

Original Research Article

Cognitive function, emotion regulation and social-support in self-care among individuals with hypertension

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ABSTRACT

Background: Hypertension, a crucial chronic disease risk factor in India, has been highlighted in recent epidemiological studies to be surging in rural and young populations. The incidence of adverse events by cause of hypertension related cardiovascular health illness is on peak. Hypertension is recognized as the most consistent risk factor for cognitive decline, associated with reduced executive functioning, slowed processing speed and deficits in memory. Additionally, the socio emotional factors like emotion regulation and social support play a significant role in symptom exacerbation, poor self-care and treatment outcomes. Improving upon the cognitive and socio emotional domains becomes imperative to ensure better self-management and life outcomes. Aim of the study was to explore the role of cognitive function, emotion regulation and social support in self-care among individuals with hypertension.

Methods: In this cross-sectional study, 31 adults aged 30-60 years diagnosed with hypertension, were approached through purposive sampling. The individuals were assessed using psychological measures: PGI memory scale (PGI-MS), trail making test A and B (TMT), emotion regulation questionnaire (ERQ), Duke-UNC functional social support questionnaire (DUFSS), self-care inventory (SCI).

Results: Participants were adults aged 30-60 years, with a higher proportion of males. Cognitive variables- particularly memory, attention, and executive functioning- were positively associated with self-care - maintenance, monitoring, and management. FSS showed strong positive relationships with cognitive functioning, emotional regulation, and all domains of self-care. In contrast, expressive suppression was negatively related to self-care maintenance.

Conclusions: The study explored the role of cognitive functioning and socio-emotional factors in individuals with hypertension implying whether improving these factors can lead to better self-care and management.

Keywords: Cognitive function, Emotion regulation, Social-support, Self-care, Hypertension

INTRODUCTION

Hypertension affects an estimated 1.28 billion adults worldwide, with two-thirds living in low- and middle-income countries. Despite its prevalence, nearly 46% of those with hypertension are unaware of the condition, and only 42% receive proper diagnosis and treatment. Hypertension is recognized as one of the leading causes of premature death globally. Hypertension, or, high blood

pressure, occurs when blood exerts excessive pressure on the artery walls for a prolonged time. Often referred to as the "silent killer," hypertension typically has no noticeable symptoms, meaning you might not be aware of the damage it's doing to your body.¹

Hypertension not only impacts physical health but also significantly affects psychological well-being. Hypertension can lead to stress, anxiety, and feelings of sadness. People with high blood pressure often worry

about their health and fear complications like heart disease.² A study found that many hypertensive patients experience anxiety, stress, or depression.³ Long-term hypertension can reduce the quality of life and cause emotional distress.⁴ To optimize hypertension management, improve overall well-being, and prevent complications, comprehensive care for individuals with hypertension should go beyond medication and regular check-ups to include self-care practices. While medical treatment, including medication and lifestyle modifications, is essential for controlling blood pressure in hypertensive individuals, psychological care addresses emotional and mental health challenges, such as stress and anxiety, that can exacerbate hypertension.⁵

Self-care has been found to be important for hypertension as it empowers individuals to manage themselves effectively. Improved blood pressure control and enhance overall wellbeing. Managing high blood pressure effectively requires individuals to be actively involved in their treatment, and self-care plays a crucial role in controlling blood pressure and improving overall health. Self-care can encompass activities such as dietary changes, regular physical activity, stress management, and medication adherence. Integrating self-care strategies into a patient's routine has been shown to result in better blood pressure control and improved quality of life.⁶

Several factors influence the ability of individuals with hypertension to engage in self-care. While cognitive function, emotional regulation, and social support are recognized as important factors in health behaviour, there is limited research that examines their combined effect on hypertension self-care. Each of these factors influences self-care in different ways, but their interactions and cumulative impact remain largely unexplored. Understanding how these factors work together is essential for developing comprehensive interventions that address not only the medical but also the psychological and social aspects of hypertension management. There is a clear gap in the literature regarding the mechanisms through which these factors interact, and further research is needed to explore their combined influence on hypertension self-care. This would lead to more tailored interventions, improving self-care adherence and ultimately enhancing patient outcomes. Therefore, exploring these factors in hypertension is crucial and there by explored in this study.^{5,7-9}

Aim

Aim of the study was to explore the role of cognitive function, emotion regulation and social support in self-care among individuals with hypertension.

Objectives

The objectives of this study were to explore the role of cognitive function, emotion regulation and social support in self-care among individuals with hypertension.

METHODS

Ethics

The research ethical committee of the university approved the protocol proposal. Thereafter, the data collection for this study was initiated with obtaining informed consent from all participants with their knowledge about the freedom to withdraw at any time. The data that was obtained was anonymized and secured in devices that were password protected. Confidentiality was maintained.

Selection and description of participants

The 31 participants aged 30-60 years from both genders diagnosed with hypertension who gave consent to participate were approached for data collection using purposive sampling method. The inclusion criteria involved participants who understand both Hindi and English, without any history or current diagnosis of any other physical or psychiatric conditions. The exclusion criteria for the study included individuals with cognitive impairment resulting from other comorbid severe medical or organic conditions such as dementia, Parkinson's disease, or traumatic brain injury, as well as adults with sensory deficits.

Study design

The study employed a single-group cross-sectional research design.

Measures

Along with the demographic sheet for patient information to be used for this study, the following measures were used. The permission to use these below mentioned tools were obtained from their respective authors.

PGI-MS

Developed at postgraduate institute of medical education and research, Chandigarh, PGI-MS consists of 10 subsets measuring various memory domains-remote memory, recent memory, verbal and nonverbal memory, short-term memory and long-term memory. PGI-MS demonstrates a robust reliability, with test-retest reliability ranging from 0.69 to 0.85 for the individual subtests and approximately 0.90 for the total scale (for both test-retest and split-half reliability). Further, the scale demonstrates significant concurrent validity with the Boston memory scale (0.71) and the Wechsler memory scale by Prasad (0.85).¹⁰

TMT

Consisting of 2 parts, part A and B, TMT is a neuropsychological assessment tool used to assess domains of cognitive functioning particularly processing speed, attention, and executive functions. TMT is a part of the Reitan neuropsychological test battery. Part A of

the TMT involves connecting numbered circles in ascending order (1, 2, 3, to 25). Part B requires the individual to connect alternating numbered and lettered circles in a sequence (1-A-2-B-3-C, to 13). TMT demonstrates solid reliability with test-retest reliability ranging from 0.80 to 0.90 and internal consistency from 0.70 to 0.90 for both parts A and B. Correlations with other cognitive tests like Wisconsin card sorting test (WCST) and digit span test are typically 0.60 to 0.80. The test provides good discriminant validity for differentiating well between patients with neurological conditions and healthy controls, often with sensitivity rates of 70% to 80% for detecting cognitive impairments by Reitan.¹¹

ERQ

ERQ is commonly used to assess individuals' emotion regulation strategies, across 2 key aspects of emotion regulation: cognitive reappraisal (changing the way one thinks about a situation thereby altering the associated emotional impact) consisting of 6 items and expressive suppression (inhibiting the emotional expressions) consisting of 4 items. Each item is rated on a seven-point Likert scale, from 1 (strongly disagree) to 7 (strongly agree), with scores ranging from 6 to 42 for cognitive reappraisal and 4 to 28 for emotional suppression. Higher scores indicate more frequent use of the strategy used by individual. Internal consistency of ERQ is generally high, with Cronbach's alpha coefficients for both subscales (reappraisal and suppression) typically above 0.80. The ERQ also demonstrates good test-retest reliability, with coefficients ranging from 0.70-0.90 over a few weeks. The ERQ has been shown to have good construct validity, as well as convergent and discriminant validity.¹²

Duke UNC DUFSS

Duke-UNC DUFSS is an 8-item measure of confident support (consisting of 5 items) and affective support (consisting of 3 items). DUFSS works on the view that an assessment of a person's perception and need for social network are as important as the person's readiness to change in accordance with the level of motivation. Items are rated on a 5 point Likert scale, from 1-much less than I would like to 5-As much as I would like. Reliability shows a Cronbach's α value of 0.91. Convergent validity was assessed using the Hopkins symptom checklist-15 (HSCL-15) and discriminant validity was assessed using the medical outcome study-HIV health survey (MOS-HIV) with good results to measure social support. Broadhead et al.¹³

The self-care inventory

Developed on the basis of the middle range theory of self-care of chronic illness, the self care inventory evaluates the level of self-care in people with a chronic illness. The SCI includes 20 items across three domains: self-care maintenance (consisting of 8 items), self-care monitoring (consisting of 6 items) and self-care management

(consisting of 6 items). Items are evaluated based on a 5-point Likert response, with 1-"Never" or "Not Likely" to 5-"Always" or "Very Likely". The global reliability index achieved for the multidimensional scales was 0.85 (self-care maintenance) and 0.88 (self-care management). Cronbach alpha coefficient was 0.88 for self-care monitoring. Test-retest reliability came out to be 0.81 (self-care maintenance), 0.91 (self-care monitoring), and 0.76 (self-care management).¹⁴

Procedure

Data collection was done in the months from December to May, 2025. The recruited participants in the study were referred by the senior consultant of the cardiology department from a private multispecialty hospital-Kailash hospital and heart institute, Noida, Uttar Pradesh, after meeting the inclusion criteria. Individuals who provided the consent for participating were then assessed on both self-report and clinician rated measures.

Statistics

Data collected was analysed using SPSS version 28. Descriptive and inferential statistical methods were employed for the analysis of data.

RESULTS

The socio-demographics of the participants of study have been summarized in Table 1. The sample for current study comprised of adults aged 30-60 years. The mean age came out to be 51.74 (SD=7.15). Study sample had a distribution of 19 males (61.3%) and 12 females (38.7%). Pearson's correlation coefficient has been provided in the Table 2.

Analysis reveals several significant prediction relationships across various outcome variables in Table 3. Notably, memory shows significant predictive power for all self-care subdomains; self-care maintenance (B=0.189, p=0.001), self-care monitoring (B=0.231, p=0.002) and self-care management (B=0.201, p=0.015). Attention is a significant predictor for memory (B=0.134, p=0.008), FSS (B=0.012, p=0.001), self-care subdomains; self-care maintenance (B=0.043, p=0.012), self-care monitoring (B=0.064, p=0.003) and self-care management (B=0.051, p=0.032), and cognitive reappraisal (B=0.074, p=0.024). Executive functioning significantly predicts self-care maintenance (B=0.013, p=0.045). Expressive suppression negatively predicts self-care maintenance (B=-0.228, p=0.041), but no significant relationships were observed with self-care monitoring and self-care management. FSS significantly predicts memory (B=6.327, p=0.007) and cognitive reappraisal (B=3.239, p=0.037), with positive associations observed. In terms of self-care, FSS significantly predicts self-care maintenance, self-care monitoring, and self-care management (B=2.794, p<0.001; B=3.470, p<0.001; B=3.263, p=0.002) respectively.

Table 1: Socio-demographic characteristics of the participants, (n=31).

Variables	N (%)	M	SD
Age (in years)			
30-60	31 (100)	51.74	7.15
Sex			
Male	19 (61.3)		
Female	12 (38.7)		
Education			
Secondary	11 (35.5)		
Graduation	20 (64.5)		
Employment status			
Government job	10 (32.3)		
Private job	6 (19.4)		
Self-employed	7 (22.6)		
Homemaker	8 (25.8)		
Family type			
Nuclear	25 (80.6)		
Joint	6 (19.4)		
TDOI (in years)			
<1	16 (51.6)		
1 or >1	15 (48.4)		
Substance use			
Yes	13 (41.9)		
No	18 (58.1)		

Table 2: Pearson's correlation matrix for cognitive function, emotional regulation, social support and self-care.

Variables	1	2	3	4	5	6	7	8	9
1. Memory	1								
2. Attention	0.469**	1							
3. Executive functioning	0.640**	0.717**	1						
4. Cognitive reappraisal	0.122	0.404*	0.215	1					
5. Expressive suppression	-0.14	0.005	-0.028	-0.496	1				
6. FSS	0.471**	0.548**	0.31	0.376*	-0.169	1			
7. Self-care maintenance	0.560**	0.446*	0.362*	0.15	-0.369*	0.616**	1		
8. Self-care monitoring	0.528**	0.510**	0.315	0.164	-0.195	0.592**	0.801**	1	
9. Self-care management	0.434*	0.385*	0.188	0.133	-0.344	0.527**	0.830**	0.732**	1

**correlation is significant at the 0.01 level (two-tailed); *correlation is significant at the 0.05 level

Table 3: Simple linear regression coefficients of study variables, (n=31).

Predictor variables	Outcome variables	B	SE	R ²	T	F	P	95% CI
Memory	Self-care maintenance	0.189	0.052	0.314	3.642	13.265	0.001	[0.083, 0.296]
	Self-care monitoring	0.231	0.069	0.279	3.348	11.211	0.002	[0.090, 0.372]
	Self-care management	0.201	0.078	0.188	2.592	6.716	0.015	[0.042, 0.360]
Attention	Memory	0.134	0.047	0.220	2.861	8.188	0.008	[0.038, 0.230]
	Cognitive reappraisal	0.074	0.031	0.163	2.377	5.650	0.024	[0.010, 0.138]
	FSS	0.012	0.003	0.300	3.526	12.430	0.001	[0.005, 0.018]
	Self-care maintenance	0.043	0.016	0.199	2.686	7.216	0.012	[0.010, 0.076]
	Self-care monitoring	0.064	0.020	0.260	3.192	10.188	0.003	[0.023, 0.105]
Executive functioning	Self-care management	0.051	0.023	0.148	2.249	5.056	0.032	[0.005, 0.098]
	Self-care maintenance	0.013	0.006	0.131	2.091	4.373	0.045	[0.000, 0.027]
	Memory	0.071	0.016	0.410	4.491	20.167	<0.01	[0.038, 0.103]
Expressive suppression	Self-care maintenance	-0.228	0.107	0.136	-2.137	4.565	0.041	[-0.446, -0.010]
	Self-care monitoring	-0.156	0.146	0.038	-1.070	1.144	0.294	[-0.453, 0.142]
	Self-care management	-0.292	0.148	0.119	-1.975	3.902	0.058	[-0.594, 0.010]

Continued.

Predictor variables	Outcome variables	B	SE	R ²	T	F	P	95% CI
FSS	Memory	6.327	2.199	0.222	2.877	8.279	0.007	[1.830, 10.825]
	Cognitive reappraisal	3.239	1.483	0.141	2.184	4.771	0.037	[0.206, 6.273]
	Self-care maintenance	2.794	0.664	0.379	4.209	17.719	0.000	[1.437, 4.152]
	Self-care monitoring	3.470	0.878	0.350	3.951	15.610	0.000	[1.673, 5.266]
	Self-care management	3.283	0.982	0.278	3.343	11.173	0.002	[1.274, 5.291]

DISCUSSION

Cognitive function, emotional regulation, and social support all play critical roles in managing hypertension and supporting self-care. Cognitive function is essential for hypertension self-care, as memory, attention, and executive skills are needed to follow medication schedules, track blood pressure, and maintain lifestyle changes.⁸

Equally important is emotional regulation, which helps individuals manage stress, anxiety, and depression; emotions commonly associated with hypertension that can trigger elevated blood pressure.⁵ Additionally, social support is a key factor in managing hypertension, as it provides emotional, informational, and practical assistance, reducing stress, enhancing medication adherence, and encouraging healthy lifestyle changes.⁹

A positive correlation between memory and processing speed and task switching abilities. Further, better memory function indicates better cognitive flexibility. In individuals with hypertension, better memory performance may reflect an ability to process and manage health-related information more efficiently, which could contribute to enhanced cognitive flexibility and improved overall cognitive performance, crucial for maintaining health self-management.

Relationship between cognitive function and Self-care (self-care maintenance, self-care monitoring and self-care management) indicates that better cognitive flexibility, processing speed and memory functioning are associated with higher abilities to maintain self-care behaviours, to engage more actively in monitoring their health and more likely to effectively manage their hypertension.^[15, 16] Memory may facilitate the recall of important health-related tasks and adherence to prescribed medication, diet, and exercise, thus contributing to better overall health management in hypertensive patients.¹⁷

Additionally, a negative relationship in emotional suppression with FSS and self-care maintenance indicating that hypertensive individuals who are more likely to suppress their emotions tend to report lower levels of perceived FSS and are less likely to engage in healthy self-care behaviours.¹⁸

Emotional suppression, while serving as a coping mechanism for managing stress, can lead to isolation and limit the emotional openness necessary for obtaining

meaningful social support and could hinder self-care activities like medication adherence, physical activity, and regular health

monitoring, all of which are essential for controlling hypertension.¹⁹

Conversely, relationship between cognitive appraisal and self-care maintenance suggests that individuals who are better at cognitively appraising stressors are more likely to engage in self-care behaviours that help manage their health. By fostering stronger cognitive appraisal skills, hypertensive individuals may enhance their self-care routines, thereby improving their health outcomes.

Relationship of FSS with memory suggest that individuals with better memory report higher levels of perceived social support. Attention and processing speed are associated with well perceived social support.²⁰ In hypertensive individuals, cognitive function plays a key role in the ability to seek out, navigate and maintain social relationships, which in turn can help to manage multiple health-related tasks and navigate the social challenges that arise from living with a chronic condition; enhance emotional and practical support by reducing stress, improving adherence to treatment, and fostering a better overall health-related quality of life.^{21,22}

Lastly, the study supported the reciprocal relationship between self-care domains (self-care maintenance, self-care monitoring and self-care management) and FSS indicating that hypertensive individuals who are more effective in maintaining their self-care routines, monitoring their health indicators (such as blood pressure, diet, and exercise) and managing their health through decision-making and problem-solving tend to report higher levels of perceived social support.

The presence of FSS provides emotional and practical assistance, encouraging individuals to stay committed to their health practices, thus enhancing their ability to manage their condition.^{17,22,23}

Limitations

The generalizability of the findings was limited due to the restricted demographic diversity. Participants recruitment faced challenges due to the exclusion of individuals with comorbidities, particularly hypertension alone.

CONCLUSION

Cognitive function, emotional regulation, and social support synergistically impact hypertension management by influencing adherence, stress coping, and self-care, necessitating integrated medical and psychological interventions for optimal control and long-term health.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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APPENDIX

SUPPLEMENTARY MATERIAL

Table 4: Simple linear regression coefficients of study variables, (n=31).

Predictor variables	Outcome variable	B	SE	R2	T	F	P	95% CI
FSS	Memory	6.327	2.199	0.222	2.877	8.279	0.007	[1.830,10.825]

*Note: B-unstandardized beta coefficient; SE-standard error; t-critical value; R²-R squared; F-F ratio; p-significance level; CI-confidence interval.

Table 5: Simple linear regression coefficients of study variables, (n=31).

Predictor variables	Outcome variable	B	SE	R2	T	F	P	95% CI
FSS	Cognitive reappraisal	3.239	1.483	0.141	2.184	4.771	0.037	[0.206,6.273]

*Note: B-unstandardized beta coefficient; SE-standard error; t-critical value; R²-R squared; F-F ratio; p-significance level; CI-confidence interval.

Table 6: Simple linear regression coefficients of study variables, (n=31).

Predictor variables	Outcome variable	B	SE	R2	T	F	P	95% CI
FSS	Self-care maintenance	2.794	0.664	0.379	4.209	17.719	0.000	1.437, 4.152
	Self-care monitoring	3.470	0.878	0.350	3.951	15.610	0.000	1.673, 5.266
	Self-care management	3.283	0.982	0.278	3.343	11.173	0.002	1.274, 5.291

*Note: B-unstandardized beta coefficient; SE-standard error; t-critical value; R²-R squared; F-F ratio; p-significance level; CI-confidence interval.

Table 7: Simple linear regression coefficients of study variables, (n=31).

Predictor variables	Outcome variable	B	SE	R2	T	F	P	95% CI
Expressive suppression	Self-care maintenance	-0.228	0.107	0.136	-2.137	4.565	0.041	-0.446, -0.010
	Self-care monitoring	-0.156	0.146	0.038	-1.070	1.144	0.294	-0.453, 0.142
	Self-care management	-0.292	0.148	0.119	-1.975	3.902	0.058	-0.594, 0.010

*Note: B-unstandardized beta coefficient; SE-standard error; t-critical value; R²-R squared; F-F ratio; p-significance level; CI-confidence interval.

Table 8: Simple linear regression coefficients of study variables, (n=31).

Predictor variables	Outcome variable	B	SE	R2	T	F	P	95% CI
Memory	Self-care maintenance	0.189	0.052	0.314	3.642	13.265	0.001	0.083, 0.296
	Self-care monitoring	0.231	0.069	0.279	3.348	11.211	0.002	0.090, 0.372
	Self-care management	0.201	0.078	0.188	2.592	6.716	0.015	0.042, 0.360

*Note: B-unstandardized beta coefficient; SE-standard error; t-critical value; R²-R squared; F-F ratio; p-significance level; CI-confidence interval.

Table 9: Simple linear regression coefficients of study variables, (n=31).

Predictor variables	Outcome variable	B	SE	R2	T	F	P	95% CI
Attention		0.134	0.047	0.220	2.861	8.188	0.008	0.038, 0.230
Executive functioning	Memory	0.071	0.016	0.410	4.491	20.167	<0.01	0.038, 0.103

*Note: B-unstandardized beta coefficient; SE-standard error; t-critical value; R²-R squared; F-F ratio; p-significance level; CI-confidence interval.

Table 10: Simple linear regression coefficients of study variables, (n=31).

Predictor variables	Outcome variable	B	SE	R2	T	F	P	95% CI
Attention	Cognitive reappraisal	0.074	0.031	0.163	2.377	5.650	0.024	0.010, 0.138

*Note: B-unstandardized beta coefficient; SE-standard error; t-critical value; R²-R squared; F-F ratio; p-significance level; CI-confidence interval.

Table 11: Simple linear regression coefficients of study variables, (n=31).

Predictor variables	Outcome variable	B	SE	R2	T	F	P	95% CI
Attention	FSS	0.012	0.003	0.300	3.526	12.430	0.001	0.005, 0.018

*Note: B-unstandardized beta coefficient; SE-standard error; t-critical value; R²-R squared; F-F ratio; p-significance level; CI-confidence interval.

Table 12: Simple linear regression coefficients of study variables, (n=31).

Predictor variables	Outcome variable	B	SE	R2	T	F	P	95% CI
Attention	Self-care maintenance	0.043	0.016	0.199	2.686	7.216	0.012	0.010, .076
	Self-care monitoring	0.064	0.020	0.260	3.192	10.188	0.003	0.023, 0.105
	Self-care management	0.051	0.023	0.148	2.249	5.056	0.032	0.005, 0.098

*Note: B-unstandardized beta coefficient; SE-standard error; t-critical value; R²-R squared; F-F ratio; p-significance level; CI-confidence interval.

Table 13: Simple linear regression coefficients of study variables, (n=31).

Predictor variables	Outcome variable	B	SE	R2	T	F	P	95% CI
Executive functioning	Self-care maintenance	0.013	0.006	0.131	2.091	4.373	0.045	0.000, 0.027

*Note: B-unstandardized beta coefficient; SE-standard error; t-critical value; R²-R squared; F-F ratio; p-significance level; CI-confidence interval.