives and options in a situation, the willingness to be flexible and to adapt to a situation, and the belief that one has this capacity to be flexible (Martin & Rubin, 1995).

Resilience can be understood as successful adaptation in response to encountering adverse circumstances. In essence, it refers to recovery or return to previous functioning subsequent to encountering stressful conditions. Psychological factors that underlie resilience responses are an important area of study in clinical psychology. Cognitive flexibility is one such factor examined in past research. The aim of this study was to explore the impact of cognitive flexibility on the relationship between resilience and symptoms of depression and anxiety.

METHODS

Research Design

This study employed a cross-sectional, single-group research design. Sample size estimation was carried out using a-priori sample size estimation method, with an anticipated effect size of 0.3, desired statistical power level of 0.8, and a probability level of error at 0.05; the minimum required sample was revealed to be 35. Purposive sampling was used to select participants. Data was eventually collected from 49 parents of children with intellectual disability, to rely on a more conservative approach in data analysis. The inclusion and exclusion criteria are in the following table: -

Inclusion Criteria	Exclusion Criteria
Parents aged between 24 years and 45 years	Participants with chronic physical or severe mental illness
They should be living with their child with intellectual disability currently and at least for the past 6 months	Parents of a child with IQ more than 70 (based on latest valid assessment)
Their child with intellectual disability should be of the age 6-17 years	Parents of a child with comorbid psychological conditions such as autism spectrum disorder or attention deficit hyperactivity disorder
The child with intellectual disability should have been previously assessed by a registered clinical psychologist based on ICD-10 criteria for mental retardation	

Instruments/Tools/Measure

Informed Consent Form. This consisted of information about the study, including the researcher's aim, procedures involved and an assurance of the participant's confidentiality and free will throughout the research process.

Personal Information Sheet. This was a proforma to guide collection of demographic information from the participants.

Cognitive Flexibility Index (CFI) (Dennis & Vander Wal, 2010). The CFI was constructed to assess cognitive flexibility, and contains items designed to measure adaptive functioning and coping in response to difficult life experiences, as well as rigidity in thinking styles. It is a 20-item self-report scale that measures aspects of cognitive flexibility a 7-point Likert scale (that ranges from '*strongly disagree*' to '*strongly agree*'). A two-factor structure emerges among the items, namely, the *Alternatives* and *Control* Subscales. However, the subscale scores were not used in this study, with a reliance on the total score as reflective of the participant's cognitive flexibility. The CFI has been found to have high internal consistency (Cronbach's $\alpha = 0.84-0.91$), good convergent construct validity, and high test-retest reliability ($r=.81$).

Brief Resilience Scale (BRS) (Smith et al., 2008). This is a 6-item self-report scale that uses a 5point Likert scale ranging from '*strongly disagree*' to '*strongly agree*', to measure resilience. The possible score on the BRS ranges from 1 (low resilience) to 5 (high resilience). The BRS has been reported to have good internal consistency reliability (Cronbach's $\alpha = 0.80-0.91$), as well as satisfactory convergent,

discriminant and concurrent validity, estimated using other established measures of resilience and personal characteristics (Kyriazos et al., 2018)

Depression Anxiety Stress Scale – 21 items (DASS-21) (Antony et al., 1998). This is a 21-item self-report scale derived from the original Depression Anxiety Stress Scale (DASS) which consisted of 42 items. This particular tool has 7 items for each domain, designed to assess depression, anxiety and stress in adults. It consists of response options ranging from 0 'Did not apply to me at all', to 3 'Applied to me very much or most of the time'. The scale has been found to have good internal consistency across several studies (Cronbach's $\alpha = 0.74$ – 0.93) (Ahmed et al., 2022). Satisfactory concurrent and convergent validity have also been established (Antony et al., 1998).

Procedure

A sample of parents of 49 children with intellectual disability were selected for the study. Children referred for the associated certification were screened for potential eligibility. Informed consent was obtained from the parents who met the study's inclusion criteria. Demographic details were filled in using an Information Profile Sheet. The next phase comprised of data collection from the parents of the children with intellectual disability participating in the study, by administration of the psychological measures (to assess cognitive flexibility, resilience, and symptoms of depression and anxiety).

Data was entered and coded in a Microsoft Excel spreadsheet and analysed using Statistical Package for Social Sciences (SPSS) version 28 (IBM, 2021). Descriptive analyses of the data was done by using mean, standard deviation, frequency and proportion. The Jarque-Bera statistic was applied, suggesting the assumption of normally distributed data across all key variables. Thus, parametric statistics were used. Inferential analyses of the data was done by using Pearson correlation method and mediational analysis based on multiple linear regression. The significance level was considered at 0.05.

RESULTS

A total 49 participants met the inclusion criteria and were included for the study. The sociodemographic profile of the participants was analysed using descriptive statistics for the domains of age, sex, highest educational qualification, employment status, socioeconomic status, marital status, family type, number of children, and with regards to the child, the child's IQ, severity of ID, age and sex. The results of the same are presented in Table 1.

Table 1: Sociodemographic profile of the participants (N=49)

	N	Percent (%)	Mean	SD
Age (in years)	49		36.92	6.06
Sex Male	16	32.7		
Female	33	67.3		
Highest Educational Qualification				
Below 10 th standard	21	42.9		
Up to 10 th standard	20	40.8		
Up to 12 th standard	3	6.1		
Up to Graduation or higher	5	10.2		
Employment Status Homemaker	25	51.0		
Self-employed	3	6.1		
Private Job	20	40.8		
Government Job	0	0		
Unemployed	1	2.0		
Other	0	0		
Socioeconomic Status				
Lower	31	63.3		
Lower Middle	17	34.7		
Upper Middle	1	2		
Upper	0	0		
Marital Status Unmarried	0	0		
Married	49	100		
Divorced	0	0		
Separated	0	0		
Family Type Nuclear	33	67.3		
Joint	16	32.7		
Extended	0	0		
Number of Children			2.59	1.02
Child's Age (in years)			11.12	3.516
Child's Sex				
Male	29	59.2		
Female	20	40.8		

The average age of the participants was found to be approximately 36.92 (SD = \pm 6.06; range = 18-45). A majority of the sample was female, specifically, 67.3% (N = 33), while 32.7% (n = 16) was male. Most of the people interviewed had attained an educational qualification below the 12th standard, with 42.9% (N = 21) having studied less than 10th standard, and 40.8% (N = 20) having achieved the 10th standard qualification. Of the remaining sample, 6.1% (N = 3) attained education up till 12th standard and 10.2% (N = 5) had studied up till graduation or higher. Furthermore, more than half the sample, i.e., 51% (N = 25) identified as home-makers, 40.8% (N = 20) held a private job, 6.1% (N = 3) were self-employed, and 2% (N = 1) were unemployed. Looking more closely at socioeconomic status, the analysis revealed that majority of the people in this study, 63.3% (N = 31) belonged to the lower socioeconomic status, indicating a household income of less than 1 lakh per annum. 34.7% (N = 17) of the sample belonged to the lower middle socioeconomic status with a household income of 1 to 2.5 lakh per annum, and 2% (N = 1) belonged to the upper middle socioeconomic status, as indicated by a household income of 2.5 and 5 lakh per annum. The entire sample (100%, N = 49) consisted of

parents who were married. With regards to family type, most of the participants, i.e., 67.3% (N = 33) lived in nuclear families, while 32.7% (N = 16) lived in a joint family setup.

The sociodemographic profile of the participants also included factors related to their children. On an average, this sample had 2.59 (SD = ± 1.02) children in total. The mean age of the children was 11.12 years (SD = ± 3.516). Furthermore, 59.2% (N = 29) of the children were male, and 40.8% (N = 20) were female. Furthermore, the profile of the children’s severity of intellectual disability was also recorded, the results of which are presented in Table 2.

Table 2: Mean and Standard Deviation of the Child’s IQ and Severity of Intellectual Disability (N=49)

	N	Percent (%)	Mean	SD
Child’s IQ			44.90	16.82
Severity of Child’s Intellectual Disability				
Mild	23	46.9		
Moderate	10	20.4		
Severe	10	20.4		
Profound	6	12.2		

The mean IQ of the child with ID was found to be 44.90 (SD = ± 16.82). Among this sample, 46.9% (N = 23) of children fell into the category of mild ID, 20.4% (N = 10) fell in into the categories of moderate and severe ID each, and 12.2% (N = 6) fell into the category of profound ID.

Cognitive flexibility and resilience were found to be significantly correlated with each other, sharing a positive association with a large effect size ($r = .749^{**}$, $p < .01$) (Table 3). Cognitive flexibility was significantly correlated with symptoms of depression ($r = .672^{**}$, $p < .01$) and anxiety ($r = .618^{**}$, $p < .01$) (Table 3). This was characterized by a negative relationship and large effect size. In addition, resilience was also found to have a negative correlation with symptoms of depression ($r = .704^{**}$, $p < .01$) as well as anxiety ($r = .707^{**}$, $p < .01$) (Table 3). The effect size was large in both cases.

Table 3: Correlation Coefficient Among Cognitive Flexibility, Resilience, and Symptoms of Depression and Anxiety

Construct	Cognitive Flexibility	Resilience	Symptoms of Depression	Symptoms of Anxiety
Cognitive Flexibility	-			
Resilience	.749**	-		
Symptoms of Depression	-.672**	-.704**	-	
Symptoms of Anxiety	-.618**	-.707**	.767**	-

Cognitive flexibility was examined as a mediational factor in the relationship between resilience and symptoms of depression and anxiety, analysed using PROCESS Macro version 4.1 with SPSS version 28.0 (Hayes, 2022; IBM, 2021). Specifically, the mediational

model was significant for symptoms of depression as an outcome measure, but not for symptoms of anxiety.

It was inferred from Table 4.1 that the regression of the direct effect of resilience on cognitive flexibility, i.e., Path A of the mediational analysis, was significant, $B = -1.863$, $SE = .241$, 95% CI (1.3788, 2.3467), $p < .01$. On fitting a series of multiple linear regression models as a part of the mediation analysis, the direct effect of cognitive flexibility, while controlling for the effect of resilience on symptoms of depression, i.e., Path B of the mediation analysis, was found to be significant, $B = -.267$, $SE = .122$, 95% CI [-.5120, -.218], $p < .01$. At the same time, the direct effect of resilience while controlling for cognitive flexibility, i.e., Path C’ of the mediation analysis, was found to be significant, $B = -.923$, $SE = .303$, 95% CI (-1.5330, -.3136), $p < .01$. These findings of the multiple linear regression analysis have been summarized in Table 4.1 below.

Table 4.1: Mediation Analysis of Resilience as independent variable, Cognitive Flexibility as mediator variable

Predictor	B	SE	R ²	F	95% CI
	Outcome Variable				
Resilience	Cognitive Flexibility	-1.863**	.241	.561	59.960 (1.3788, 2.3467)
	(Path A)				
Cognitive Flexibility	Symptoms of Depression	-.267*	.122	.544	27.425 (-.5120, -.0218)
	(Path B)				
Resilience	Symptoms of Depression	-.923**	.303		(-1.5330, -.3136)
	(Path C')				

Outcome Variable: Symptoms of Depression

Note. B: Unstandardized Beta Coefficient; SE: Standard Error; R²: R squared; F: F Ratio; CI: Confidence

** $p < 0.01$, * $p < 0.05$

Thus, as highlighted in Table 4.1 and Table 4.2, and graphically in Figure 1, cognitive flexibility was found to be a significant partial mediator of the impact of resilience on symptoms of depression ($R^2 = .544$, $p < .01$) (Table 4.1).

Further to the multiple linear regression models, the total effect, i.e., the sum of the direct and the indirect effects of resilience was significant at 0.01 level, $B = -1.421$, $SE = .209$, 95% CI (-1.8404, -1.0005). The indirect effect of resilience, mediated by cognitive flexibility on symptoms of depression, i.e., Path C of the mediation analysis, was tested using a percentile bootstrap estimation approach with 5000 samples (Shrout & Bolger, 2002), implemented with the PROCESS Macro version 4.1 (Hayes, 2022). The results indicated that the indirect coefficient was significant, with $B = -.497$, $SE = .208$, 95% CI (-.9190, -.1212), as shown in Table 4.2 below.

Table 4.2: Mediation Analysis showing the Total and Indirect Effects of Resilience on Symptoms of Depression as Mediated by Cognitive Flexibility

Predictor			B	SE	95% CI
	Total Effect of	Resilience Indirect Effect of			
			-1.421**	.209	(-1.8404, -1.0005)
			-.497*	.208	(-.9190, -.1212)

Resilience (Path C)

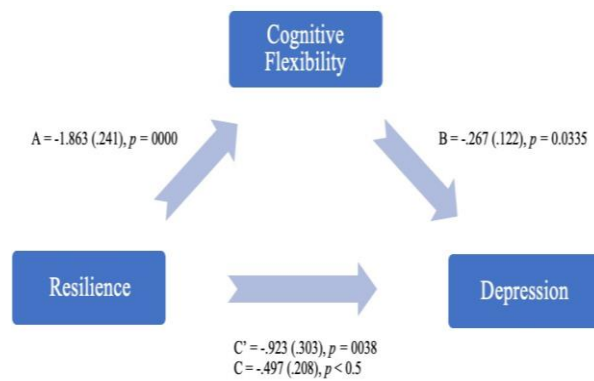
Outcome Variable: Symptoms of Depression

Note. B: Unstandardized Beta Coefficient; SE: Standard Error; CI: Confidence

**p<0.01, *p<0.05

Therefore, the findings support a partial mediation by cognitive flexibility in the relationship between resilience and symptoms of depression parents of children with intellectual disability. The mediation analysis has also been diagrammatically conceptualized with the paths of mediation and their unstandardized coefficients of regression in Figure 1 below.

Figure 1: Mediation Analysis showing the Effects of Resilience on Symptoms of Depression as Mediated by Cognitive Flexibility



DISCUSSION

Cognitive flexibility is understood as the capacity generate alternatives to respond to situations in the environment. Resilience, in contrast, is simply the capacity to bounce back when faced with adversity. Thus, cognitive flexibility can be conceptualized as a factor enhancing resilient responses. This study, to the best of our knowledge, is the first one to investigate this association among a population engaged in caregiving.

Resilience shared a significant negative correlation of large strength with symptoms of depression, and also with symptoms of anxiety. This is consistent with previous findings that have highlighted the protective role of resilience against both anxiety and depressive psychopathology (Ran et al., 2020; Wu et al., 2020). Resilience, as the capacity to adjust positively to adverse circumstances, naturally buffers against negative outcomes. It was hypothesized that cognitive flexibility would significantly impact the relationship between these variables. A mediational analysis based on multiple

linear regression modeling was carried out separately for anxiety and depression as outcome variables. While cognitive flexibility did not seem to mediate the impact of resilience on symptoms of anxiety, it was a significant factor partially mediating the impact of resilience on symptoms of depression. Thus, the buffering effect of resilience against psychopathology was partially attributable to the mediating role of cognitive flexibility. Cognitive flexibility has emerged as an important factor in mental health research in last couple of decades, and studies in the past have examined its protective role among caregivers for family members with psychosis (Jansen et al., 2017) and end-stage cancer (Karabekiroğlu et al., 2018). Furthermore, this is consistent with the cognitive model of depression (Beck, 1967) that posits an inflexible, negative world view towards self, others and the future, in its conceptualization of depression. Thus, while resilience is protective against depression, this study indicates that its effect is partially driven by the ability to adapt cognitive processing strategies when grappling with novel situations. Findings on the role of cognitive flexibility in the prevention of anxiety are less robust. Cognitive flexibility has been investigated as a mediating factor in the relationship of resilience with psychopathology (Soltani et al., 2013; Arici-Ozcan et al., 2019). It has not, however, been conceptualized as such in the context of caregiving. To the best of our knowledge, this study is the first one to demonstrate the mediating role of cognitive flexibility between resilience and depression among parents providing long-term caregiving to children.

With regards to limitations of the study, the social stigma associated with the condition of intellectual disability was seen to impact the willingness of parents of participate. Reliance on use of self-report measures can be a source of bias, especially among parents providing caregiving, where desirability can potentially impact disclosure. Lack of longitudinal data makes causal inferences less reliable. It is of note that paucity of Indian tools, specifically to measure cognitive flexibility, and resilience can impact reliability of the findings.

CONCLUSIONS

Cognitive flexibility, resilience, and symptoms of anxiety and depression are significantly correlated among each other in parents of children with intellectual disability, with cognitive flexibility and resilience found to buffer against the negative outcomes. Interventions to enhance resilience can help this population cope better with their life circumstances, and protect against caregiver burden and psychopathology, such as symptoms of depression and anxiety. Specifically, strategies to enhance cognitive flexibility can support

resilient outcomes, and can be especially protective against the development of depressive symptoms.

Parents of Children with intellectual disability represent a large and vulnerable population in India, and experience significant burden and high rates of depression and anxiety. While the need for interventions to support their coping is well-established, there is a paucity of literature on factors that support their mental health. Research has also highlighted that many parents caregiving for children with ID have been found to show resilience despite the exposure to challenging circumstances within their parenting role. Identifying factors that promote such resilience becomes valuable to better support such parents exposed to this adversity. This study in particular identifies cognitive flexibility as a target for intervention to enhance resilience and protect against negative mental health outcomes among this group.

Cognitive flexibility emerged as a partial mediator in the role of resilience as a buffer against symptoms of depression, among the participants of this study, i.e., parents caregiving for children with ID. Thus, the findings imply that therapeutic techniques to enhance cognitive flexibility can support the mental health of such parents. Acceptance and commitment therapy (ACT) can be a promising approach in this context, since it particularly strengthens psychological flexibility (Hayes, 2005), which is closely related to cognitive flexibility (Grant & Cassidy, 2022). In addition, ACT has been found to be an effective intervention in the treatment of both depression and anxiety, further highlighting its suitability for this population of parents. Application of this research as discussed has implications for guiding effective interventions with caregivers of children with ID.

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A request from President and EC Members.