

Hypertension-related distress and its associated factors: findings from an urban primary health centre of South Delhi, India

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ABSTRACT

Background: Living with hypertension (HTN) has been found to cause distress, which adversely affects one's self-care and may lead to elevated blood pressure. There is a paucity of data regarding the prevalence of HTN-related distress. This study was conducted to estimate the prevalence of HTN-related distress among adults with HTN attending an outpatient department in an urban primary health centre and to determine the factors associated with distress. **Methods:** This was a cross-sectional study conducted at the outpatient department of an urban primary health centre in Delhi, India. The enrolled participants were administered a questionnaire, which included a Distress Scale for patients with diabetes mellitus and/or hypertension (DSDH17 M) (to assess for HTN-related distress) and Health-Related Quality of Life, Healthy Days Measure. A descriptive analysis was performed. Factors associated with HTN-related distress were tested using logistic regression. **Results:** One hundred forty-one participants were enrolled in this study. Most were women (73.76%) with a mean age of 60.15 years (standard deviation [SD]: 0.78). The prevalence of HTN-related distress (average DSDH17 M score ≥ 3) was 14% (95% confidence interval [CI]: 9.30–21.03). Patients with HTN-related distress had significantly poor health and reported a greater number of days where they were physically or mentally unhealthy. Patients with uncontrolled blood pressure had six times the odds (95% CI: 1.69–21.77, P value = 0.006) of HTN-related distress compared to those with controlled blood pressure. **Conclusions:** Hypertension-related distress was present in 14% of adults with HTN. Patients with uncontrolled blood pressure had six times the odds of HTN-related distress.

Keywords: Hypertension-related distress, India, non-communicable disease

Introduction

India has experienced an epidemiological transition, resulting in a rise in non-communicable diseases (NCDs), which were responsible for 52.8% of all deaths from 2015 to 2017. The major cause of death was ischemic heart disease.^[1,2]

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Hypertension (HTN) is a major risk factor for ischemic heart disease and the fifth National Family Health Survey conducted in 2019–2021 estimated 21.3% of all women and 24% of all men above the age of 15 years in India to have HTN.^[3] Patients with NCDs adopt a lifelong change in their lifestyle to live with a chronic disease. This often causes emotional distress, which is difficult to identify by healthcare practitioners as it may present with non-specific symptoms including physical symptoms.^[4] HTN has been known to be associated with various mental illnesses. Patients with HTN are more likely to suffer from depression and anxiety as compared to the general population.^[5]

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In turn, elevated blood pressure has been seen among patients with depression as well, hence it is a vicious cycle.^[6] Depression among patients with HTN has been found to worsen their self-efficacy and decreases their adherence to medication.^[7] In recent times, the importance of incorporation of psychosocial care into the routine care of patients with chronic diseases is being emphasised.^[8] However, in India, there is massive scope for appropriate measures to be taken in this field.

Psychological distress among patients with HTN was first identified in 1978 and since then various studies found a higher prevalence of distress among hypertensives as opposed to the general population.^[9-11] It has been found that HTN is associated with increased distress and at the same time, distress is associated with increased blood pressure.^[12] Those aware of having high blood pressure have increased catecholamine release and their blood pressure further increases in the presence of mental stress.^[13] Also, stress and anxiety cause autonomic arousal and increased catecholamine release, which increases blood pressure and is a risk factor for developing cardiovascular events.^[14] Self-care is an important component of NCD management and, apart from adhering to medication, one has to control their diet and have adequate exercise to achieve optimal disease control.^[15] Hypertension-related distress has been found to adversely impact self-care and those with distress are found to have lower physical activity, worse diet and lower adherence to treatment.^[16] In comparison to diabetes related-distress, which has been studied in depth for more than 25 years and has multiple validated scales, which have been used in India, HTN-related distress has not been so thoroughly explored.^[17] We found one scale to diagnose HTN-related distress.^[18] In India, there is a scarcity of evidence related to the prevalence of distress and its associated factors. Hence, it is imperative to study the burden of distress to help achieve HTN control. We conducted this study to estimate the prevalence of HTN-related distress among adult patients with HTN attending an outpatient department in an urban primary health centre (UHC) in South Delhi, India.

Methodology

Subjects and methods

Study design, study population and duration

This cross-sectional study was conducted in the outpatient department (OPD) of an urban health centre in Dakshinpuri Extension of South Delhi. Dakshinpuri Extension is an urban resettlement colony, which has been adopted by the Community Medicine Department. The patients included in this study were adults more than 18 years of age, diagnosed with HTN more than 3 months ago, and who attended the OPD. We did not exclude anyone from the study. The study was conducted from March 2022 to April 2022.

Sample size estimation and sampling

For sample size estimation, the prevalence of HTN-related distress was taken as 21.1% and an absolute precision of 7%.^[16] The sample size was 131. In this study, consecutive eligible

patients attending the OPD on consecutive days were included until the sample size was achieved.

Study procedure

The data were collected by three trained community physicians. The enrolled patients were administered a questionnaire regarding their socio-demographic characteristics, treatment details, physical activity, diet, and social support. The details related to the latest blood pressure, weight, height and medication details were extracted from the patient's OPD card. The blood pressure was considered to be controlled if the last recorded reading had a systolic pressure below 140 and a diastolic pressure below 90.^[19] Polypharmacy was considered when someone took five or more medications per day.^[20] Physical activity was considered inadequate if a person did less than 150 min of moderate physical activity a week or equivalent.^[21] Fruit and vegetable consumption was considered to be inadequate when one consumed less than five servings, that is less than 400 gm of fruits and vegetables a day.^[21] Support included emotional (affection, acceptance, approval, validation of self-care efforts), tangible (material support such as services, financial assistance or goods) and informational (provided by family or friends, for example, guidance or information about their similar experiences). Knowledge about the curability and complications of HTN was assessed based on two questions with a score of 0: no knowledge, 1/2: inadequate knowledge and 2/2: adequate knowledge. Socioeconomic status was estimated as per the modified Kuppuswamy Scale 2021.^[22]

Distress Scale for patients with diabetes mellitus and/or HTN (DSDH17 M) was administered by the investigating physicians to screen for HTN-related distress.^[18] It is a free-to-use tool and consists of 17 self-reported measures. It contains three domains: 'Physician associated distress', 'interpersonal stress' and 'regimen-related distress and emotional burden'. Each item is rated on a 6-point scale ranging from 'not a problem' to 'a very serious problem.' The total score is the sum of the item's responses divided by the number of items. This scale is an adaptation of the Diabetes Distress Scale (DDS17). Hypertension-related distress is present when the average score is more than or equal to three. Quality of life was measured using the tool—Health Related Quality of Life, Healthy Days Measure.^[23] This scale was developed by Centers for Disease Control and Prevention (CDC). It has been validated and it is free to use. It assesses a person's perceived sense of well-being and the number of physically and mentally unhealthy days in the past month.

Statistical analysis

Data were collected using Epicollect version five and analysis was performed in Stata version 13. Missing data have been stated as such and were excluded from the analysis. We have presented the continuous variables, which were normally distributed as mean (SD) and non-normal data as median (interquartile range [IQR]). Percentages were calculated for

categorical variables. The prevalence of HTN-related distress was reported with a 95% confidence interval (CI). Health rating and mean number of unhealthy days (total, physical and mental) were compared between distressed and non-distressed hypertensives using the Wilcoxon rank-sum test. The association between health-related quality of life and distress was estimated by logistic regression. Factors associated with HTN-related distress were tested using logistic regression. Factors with a *P* value of 0.20 on bivariable analysis were considered for multivariable regression. The primary data used in this research article can be accessed publicly from https://figshare.com/articles/dataset/Dataset_for_study_on_hypertension_related_distress_conducted_in_Dakshinpuri_Extension_csv/20481378.

Ethical clearance

Ethical clearance was obtained from Institute Ethics Committee, All India Institute of Medical Sciences, Ref. no.: IEC-165/04.03.2022. The study conforms to the Declaration of Helsinki.^[24] Written informed consent was obtained from the eligible participants after informing them about the purpose of the study, and that confidentiality and anonymity would be maintained. The confidentiality of the participants was strictly maintained throughout the study.

Results

We were able to enroll 141 persons with HTN in this study. Most participants in this study were women (73.8%) with a mean age of 60.15 years (SD: 0.78) with no formal education (54.0%), who were housewives (57.5%) belonging to upper lower socioeconomic status (44.1%) [Table 1]. Around half of the participants had diabetes as a comorbidity (51.1%) and more than half were obese (59.6%). The median duration of HTN among the participants was 5 years (interquartile range [IQR]: 1.5–10). Blood pressure was controlled in 46.8% of the participants. The most common complication of HTN diagnosed was cardiac and cerebrovascular accidents. The median 10-year cardiovascular disease (CVD) risk score among the participants was 8% (IQR: 5–11). Most participants did not consume adequate fruits and vegetables a day, did not feel like they required support and had no knowledge about the complications and the need for lifelong treatment of HTN [Table 1]. The prevalence of HTN-related distress (average DSDH17 M score more than or equal to three) was 14% (95% CI: 9.30–21.03). Among the domains of distress, the most prevalent was regimen-related and emotional burden (20.57%, *n* = 29), followed by interpersonal (18.44%, *n* = 26) and then physician-related distress (8.51%, *n* = 12). Persons with HTN-related distress had significantly worse health in general and reported a greater number of days where they were physically or mentally unhealthy (*P* < 0.01) [Table 2]. On logistic regression after adjusting for age, sex and comorbidities, it was seen that those with HTN distress had 18.71 (95% CI: 4.96–70.57, *P* < 0.01) times the odds of reporting poor health than those with no distress. Also, those with HTN distress had 16.98 (95% CI: 5.01–57.52, *P* < 0.01) times the odds of reporting 15 or more days where their mental

Table 1: Socio-demographic and health-related characteristics (n=141) of adult participants with hypertension attending an outpatient department in an urban primary health centre in South Delhi, India

Variable	n (%)
Sex	
Male	37 (26.24)
Female	104 (73.76)
Age	
30–40	2 (1.42)
40–50	24 (17.02)
50–60	51 (36.17)
60–70	44 (31.21)
70–80	19 (13.47)
>80	1 (0.71)
Highest level of education	
No formal schooling	51 (36.17)
Less than primary schooling	25 (17.73)
Primary school	31 (21.99)
Middle school	12 (8.51)
High school	15 (10.64)
Intermediate or diploma	5 (3.54)
Graduated	2 (1.42)
Marital status	
Currently married	84 (59.57)
Separated	2 (1.42)
Widowed	55 (39.01)
Work status	
Homemaker	81 (57.45)
Employed	17 (12.06)
Retired	27 (19.15)
Unemployed	16 (11.34)
Socioeconomic status*	
Upper class	0 (0.00)
Upper middle	8 (6.77)
Lower middle	21 (17.80)
Upper lower	52 (44.07)
Lower	37 (31.36)
Comorbidities [†]	
Diabetes	72 (51.06)
COPD	8 (5.67)
Hypothyroidism	11 (7.80)
Stroke	5 (3.55)
Coronary artery disease	4 (2.84)
Cancer	2 (1.42)
Duration of HTN	
<1 year	35 (24.82)
1–5 years	46 (32.62)
5–10 years	33 (23.41)
10–20	21 (14.89)
>20 years	6 (4.26)
Blood pressure	
Controlled	66 (46.81)
Uncontrolled	75 (53.19)
Body mass index (Indian standards)	
Underweight	7 (4.96)
Normal	28 (19.86)

Contd...

Table 1: Contd...

Variable	n (%)
Overweight	22 (15.60)
Obese	84 (59.58)
Tobacco smoker	
Yes	11 (7.80)
No	127 (90.07)
Quit more than a year ago	3 (2.13)
Smokeless tobacco consumer	
Yes	12 (8.51)
No	129 (91.49)
Quit more than a year ago	0 (0.00)
Alcohol consumer	
Yes	7 (4.96)
No	133 (94.33)
Quit more than a year ago	1 (0.71)
Cardiovascular disease risk score (%)	
<5	30 (21.28)
5–10	59 (41.85)
10–20	45 (31.91)
>20	7 (4.96)
Polypharmacy	
Yes	41 (29.08)
No	100 (70.92)
Hypertensive complications	
Yes	23 (16.31)
No	118 (83.69)
Complications [†]	
Retinopathy	7 (4.96)
Nephropathy	0 (0.00)
Cardiac	8 (5.67)
Stroke	8 (5.67)
Physical activity	
Adequate	86 (60.99)
Inadequate	44 (31.21)
Contraindicated	11 (7.80)
Adequate fruit and vegetable intake	
Yes	22 (15.60)
No	119 (84.40)
Support	
Yes	
Considered adequate	36 (25.53)
Considered inadequate	5 (3.55)
No	
Unmet need for support present	24 (17.02)
No unmet need for support	76 (53.90)
Source of support (n=41)	
Spouse	9 (21.95)
Children	24 (58.54)
In-laws	8 (19.51)
Knowledge about hypertension complications and curability	
Adequate present	13 (9.22)
Intermediate	63 (44.68)
Absent	65 (46.10)

*Data for 23 participants (16.31%) were unavailable. [†]Multiple answers are possible

and/or physical health was not good. The factors that were potentially associated with HTN-related distress in the bivariable analysis were age, body mass index (BMI), control status of blood

pressure, presence of comorbidities, polypharmacy and HTN complications [Table 3]. In the multivariable analysis, those with uncontrolled blood pressure had six times the odds (95% CI: 1.69–21.77, *P* value = 0.006) of having HTN-related distress compared to those with controlled blood pressure.

Discussion

Among adults living with HTN attending a UHC in a resettlement colony in South Delhi, 14% were found to have distress related to HTN, and 20.6% of the participants were found to suffer from regimen-related distress and emotional burden. Distress was significantly more among those with uncontrolled blood pressure.

Hypertension and distress: Multiple studies have previously determined that the diagnosis of HTN and distress have a bidirectional relationship.^[10,25] Increased levels of stress are a known risk factor for HTN and persons living with HTN are more distressed than those without HTN.^[26–28] The latter finding has been consistent over the past two decades in India. A study conducted in 2000 in Chandigarh by Joshi *et al.*^[11] among subjects over 60 years used the PGI Health Questionnaire-N-1 to find a statistically significant difference in the mean scores of distress among those with and without HTN. In 2022, a study conducted in South India among women from indigenous communities found that suffering from HTN was significantly associated with the presence of psychological distress.^[29]

Among persons with HTN, the prevalence of distress of 14% found in this study is far less compared to that reported by a study conducted by Prakash *et al.*^[30] in Rajasthan, where the prevalence was 58.6%. However, that study was conducted in 2007 among patients (aged 60 + years) attending a geriatric clinic for consultation and used a different scale to capture distress. Over the years, the increase in awareness and control rates of HTN may have also been attributed to the decreased prevalence of distress.^[31,32] A study conducted in Mexico in 2016 by Doubova *et al.*^[16] used the same tool: DSDH 17 M, and reported the prevalence of HTN-related distress as 21.1%. This study too was a facility-based study conducted in two family medical clinics among adults diagnosed with HTN more than 3 years ago. When compared to household-based surveys, the prevalence was higher in this study, which was facility-based.^[25,28] A study conducted in nine countries in the former Soviet Union by Footman *et al.*^[25] in 2013 found the prevalence of distress among hypertensives to be 9.9%. Data from the National Health Interview Survey in the USA in 2016 published by Ojike *et al.*^[28] found the prevalence to be 3.2%. This may be attributed to the fact that those attending the OPD may be driven to do so by the state of fear or distress, which causes the development of adaptive behaviour.^[33]

Emotional burden: It is known that chronic conditions cause emotional burdens to patients because they have to adjust their lifestyle and aspirations and have to live with a disease lifelong.^[4] Along these lines, regimen-related distress and emotional burden

Table 2: Comparison of quality of life between patients with and without hypertension-related distress attending an outpatient department in an urban primary health centre in South Delhi, India

Quality of life	Hypertension-related distress present (n=20)	Hypertension-related distress absent (n=121)	P
Health in general			
Excellent	0 (0.00)	10 (8.26)	<0.0001
Very good	0 (0.00)	13 (10.74)	
Good	2 (10.00)	43 (35.54)	
Fair	9 (45.00)	48 (39.67)	
Poor	9 (45.00)	7 (5.79)	
Number of days physical health was not good in past 30 days			
Median (IQR)	6 (0–15)	0 (0–5)	0.0023
Number of days mental health was not good in past 30 days			
Median (IQR)	15 (6–15)	0 (0–5)	<0.0001
Number of days physical health and/or mental health was not good in past 30 days			
Median (IQR)	16 (12.5–27.5)	0 (0–10)	<0.0001
Number of days physical and mental health kept one from doing usual activities in past 30 days (activity limitation)			
Median (IQR)	8.5 (1–12.5)	0 (0–0)	<0.0001

were most prevalent among the participants in this study. This may indicate that focus should be put on better equipping those with HTN to emotionally deal with the burden of this lifelong condition. ‘Healthy coping’ should be prioritized in the psychosocial care of hypertensives.^[4]

Factors associated with distress: It has been found that HTN is associated with increased distress and at the same time, distress is associated with increased blood pressure.^[12] In this study as well, elevated blood pressure above the cut-off 140/90 was significantly associated with HTN-related distress. A survey conducted in England and Scotland in 2010 found that distressed participants were likely to have low or very high blood pressure.^[10] Multiple studies on diabetes distress have also found that distress is associated with elevated HbA1c values.^[34-37] In this study, temporality is difficult to determine, however, to understand if distress causes elevated values or if elevated values cause distress or both.

Health-related quality of life: In this study, significantly worse health-related quality of life was observed among those with HTN-related distress as compared to those without HTN-related distress. Those with distress rated their overall health worse, as well as complained of a greater number of physical and mental days in the past month where their health was not good. They also experienced a greater number of days where they were unable to perform their routine activities due to health complaints. Poor HRQOL has been previously established among hypertensives and similar findings have also been found when comparing the quality of life among those with diabetes mellitus who were distressed and not distressed.^[38-42]

Strengths and limitations

In this study, we were able to estimate the prevalence of distress among those with HTN, as well as find the association

between HTN-related distress and quality of life. Only limited data are available from India regarding HTN-related distress and no published studies could be found that associated it with the quality of life. However, our study had certain limitations. Being a cross-sectional study, the temporality between HTN-related distress and poor health-related quality of life could not be determined. We also could not determine the duration of HTN-related distress. Causal inferences could not be carried out, nor could the direction of the association. Some of the information collected was self-reported and may have been affected by recall and rumination bias. Because it was a facility-based study where participants were of a certain background, external validity is limited. In future, a community based and longitudinal/cohort study can be conducted to capture HTN-related distress better.

Conclusion

The prevalence of HTN-related distress was 14% among the adults with HTN attending an outpatient department in a UHC in South Delhi, India. The most prevalent domain of distress was regimen-related and emotional burden. Patients with uncontrolled blood pressure had six times higher odds of HTN-related distress compared to the patients with controlled blood pressure. Patients with HTN-related distress had poorer health-related quality of life compared to those without distress. Thus, it can be seen that distress among persons with HTN is a prevalent problem that needs to be appropriately addressed to ensure blood pressure control and improved quality of life. Further research ought to be performed to determine factors associated with it and ways to mitigate HTN-related distress. Physicians may integrate screening for distress among people with HTN as a part of NCD care and accordingly, measures may be undertaken to decrease the distress experienced.

Table 3: Factors associated with HTN related distress among adult participants with hypertension attending an outpatient department in an urban primary health centre in South Delhi, India

Variable	Distress present–n (%)	cOR (95% CI)	P	aOR (95% CI)	P
Sex					
Male	6 (16.21)	1	0.68	Not included	
Female	14 (13.46)	0.80 (0.28–2.27)			
Age					
18–59	10 (19.60)	1	0.17	1	0.08
60–83	10 (11.11)	0.51 (0.20–1.33)		0.39 (0.13–1.13)	
Highest level of education					
Illiterate	10 (19.60)	1	0.92	Not included	
Literate	10 (11.11)	0.51 (0.20–1.33)			
Marital status					
Currently married	11 (13.09)	1	0.65	Not included	
Separated/widowed	9 (15.79)	1.24 (0.48–3.23)			
Work status					
Unemployed	18 (14.52)	1	0.76	Not included	
Employed	2 (11.76)	0.79 (0.17–3.73)			
Socioeconomic status (n=17)					
Upper middle	1 (12.5)	0.61 (0.06–5.81)	0.67	Not included	
Lower middle	1 (4.76)	0.21 (0.02–1.88)	0.16		
Upper lower	8 (15.38)	0.78 (0.26–2.38)	0.66		
Lower	7 (18.92)	1			
Presence of comorbidities					
Yes	15 (17.24)	1	0.19	1	0.37
No	5 (9.26)	0.49 (0.17–1.44)		0.53 (0.13–2.11)	
Duration of hypertension					
<1 year	4 (22.22)	1	0.32	Not included	
1 or more years	16 (13.01)	0.52 (0.15–1.79)			
Blood pressure control status					
Controlled	4 (6.06)	1	<0.01	1	0.006
Uncontrolled	16 (21.33)	4.20 (1.33–31.30)		6.07 (1.69–21.77)	
Body mass index (BMI)					
Normal/underweight	2 (5.71)	1	0.07	1	0.13
Overweight/obese	18 (16.98)	3.38 (0.74–15.35)		3.57 (0.70–18.23)	
Tobacco smoker					
Never	17 (13.39)	1	0.44	Not included	
Ever	3 (21.43)	1.76 (0.45–6.98)			
Smokeless tobacco consumption					
No	18 (13.95)	1	0.80	Not included	
Yes	2 (16.67)	1.23 (0.25–6.10)			
Alcohol consumption					
Never	18 (13.53)	1	0.40	Not included	
Ever	2 (25.00)	2.13 (0.40–11.38)			
Cardiovascular disease risk score					
<10	11 (12.36)	1	0.42	Not included	
More than, equal to 10	9 (17.31)	1.48 (0.57–3.86)			
Presence of polypharmacy					
No	11 (11.00)	1	0.10	1	0.38
Yes	9 (21.95)	2.28 (0.86–6.00)		1.71 (0.52–5.68)	
Presence of hypertensive complications					
Yes	6 (26.09)	1	0.10	1	0.26
No	14 (11.86)	0.38 (0.13–1.13)		0.49 (0.14–1.72)	
Exercise					
Adequate	12 (13.95)	1	0.92	Not included	
Inadequate	8 (14.55)	1.05 (0.40–2.76)			

Contd...

Table 3: Contd...

Variable	Distress present–n (%)	cOR (95% CI)	P	aOR (95% CI)	P
Adequate fruit and vegetable intake					
Yes	3 (13.64)	1	0.94	Not included	
No	17 (14.29)	1.06 (0.28–3.96)			
Knowledge about complications and curability					
Some	11	1	0.91	Not included	
No	9	0.95 (0.37–2.46)			
Support present					
No	16 (16)	1	0.32	Not included	
Yes	4 (9.76)	0.57 (0.18–1.81)			

List of abbreviations

Abbreviation	Definition
HTN	Hypertension
UHC	Urban health centre
OPD	Outpatient department
DSDH17M	Distress Scale for patients with diabetes mellitus and/or hypertension
DDS17	Diabetes Distress Scale 17
CDC	Centers for Disease Control and Prevention
CVD	Cardiovascular disease
BMI	Body mass index

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Conflicts of interest

There are no conflicts of interest.

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