ORIGINAL RESEARCH PAPER
Volume - 14 | Issue - 05 | May - 2025 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

SOCIO-DEMOGRAPHIC AND PSYCHOSOCIAL DETERMINANTS OF HYPERTENSION AMONG MIDDLE-AGED ADULTS IN RURAL TAMIL NADU

Medical Education

N. Meena — Senior Lecturer In Physiotherapy, Division Of Physical Medicine & Rehabilitation Government Medical College And Hospital (Erstwhile Rajah Muthiah Medical College & Hospital), Annamalai Nagar- 608002, Chidambaram, Cuddalore District, Tamilnadu, India

I. Alwyn* — Intern, Bachelor Of Physiotherapy, Division Of Physical Medicine & Rehabilitation Government Medical College And Hospital, Cuddalore District, Tamilnadu, India
*Corresponding Author

ABSTRACT

Background: Hypertension remains a major public health issue and a key contributor to cardiovascular diseases, with varying prevalence across regions. In Tamil Nadu's Cuddalore district, elevated hypertension rates are influenced by lifestyle choices and limited access to healthcare. Exploring its relationship with physical activity and psychosocial elements is essential for effective health planning. **Objective:** This study aimed to investigate the association between hypertension, physical activity, and psychosocial risk factors among middle-aged individuals in the Cuddalore district. Methodology: A cross-sectional study was carried out at Government Medical College and Hospital, Chidambaram, involving 100 participants aged 35–60 years. Ethical clearance was obtained, and informed consent was secured. Data on demographics, health conditions, and psychosocial aspects were collected through structured interviews. Blood pressure was measured in accordance with American Heart Association criteria. Physical activity was evaluated using the RAPA questionnaire. Variables such as BMI, education, occupation, and lifestyle habits were also considered. Chi-square tests were used for statistical analysis. **Results:** Hypertension showed significant associations with BMI, education level, and self-reported health status. Among overweight participants, 87% were hypertensive ($X^2 = 12.08$, $p = 0.002$). Those with primary education (80.8%, $X^2 = 10.57$, $p = 0.014$) and poor health perception (83.1%, $X^2 = 5.71$, $p = 0.048$) had higher hypertension rates. Unemployed and self-employed individuals also showed increased prevalence. No significant link was observed between hypertension and physical activity (RAPA 1: $X^2 = 1.16$, $p = 0.885$; RAPA 2: $X^2 = 0.68$, $p = 0.712$). **Conclusion:** The findings highlight a strong association between hypertension and socio-demographic factors, emphasizing the need for targeted health interventions.

KEYWORDS

Hypertension, Middle-aged adults, Psychosocial risk factors, Physical activity

INTRODUCTION:

Hypertension, commonly referred to as high blood pressure, is a significant public health challenge worldwide, contributing to a substantial burden of cardiovascular diseases, stroke, and kidney disorders. It is a chronic condition where blood pressure in the arteries remains elevated over time, increasing the risk of severe health complications. According to the World Health Organization (2019), approximately 33% of the global population is affected by hypertension, with prevalence rates slightly higher in men (34%) than women (32%) [1]. In India, data from the National Family Health Survey (NFHS-5, 2019-21) highlight a hypertension prevalence of 24% among men and 21.3% among women, with Tamil Nadu exhibiting even higher rates at 30.2% for men and 24.8% for women. In the Cuddalore district, the prevalence is 27% in men and 20.1% in women.

Several risk factors contribute to the development of the condition, including genetic predisposition, environmental influences, unhealthy diet, lack of physical activity, obesity, stress, and low socio-economic status [2]. In middle-aged adults (35-60 years), the risk of high blood pressure is particularly concerning due to the onset of age-related metabolic and cardiovascular changes. Even though increasing awareness of high blood pressure and its risk factors, there remains a gap in understanding its correlation with physical activity levels and psychosocial risk factors in rural Indian settings. Various studies indicate that physical inactivity is a major contributor to hypertension, with sedentary lifestyles exacerbating cardiovascular risks [3]. Additionally, psychosocial stressors such as financial instability, occupational stress, and social isolation, play a crucial role in hypertension onset and progression [4]. However, limited research has been conducted on how these factors collectively impact hypertension in middle-aged adults, particularly in rural South India. Filling this gap through targeted research can help shape effective public health strategies for the prevention and management of hypertension.The present study aims to analyze the correlation between hypertension, physical activity, and psychosocial risk factors in middle-aged adults in rural Tamil Nadu. By examining the prevalence and associated risk factors, the study seeks to provide evidence-based insights that can guide the development of effective interventions and policies for hypertension management in resource-limited settings.

Methodology

This study was conducted at the Government Medical College and Hospital, Cuddalore district, Chidambaram, Tamil Nadu, India. The methodology followed a structured process to ensure systematic data collection and analysis.

Participant Recruitment And Consent

The study commenced after receiving approval from the hospital authorities. A total of 100 middle-aged adults, between the ages of 35 and 60, were recruited. Participants were informed about the study's objectives, procedures, confidentiality protocols, and their right to withdraw at any point. Informed consent was obtained from all participants prior to data collection.

Data Collection

Structured Questionnaire: Data on socio-demographic details, medical history, and lifestyle habits were collected using a self-reported questionnaire.

Physical Activity Assessment: The Rapid Assessment of Physical Activity (RAPA) questionnaire [5] was used to evaluate the physical activity levels.

Psychosocial Risk Factors: Data collected on body mass index (BMI), smoking habits, alcohol consumption, stress levels, and occupational status.

Blood Pressure Measurement: Blood pressure was assessed following the American Heart Association guidelines [6]. Hypertension was defined as a systolic blood pressure (SBP) of 140 mmHg or above, and/or a diastolic blood pressure (DBP) of 90 mmHg or above. Pre-hypertension was identified when the SBP ranged from 120 to 139 mmHg, and/or the DBP ranged from 80 to 89 mmHg.

Measurement Procedure

Blood Pressure Measurement: Blood pressure was measured using a sphygmomanometer, ensuring a seated position with adequate rest before assessment.

BMI Assessment: Height and weight were recorded to calculate BMI, categorized as:

i **Underweight:** <18.5

ii **Normal weight:** 18.5-24.9
iii **Overweight:** ≥25

Physical Activity Assessment: Participants completed the RAPA questionnaire to assess their physical activity levels.

Psychosocial Factors: Information gathered on marital status, occupation, education level, smoking and alcohol habits, and perceived stress levels.

Data Analysis
Descriptive Analysis: Frequency distribution to determine the prevalence of hypertension among the participants.

Inferential Analysis: Bivariate chi-square tests were applied to assess associations between hypertension and categorical variables, such as age, gender, BMI, smoking, alcohol consumption, and physical activity levels.

Ethical Considerations
Confidentiality and voluntary participation were ensured throughout the study, with strict data protection measures in place to safeguard participant information.

Data Analysis And Results
This study examined the association between psychological risk factors, physical activity, and hypertension among 100 adults. The analysis used Chi-square tests. Statistical analysis was conducted using SPSS Version 21. Table 1 analyzes the relationship between physio-psychological factors and the presence or absence of hypertension.

Table 1: Physio-Psychological Risk Factors in Hypertension

Variables	Frequency (%)	Non-Hypertension (%)	Hypertension (%)	Chi-Square Test (X^2)	P-Value
Age					
35 – 44	34 (34%)	10 (29.4%)	24 (70.6%)	0.59	0.745
45 – 54	37 (37%)	8 (21.6%)	29 (78.4%)		
More than 55	29 (29%)	7 (24.1%)	22 (75.9%)		
Gender					
Male	62 (62%)	12 (19.4%)	50 (80.6%)	2.77	0.096
Female	38 (38%)	13 (34.2%)	25 (65.8%)		
BMI					
Under weight	4 (4%)	3 (75%)	1 (24%)	12.08	0.002*
Normal	42 (42%)	15 (35.7%)	27 (64.3%)		
Over weight	54 (54%)	7 (13%)	47 (87%)		
Marital status					
Married	97 (97%)	24 (24.7%)	73 (75.3%)	0.11	0.735
Widow	3 (3%)	1 (33.3%)	2 (66.7%)		
Education					
Illiterate	17 (17%)	9 (52.9%)	8 (47.1%)	10.57	0.014*
Primary	52 (52%)	10 (19.2%)	42 (80.8%)		
Secondary school	19 (19%)	2 (10.5%)	17 (89.5%)		
Higher education	12 (12%)	4 (33.3%)	8 (66.7%)		
Heart disease	15 (15%)	3 (20%)	12 (80%)	0.23	0.628
Sleeping problem	21 (21%)	7 (33.3)	14 (66.7%)	0.98	0.321
Occupation					
Public sector	2 (2%)	1 (50%)	1 (50%)	14.86	0.021*
Private sector	18 (18%)	7 (38.9%)	11 (61.1%)		
Agriculture	18 (18%)	7 (38.9%)	11 (61.1%)		
Business	1 (1%)	1 (100%)	-		
Self-employee	43 (43%)	8 (18.6%)	35 (81.4%)		
Unemployed	6 (6%)	1 (16.7%)	5 (83.3%)		
Others	12 (12%)	-	12 (100%)		
Place–Resident					
Urban	3 (3%)	2 (66.7%)	1 (33.3%)	2.86	0.091
Rural	97 (97%)	23 (23.7%)	74 (76.3%)		

%-Percentage, X^2-Chi-square, p-Probability, *-Significant

There was a significant association between BMI and hypertension (X^2 = 12.08, p = 0.002), with 87% of overweight individuals having hypertension. Education level also showed a significant association with hypertension (X^2 = 10.57, p = 0.014), as 80.8% of those with only primary education had hypertension. Likewise, poor health status was significantly associated with a higher prevalence of hypertension (X^2 = 5.71, p = 0.048). Occupation was another factor significantly associated with hypertension (X^2 = 14.86, p = 0.021), with 83.3% of unemployed individuals being affected.

Association Between Physical Activity And Hypertension
The association of physical activity with hypertension, assessed using RAPA 1 and RAPA 2, is presented in Table 2 and Table 3.

Table 2: Association of Physical Activity and Hypertension Assessed by RAPA 1

RAPA 1 Category	Frequency (%)	Non-Hypertension (%)	Hypertension (%)	Chi-Square Test (X^2)	P-Value
Sedentary	4 (4%)	1 (25%)	3 (75%)	1.16	0.885
Under-Active	8 (8%)	2 (25%)	6 (75%)		
Under-Active-Regular LightActivity	19 (19%)	3 (15.8%)	16 (84.2%)		
Under-Active-Regular Active	27 (27%)	7 (25.9%)	20 (74.1%)		
Active	42 (42%)	12 (28.6%)	30 (71.4%)		

Most sedentary individuals (75%) had hypertension; however, the association between physical activity level and hypertension was not statistically significant (X^2 = 1.16, p = 0.885).

Table 3: Association of Physical Activity and Hypertension Assessed by RAPA 2

RAPA 2 Category	Frequency (%)	Non-Hypertension (%)	Hypertension (%)	Chi-Square Test (X^2)	P-Value
None	98 (98%)	25 (25.5%)	73 (74.5%)	0.68	0.712
Either Strength or Flexibility	1 (1%)	-	1 (100%)		
Both	1 (1%)	-	1 (100%)		

The association between RAPA 2 and hypertension was statistically insignificant (X^2 = 0.68, p = 0.712). However, a majority of individuals who did not engage in strength or flexibility exercises had hypertension (74.5%).

Association Between Physical Activity and Physio-Psychological Risk Factors
Table 4 illustrates the relationship between physical activity (measured using RAPA 1) and physio-psychological risk factors.

Table 4: Association Between Physical Activity and Physio-Psychological Risk Factors

Risk Factor	Chi-Square Test (X^2)	P-Value
Age	16.81	0.032*
Gender	34.95	0.001*
BMI	3.19	0.922
Marital Status	8.44	0.077
Education	18.35	0.105
Health Condition	28.16	0.001*
Smoking Habit	16.30	0.042*
Alcohol Consumption	11.47	0.018*

X^2-Chi-square, *-Significant

Age and gender were significantly associated with physical activity ($p < 0.05$). Health conditions, smoking, and alcohol consumption also showed a significant association with physical activity ($p < 0.05$). In contrast, BMI and education were not significantly associated with physical activity.

The analysis showed a significant association between hypertension and factors like BMI, education, health condition, and occupation, but no link to physical activity levels (RAPA 1 and 2). Age, gender, smoking, alcohol, and health status also influenced activity levels. These findings emphasize the need for targeted lifestyle interventions addressing both physical and psychological health to manage and prevent hypertension.

DISCUSSION

The present study explored the correlation between hypertension, physical activity levels, and psychosocial risk factors among middle-aged adults in Government Medical Hospital, Cuddalore district, Tamil Nadu, India.

The findings provide critical insights into the prevalence of hypertension in this demographic and highlight significant associations with various risk factors.

Prevalence And Demographic Factors

The present study found a high hypertension prevalence of 75% among 100 participants, aligning with Gupta et al., who reported around 70% among middle-aged adults in India [7]. However, no significant association between age and hypertension was observed, contrasting Whelton et al., who identified age as a risk factor, especially in older adults [8]. The consistent prevalence across age groups suggests that lifestyle and psychosocial factors may play a greater role. A higher hypertension rate was seen in males (80.6%) than females (65.8%), though not statistically significant. This pattern is in line with global data, where men generally show higher hypertension rates than women, particularly in midlife [9].

Psychosocial Risk Factors

In the present study, a higher prevalence of hypertension was observed among overweight and obese individuals, supporting findings by Jayedi and Shab-Bidar that abdominal obesity significantly predicts hypertension risk [10]. Hypertension was also more common in individuals with lower education levels, consistent with Liu et al., who linked educational attainment to better blood pressure control [11]. Participants with poor overall health had a significantly higher risk of hypertension, aligning with Kearney et al., who associated co-morbidities and unhealthy lifestyles with elevated blood pressure [12]. Hypertension was notably higher among self-employed and unemployed individuals, reflecting Virtanen et al.'s findings on job insecurity and stress as risk factors [13]. These results underscore the multifactorial nature of hypertension and the critical role of psychosocial and socio-demographic determinants in its development [14].

Physical Activity And Hypertension

The study found no statistically significant association between physical activity (measured by RAPA 1) and hypertension, despite a high prevalence of hypertension among sedentary individuals, contrary to established literature supporting physical activity's protective role [15]. Similarly, while hypertension prevalence was higher (74.5%) among participants not engaging in strength and flexibility exercises (RAPA 2), the association was also not significant [16], suggesting other factors may influence hypertension in this population [17].

Analysis Of Associations With Physical Activity

Analysis revealed significant correlations between RAPA 1 activity and age, gender, health, smoking, occupation, and lifestyle. Individuals over 55 were more sedentary [18]. Males and participants in good health were more active [19], while regular smokers were less active [20]. Public sector employees and unemployed individuals were generally more active, whereas those in agriculture and business were more sedentary [21]. An active lifestyle correlated with higher activity [19]. For RAPA 2, only higher education and absence of respiratory issues were significantly associated with participation [22].

Limitations Of The Study And Future Recommendations

This study has several limitations. The sample size of 100 may not suffice for generalization. Its cross-sectional design limits causal inference. Self-reported data introduce recall and social desirability bias. RAPA 1 and 2 provided basic activity insights without intensity or duration details. Confounding factors like genetics, medication, and diet were not considered. Conducting research in one area limits generalizability, and self-reported health may reduce reliability. Short duration prevented trend analysis. Future studies should use larger, diverse, longitudinal designs with objective measures and clinical assessments, controlling for confounders. Promoting physical activity, enhancing healthcare access, and community mental health support are vital.

CONCLUSION:

The study reveals a high prevalence of hypertension among middle-aged adults in Cuddalore, with significant associations to psychosocial factors like BMI, education, and health status. While physical activity was not significantly linked to hypertension, inactivity may still contribute to risk. The findings highlight the need for targeted public health interventions, including promoting physical activity, improving healthcare access, and addressing socio-economic factors. Future research should use larger samples and longitudinal designs to establish causal relationships and improve interventions.

Conflict Of Interest: The authors declare that there is no conflict of interest regarding the publication of this paper. No financial support, grants, or personal relationships have influenced the work reported in this manuscript. All authors have contributed to the work and approve its submission for publication.

REFERENCES

1. World Health Organization. (2021). WHO Global Report on Hypertension: The race against a silent killer.
2. National Family Health Survey (NFHS-5). (2019–21). India Fact Sheet. Retrieved from https://rchiips.org/nfhs/NFHS-5_FCTS/India.pdf
3. National Heart, Lung, and Blood Institute. (n.d.). High blood pressure: Causes and risk factors. Retrieved from https://www.nhlbi.nih.gov/health/high-blood-pressure/causes
4. Spruill, T. M. (2010). Chronic psychosocial stress and hypertension. Current Hypertension Reports, 12(1), 10–16.
5. Whelton, P. K. et al. (2018). 2017 guideline for the prevention, detection, evaluation, and management of high blood pressure in adults: Executive summary. Journal of the American College of Cardiology, 71(19), 2199–2269.
6. Topolski, T. D. et al. (2006). The Rapid Assessment of Physical Activity (RAPA) among older adults. Preventing Chronic Disease, 3(4). Retrieved from http://www.cdc.gov/pcd/issues/2006/oct/06_0001.htm
7. Gupta, R. et al. (2019). Emerging trends in hypertension epidemiology in India. Journal of Human Hypertension, 33(8), 575–587.
8. Whelton, P. K. et al. (2018). 2017 ACC/AHA guideline for the prevention, detection, evaluation, and management of high blood pressure in adults. Journal of the American College of Cardiology, 71(19), e127–e248.
9. Mills, K. T. et al. (2016). Global disparities of hypertension prevalence and control. Circulation, 134(6), 441–450.
10. Jayedi, A. & Shab-Bidar, S. (2021). Abdominal obesity and risk of hypertension. Nutrition, Metabolism and Cardiovascular Diseases, 31(3), 563–573.
11. Liu, S. Y. et al. (2013). Sheepskin effects of education: The long-term health impacts of attaining a high school diploma. American Journal of Public Health, 103(6), 994–1001.
12. Kearney, P. M. et al. (2005). Global burden of hypertension. The Lancet, 365(9455), 217–223.
13. Virtanen, M. et al. (2018). Work stress and risk of death in people with cardiometabolic disease. The Lancet Diabetes & Endocrinology, 6(9), 705–713.
14. Paul, G. K. et al. (2021). Hypertension and its physio-psychosocial risk factors in elderly people: A cross-sectional study in north-eastern region of Bangladesh. Journal of Geriatric Cardiology, 18(1), 75–82.
15. Cornelissen, V. A. & Smart, N. A. (2013). Exercise training for blood pressure: A systematic review and meta-analysis. Journal of the American Heart Association, 2(1), e004473.
16. Pescatello, L. S. et al. (2015). Exercise and hypertension: Recent advances in exercise prescription. Current Hypertension Reports, 17(11), 87.
17. Centers for Disease Control and Prevention (CDC). (2022). Physical activity among adults aged 50 and over — United States, 2017. Morbidity and Mortality Weekly Report, 71(18), 597–603.
18. Warburton, D. E. & Bredin, S. S. (2017). Health benefits of physical activity: A systematic review of current systematic reviews. Current Opinion in Cardiology, 32(5), 541–556.
19. Ussher, M. et al. (2003). Efficacy of exercise counseling as an aid for smoking cessation: A randomized controlled trial. Addiction, 98(4), 523–532.
20. Steeves, J. A. et al. (2015). Classification of occupational activity categories using accelerometry: NHANES 2003–2004. The International Journal of Behavioral Nutrition and Physical Activity, 12, 89.
21. Churilla, J. R. & Fitzhugh, E. C. (2012). Total physical activity volume and risk of metabolic syndrome in U.S. adults: 1999 to 2004. Journal of Physical Activity and Health, 9(5), 598–607.