Original Research Article

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20174238

Prevalence of hypertension and its association with psychosocial factors among old age home inmates in an urban area of Kancheepuram district, Tamil Nadu

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Received: 28 July 2017 Revised: 30 August 2017 Accepted: 01 September 2017

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ABSTRACT

Background: Among the non-communicable diseases prevalent among old age home inmates, hypertension is one of the diseases which if not diagnosed and treated adequately, could lead to high mortality and morbidity due to limited resources. The objective of this study is to find out the prevalence of hypertension among the old age home inmates and also its association with psychosocial morbidity among them.

Methods: This community based cross sectional descriptive study was done among 250 inmates of selected old age homes in Kancheepuram district. A total of 8 old age homes were randomly chosen and universal sampling was done in each old age home to obtain the required sample size. Structured questionnaire was used to collect data and psychosocial morbidity among the inmates was assessed by Depression, Anxiety and Stress scale (DASS 21). Data analysis was done by SPSS software version 21.

Results: The prevalence of hypertension and prehypertension was found to be 72.8% and 10% respectively and the prevalence of psychosocial morbidity was found to be high among the study participants (depression- 68.4, anxiety-46.8, stress- 50.4). Statistically significant association was found between uncontrolled hypertension and psychosocial factors (anxiety and stress). About 27% of the hypertensive was unaware of free medication offered for hypertension at Government health centres.

Conclusions: This study highlights the need for setting up of specialized geriatric clinics at Government Health Centres to provide speedy medical services and supply of medication for the elderly. Health education has to be given to both the inmates and care takers about chronic diseases like hypertension.

Keywords: Blood pressure, Depression, Elderly

INTRODUCTION

Hypertension is defined as a systolic blood pressure equal to or above 140 mm Hg and/or diastolic blood pressure equal to or above 90 mm Hg.1 Hypertension has a multifactorial etiology, which combines the influence of both environmental and genetic factor.² Hypertension is one of the most powerful and independent modifiable risk factor for the development of all the major cardio vascular diseases (CVD) that commonly affects the elderly like coronary artery disease (CAD), peripheral artery disease (PAD), stroke, heart failure and renal failure.3

According to census 2011, the elderly population (age 60 years and above) in India contributes to 8.14% of the total population, which is projected to rise to 17% by 2020.4 Over the past 50 years, life expectancy has increased dramatically in developing countries like India. The problems faced by the elderly population are multi-dimensional. They face not only medical problems, but also socio-economical, psychological, emotional problems and social security issues.⁵ The Joint family tradition is disappearing slowly due to rapidly growing nuclear families. Because of this, the elderly population is being exposed more to financial insecurities.⁶ The interests of the elderly to spend their old age in sacred places, the migration of children in search of employment opportunities, their maladjustment in family and poverty of the elderly are the major reasons for the Indian elderly being forced to shift to old age homes.⁷

As a part of National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS), drugs for Non Communicable Diseases (NCD) like hypertension and diabetes are offered at free of cost in NCD clinics set up at Government health centres. But the major problem lies in the accessibility of these drugs by residents of old age homes. As they are alienated from their family, they feel less motivated to get treated for their medical conditions.

Psychosocial factors are the factors that affect a person psychologically or socially. It includes several domains such as mood status (anxiety, depression and stress) and social factors (socioeconomic status, education, employment, religion, ethnicity, family, physical attributes, locality, relationships with others, changes in personal roles, and status).

Among these psychosocial factors, depressive disorders, anxiety and stress play a major role in outcome and prognosis of NCD's like Hypertension. Depression (major or minor depressive disorder) is a common mental disorder, characterized by sadness, loss of interest, low self-esteem, feelings of guilt, disturbed sleep, feelings of tiredness and poor concentration. Anxiety is an emotion characterized by feelings of tension, worried thoughts and physical changes like increased blood pressure. Stress is defined as "the adverse reaction people have to excessive pressures or other types of demand placed on them" Stress is a state and not an illness. It may affect a person both mentally and physically if it becomes too excessive and prolonged.

Among these psychosocial factors, depressive disorders, anxiety and stress play a major role in outcome and prognosis of NCD's like hypertension. Prevalence of these psychosocial factors among old age home inmates were always found to be on the higher side. ^{13,14}

Based on this background, the study was planned to find out the prevalence of hypertension among the old age home inmates in Kancheepuram district with the following objectives.

1. To find out the prevalence of hypertension among the old age home inmates in the study area.

- 2. To find out if there is an association between psychosocial factors like depression, anxiety and stress with the presence and complications due to hypertension.
- 3. To find out the awareness about free medication for hypertension being offered at government health centres as a part of NPCDCS programme.

METHODS

Study design

This was community based descriptive cross sectional study carried out in an urban area of Kancheepuram district of Tamil Nadu.

Study area and population

The study was done among the residents of selected old age homes in Kancheepuram district of Tamil Nadu.

Study period

The study was carried out between July 2016 and December 2016.

Sample size and sampling technique

A study done by M Anitha Rani et al in old age homes in Chennai in 2012, found the prevalence of hypertension to be 39.5%. So, taking the prevalence of hypertension (P) as 39.5% with a precision of 16% of P at 95% confidence interval, the sample size calculated using the formula (4PQ/L²), was found to be 240, which was rounded off to 250.

The list of old age homes in Kancheepuram district was collected from the Directory of old age homes 2009, published by Help Age India. There were a total of 32 old age homes in Kancheepuram district. By simple random sampling, 8 willing old age homes were randomly selected and the manager was met in person and all the details of the study were explained to him including the study purpose and confidentiality of both the participants and the old age homes. The 8 old age homes were selected randomly by lottery method and in each old age home, universal sampling technique was followed. Each old age home had an average of 40 inmates.

The inclusion criteria were that the inmates should have stayed in the old age home for a minimum period of one year, should not have been diagnosed with any psychiatric illness other than depression and must voluntarily give informed consent. The exclusion criteria were, those who did not give consent, those who were not able to answer the questions and those who were having psychiatric illnesses. So based on the inclusion and exclusion criteria, 250 inmates were selected for the study.

Ethical approval and informed consent

Ethical approval was obtained from institutional ethical committee. Informed consent was obtained from all the selected participants and managers of old age home.

Data collection method

The data for this study was collected using a pre-tested structured interview schedule consisting of socio-demographic details of the participants, history of type 2 diabetes mellitus (T2DM), complications of hypertension like coronary artery disease, stroke and hypertensive retinopathy were enquired and looked into the medical records and noted, source of treatment expenditure for participants who had a history of hypertension, awareness of free medication being offered for hypertension at Government health centres.

Study tool

Socio-demographic characteristics of the participants were collected using a structured questionnaire by interview method.

A mercury sphygmomanometer was used to measure the blood pressure. Blood pressure was measured in right arm in sitting position with feet placed on level ground and the arm placed at level of the heart. Two readings were taken with a minimum 5 minutes interval Participants who had a blood pressure above 140/90 mm/Hg were defined as having hypertension¹⁷. Complications related to hypertension were enquired and looked into their medical records.

Depression, anxiety and stress were assessed by a structured 21 item depression, anxiety and stress questionnaire (DASS–21). It consists of 3 subscales to assess depression, anxiety and stress respectively. The participants were asked to rate their experience on each symptom on a 4-point Likert scale ranging from '0' (does not apply to me), to '3' (applies to me most of the time). The scores are summed up in each subscale and are categorized into mild, moderate, severe and extremely severe. BASS–21 has been validated for use to measure depression, anxiety and stress among adult population.

Data analysis

Data analysis was carried out using SPSS software version 22. The prevalence of hypertension, sociodemographic characteristics and the psychosocial morbidity among the study participants were analysed using descriptive statistics. Strength of association (Odd's ratio, 95% confidence interval) and statistical significance (Chi square and p value) were tested to look for association between hypertension and psychosocial variables.

Blood pressure classification

a) Participants with previous history of hypertension

Despite being on anti-hypertensive medication, inability to achieve blood pressure below 140/90 mm/Hg is classified as uncontrolled blood pressure as per Joint National Committee VII guidelines. So, blood pressure below 140/90 mm Hg was considered as controlled blood pressure.

b) Participants without previous history of hypertension

The study participants who did not have any previous history of hypertension were classified into normal, prehypertension, stage 1 hypertension and stage 2 hypertension as per the guidelines established by the Joint National Committee 7 (JNC 7). 17

Table 1: Blood Pressure classification among patients with and without history of hypertension.

Blood pressure classification	SBP mm Hg	DBP mm Hg					
Participants with histo	ry of hyperter	sion					
Controlled blood pressure	<140	<90					
Uncontrolled blood pressure	>140	>90					
Participants without h	Participants without history of hypertension						
Normal	<120	<80					
Pre-hypertension	120-139	80-89					
Stage 1 hypertension (stage 1 HT)	140-159	90-99					
Stage 2 hypertension (stage 2 HT)	>160	>100					

RESULTS

Socio-demographic characteristics of the study participants

A total of 250 subjects participated in this study. The mean age of the participants was 72.3±13.0 years. Highest percentage of the participants belonged to the age group of 70-79 years (32%), followed by age group of 80 years and above (31.2%). Female participants were predominantly higher (63.6%), when compared with males. As for the educational status, 28.8% of them were illiterate, followed by 23.6%, who have studied up to primary school. Illiteracy was higher among females (33.3%) when compared with males (18.7%) (Table 2).

Participants were enquired on their previous occupation before they were enrolled in old age homes and it was found that 78.8% of the participants were unemployed. Unemployment was higher among females (78.8%) when compared with males (68.1%). Among the study participants, 72.4% were widowed and 12.8% were

unmarried. About 22.4% of them had an own house, while the rest had a rented house (77.6%). About 45.6% belonged to a three generation family and 42.4%

belonged to nuclear family. Current consumption of alcohol (1.6%) and tobacco (8.4%) were low among the study participants (Table 2).

Table 2: Socio-demographic characteristics of the study participants.

G	Characteristics	Male (Male (n=91) Female		(n=159)	Total	Total (N=250)	
S. no.	Characteristics	n	%	n	%	n	%	
	Age group (in years)							
	<60	19	20.9	30	18.9	49	19.6	
1	60-69	18	19.8	25	15.7	43	17.2	
	70-79	20	22	60	37.7	80	32	
	>80	34	37.4	44	27.7	78	31.2	
	Education							
	Illiterate	17	18.7	53	33.3	70	28.8	
	Primary school	19	20.9	40	25.2	59	23.6	
2	Intermediate	14	15.4	36	22.6	50	20	
	High school	29	31.9	21	13.2	50	20	
	Graduate or post graduate	11	12	6	3.7	17	6.8	
	Profession	1	1.1	3	1.9	4	1.6	
	Previous occupation							
	Unemployed	62	68.1	135	84.9	197	78.8	
	Unskilled	3	3.3	0	0	3	1.2	
3	Semiskilled	6	6.6	21	13.2	27	10.8	
	Skilled	15	16.5	0	0	15	6.0	
	Clerical or shopkeeper	4	4.4	0	0	4	1.6	
	Professional	1	1.1	3	1.9	4	1.6	
	Marital status							
	Married	6	6.6	7	4.4	13	5.2	
4	Unmarried	13	14.3	19	11.9	32	12.8	
	Widower	62	68.1	119	74.8	181	72.4	
	Divorce	10	11.0	14	8.8	24	9.6	
	Ownership of the house							
5	Owned	31	34.1	25	15.7	56	22.4	
	Rented	60	65.9	134	84.3	194	77.6	
	Type of family							
6	Nuclear	30	33	76	47.8	106	42.4	
U	Joint	15	16.5	15	9.4	30	12.0	
	Three generation	46	50.5	65	40.9	110	45.6	
	Religion							
7	Hindu	90	98.9	152	95.6	242	96.8	
	Christian	1	1.1	7	4.4	8	3.2	
	Consumption of tobacco							
8	Yes	18	19.8	3	1.9	21	8.4	
	No	73	80.2	156	98.1	229	91.6	
	Consumption of alcohol							
9	Yes	4	4.4	0	0	4	1.6	
	No	87	35.6	159	100	246	98.4	

Among the study participants, those who had a history of T2DM were 28.8%. Male participants with T2DM were predominantly higher (33%) when compared with female participants (26.4%). Prevalence of hypertension among the study participants was 72.8%. As per the scoring criteria in depression, anxiety and stress scale (DASS 21),

depression was present in 68.4% of the study participants, Anxiety was present in 46.8% and stress was present in 50.4% of the study participants. Psychosocial morbidity was higher among male participants when compared with female participants (Table 3).

Table 3: Clinical variables of the study participants.

S. no.	Characteristics	Male (n=91)		Female (n=159)	Female (%) (n=159)		Total (%) (N=250)	
		n	%	n	%	n	%	
	History of T2DM							
1.	Yes	30	33	42	26.4	72	28.8	
1.	No	61	67	117	73.6	178	71.2	
	Hypertension							
2.	Present	67	73.63	115	72.32	182	72.8	
4.	Absent	24	26.37	44	27.68	68	27.2	
	Psycho-social variables a)Depression (DASS-21)							
	Yes	75	82.4	96	60.4	171	68.4	
	No	16	17.6	63	39.6	79	31.6	
,	b)Anxiety (DASS-21)							
3.	Yes	58	63.7	59	37.1	117	46.8	
	No	33	36.3	100	62.9	133	53.2	
	c) Stress (DASS-21)							
	Yes	54	59.3	72	45.3	126	50.4	
	No	37	40.7	87	54.7	124	49.6	

Table 4: Prevalence of hypertension among the study participants.

S. no	Characteristics	Number	Percentage (%)
	Participants with history of hypertension (n=122)		
	Uncontrolled blood pressure	75	61.5
	Controlled blood pressure	47	38.5
	Complications due to hypertension		
1	Yes	76	62.3
	No	46	37.7
	Participants without history of hypertension (JNC 7) n=1	128	
	Normal	43	33.6
	Pre-hypertension	25	19.5
2	Stage 1	46	35.9
	Stage 2	14	10.9

Table 5: Association of grade of hypertension with psychosocial variables among the study participants with history of hypertension.

S. no	Psycho-social variables	Partcicpants wi Uncontrolled blood pressure (n=75)	th history of Hypertension Controlled blood pressure (n=47)	OR, 95% CI	Chi- square	P value
	Depression					
1	Yes	57	29	1.966 (0.891–4.338)	2.840	0.092
	No	18	18	1.900 (0.891–4.338)	2.040	0.092
	Anxiety					
2	Yes	52	19	3.332 (1.555–7.137)	9.925	0.002*
	No	23	28	3.332 (1.333–7.137)	9.923	0.002
3	Stress					
	Yes	48	17	12.045 (1.468–6.703)	8.990	0.003*
	No	27	30	12.043 (1.406–0.703)	6.990	0.003

^{*}P value<0.05, Significant at 95% confidence interval.

Table 6: Association of hypertension with psychosocial variables among the study participants without history of hypertension.

S. no.	Psycho-social	Participants without history of hypertension				Chi-	
	variables	Normal (n=43)	Pre-HT (n=25)	Stage 1 HT (n=46)	Stage 2 HT (n=14)	Square	P value
	Depression						
1	Yes	25	18	31	11	2.617	0.455
	No	18	7	15	3	2.017	0.433
	Anxiety						
2	Yes	9	10	18	9	9.476	0.024*
	No	34	15	28	5	9.470	
	Stress						
3	Yes	20	11	21	9	1.783	0.619
	No	23	14	25	5	1./63	0.019

^{*} P value <0.05, significant at 95% confidence interval.

Table 7: Association of psychosocial variables with complications due to hypertension.

	Psycho-social variables	Complications d	ue to hypertension		Chi- square	P value
S. no.		Yes (n=76)	No (n=46)	OR, 95% CI		
	Depression					
1	Yes	60	26	2 995 (1 202 - 6 426)	6.928	0.008*
	No	16	20	2.885 (1.293 – 6.436)	0.928	0.006*
	Anxiety					
2	Yes	53	18	2 505 (1 662 - 7 700)	11.034	0.001*
	No	23	28	3.585 (1.663 – 7.728)		
3	Stress					
	Yes	48	17	2.924 (1.369 – 6.245)	7.903	0.005*
	No	28	29	2.724 (1.307 - 0.243)		0.005

^{*} P value<0.05, significant at 95% confidence interval.

Among the study participants who had a history of hypertension and were on anti-hypertensive medication, 61.5% had uncontrolled blood pressure and 38.5% had controlled blood pressure. In spite of being on anti-hypertensive medications, complications due to hypertension were high (62.3%) among them. Among the study participants who did not have any history of hypertension, 33.6% had a normal blood pressure, 19.5% were found to be pre-hypertensive, 35.9% were categorised as stage 1 hypertension and 10.9% were categorised as stage 2 hypertension (Table 4).

Among the study participants with history of hypertension, the odds of having uncontrolled blood pressure was nearly 2 times higher among depressed individuals. (OR–1.966, 95% CI: 0.891-4.338). The odds of having uncontrolled blood pressure was 3.3 times higher among the participants with anxiety (OR–3.332, 95% CI: 1.555–7.137). The odds of having uncontrolled blood pressure was 12 times higher among the participants with stress (OR–12.045, 95% CI: 1.555 – 7.137). The association between psychosocial variables such as anxiety and stress, with uncontrolled blood pressure were statistically significant (p<0.05) (Table 5).

Among the study participants with no previous history of hypertension, statistically significant association was found between anxiety and presence of hypertension (p<0.05) (Table 6).

Among the study participants, statistically significant association was found between the psychosocial variables (depression, anxiety and stress) with complications due to hypertension (p<0.05). Among the participants with hypertension, the odds of developing complications due to hypertension was 2.8 times higher among those with depression (OR–2.885, 95% CI: 1.293–6.436), 3.5 times higher among those with anxiety (OR–3.585, 95% 95% CI: 1.663–7.728) and 2.9 times higher among those with stress (OR–2.924, 95% CI: 1.369 – 6.245) (Table 7).

Among the study participants who were already on antihypertensive medication, only 73% were aware of the fact, that the drugs for treating hypertension are being offered at government health centres at free of cost. The rest were unaware and were dependant on family members and old age home for their medication for hypertension.

Among the study participants who were already on antihypertensive medication, only 59% made use of the free drugs for treating hypertension being offered at government health centres. About 16% had their drugs delivered by their children or grand-children, 12% by relatives or friends, 10% were self-funded with their pension money and remaining 3% got their drugs delivered from the old age home (Figure 1).

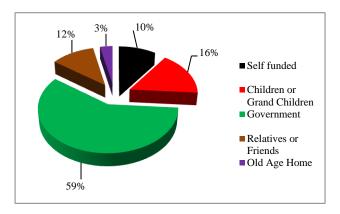
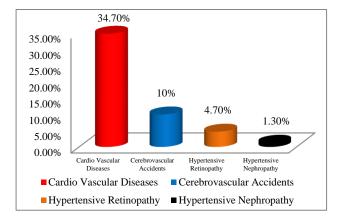


Figure 1: Treatment expenditure among hypertensive patients.



Among the study participants, the most frequently reported complication due to hypertension was cardio-vascular diseases (34.7%) followed by Cerebrovascular accidents like stroke (10%) (Figure 2).

DISCUSSION

Though various measures are being taken by the government through National and State programs, for the early diagnosis and treatment of non-communicable diseases like hypertension, it still pose a major public health challenge to the community, particularly among the elderly. The study done in old age homes in Kancheepuram district shows that hypertension is highly prevalent among inmates of the old age home and is directly related to psychosocial factors.

Among the study population, female participants were proportionately higher (63.6%) when compared with males (36.4%). Majority of the study participants were

illiterate (28.8%). There was more number of widows/widowers (72.4%) among the study group. Similar findings were observed by Anitha Rani et al, Md. Asadullah et al and Goud AA et al. ^{15,21,14} These findings highlight the fact that, illiteracy, female gender, being a widow/widower are one among the major reasons for admission of elderly into old age homes.

The prevalence of hypertension among the old age home inmates was found to be 72.8%. A study done by Tsuyuki et al in 2008 in Canada among 15 long term care facilities found the prevalence to be 38%. ²² Study done by Md Asadullah et al in 2012 in Karnataka and a study done by Anitha Rani et al in Chennai, found the prevalence of hypertension to be 44.1% and 39.5% respectively. ^{21,15} Study done by Usha Rani et al in Mangalore, found the prevalence of hypertension to be the second highest among all the other morbidities among the old age home inmates. ²³ This shows that, hypertension is highly prevalent among the inmates of the old age homes.

Among the 250 participants in the study population, 72.8% were having hypertension and 10% were having pre-hypertension. Among those with hypertension, 32.9% were newly diagnosed with no previous history of hypertension. In study done by Anitha Rani et al in Chennai, among those who were diagnosed as having hypertension, 39% were newly diagnosed. This shows the lack of basic screening facilities for diseases like hypertension among the old age home inmates.

Among the study group, 24% had undiagnosed hypertension and among those who had a previous history of hypertension, nearly 61.5% had uncontrolled hypertension. This shows the burden of hypertension is very high among the inmates of old age homes. With no family support and having no intention to get treated for their illness, inmates of the old age were living a miserable life.

Among the psychosocial problems of the study population, depression had the highest prevalence (68.4%). Similar findings were observed in the study done by Pradeep Kumar et al in Lucknow.²⁴ This depression among the old age home inmates could play a major role in their non-compliance to treatment.

Among the study participants with history of hypertension, anxiety and stress were found to be higher among those who had uncontrolled blood pressure and this association was found to be statistically significant. In a study done by Grimsurd et al among the hypertensive patients in South Africa, significant statistical association was found between anxiety disorders and hypertension. In a study done by Anitha Sharma among hypertensive patients in Shimla, higher frequency of anxiety and stress were found among hypertensive patients. This concludes that, when anxiety and stress co-exist among hypertensive patients, it could lead to uncontrolled hypertension.

It was found that the psychosocial variables like depression, anxiety and stress were associated with complications due to hypertension. The complications due to hypertension identified in our study were Stroke, Retinopathy and Nephropathy and CVD's like Coronary artery disease, among which, CVD was the most commonly reported complication. Roest AM et al had found that anxiety was an independent risk factor for development of CVD.²⁷ Beth et al concluded that mental health problems like depression, anxiety and stress were risk factors for the development of CVD.²⁸ These findings conclude that, when psychosocial morbidity and hypertension co-exist, the odds of developing complications like cardiovascular diseases are found to be on the higher side.

All the participants who had a history of hypertension were on anti-hypertensive medication. Among them, only 59% of the participants had their drugs from nearby Government health centres and 73% of them were aware of the free medication being offered. But still, some of them refused to go to the Government centres to get medication. The major reasons given by them were, distance from old age home to the health centre, lack of motivation and lack of transport facilities. So, this made them depend on their family members and old age home for their medicine supply, which if not provided in a timely manner, would result in irregular and uncontrolled blood pressure.

CONCLUSION

In this study, the prevalence of hypertension was found to be high among the inmates of the old age home and there were a higher number of undiagnosed cases of hypertension among them. The prevalence of psychosocial problems like depression, anxiety and stress were also found to be high.

The findings of this study highlights the need for specialised geriatric clinics to be set up by the government in various health centres through which, outreach activities to screen NCD's like hypertension in old age homes and to provide free medication for hypertension as per NPCDCS programme can be done. It must be kept in mind that, health problems of the elderly in old age homes should always be tackled with a psychosocial intervention component incorporated in the management of these chronic diseases, for achieving better treatment outcomes.

Funding: No funding sources Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee, Sree Balaji Medical College and Hospital

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Cite this article as: Anantha EVM, Gopalakrishnan S, Umadevi R. Prevalence of hypertension and its association with psychosocial factors among old age home inmates in an urban area of Kancheepuram district, Tamil Nadu. Int J Community Med Public Health 2017;4:3712-20.