International Journal of Scientific Advances
ISSN: 2708-7972
Volume: 6 | Issue: 2 | Mar – Apr 2025 Available Online: www.ijscia.com
DOI: 10.51542/ijscia.v6i2.13

The Relationship of Obesity and Stress Level with The Incident of Hypertension in Public Primary School Teachers in Bedali Village, Lawang District, Malang Regency

Dwi Aprilawati[1*], Muhammad Auliya Rachman[1], Deandra Maharani Widiatmaja[1], Faizatuz Azzahrah Syamsudi[1], Mahrumi Dewi Tri Utami[1], Nadia Mardiana Hudan[1] , Almira Disya Salsabil[1], Khisma Ekiyanti[1], Vatine Adila[1], Agus Murdianto[2]

[1]Faculty of Medicine, University of Airlangga, Surabaya, Indonesia

[2]UPT Latkesmas Murnajati, Lawang

*Corresponding Author: Dwi Aprilawati; dwiaprilawati@gmail.com

ABSTRACT

Introduction: Hypertension is a non-communicable disease with the most prevalence in the world. In 2021, it is estimated that there will be 1.4 million residents and adults experiencing hypertension [5]. In Indonesia, the incidence of hypertension in the age group >15 years reached 34.1% [13]. According to data from the Bedali Polindes in 2020, hypertension is included in the top 10 most common diseases in Bedali Village. Obesity and stress levels often occur in elementary school teachers due to the lack of implementation of good diet and physical activity at school and the high workload [9]. ***Objective:*** The purpose of this study was to determine the relationship between obesity and stress with the incidence of hypertension in public elementary school teachers in Bedali Village, Lawang District, Malang Regency. ***Methods:*** The method of this research is analytic observational with a cross-sectional research design. The research was conducted from 7 – 13 May 2023. The sample of respondents consisted of all teachers at SDN 1 Bedali, SDN 2 Bedali, SDN 4 Bedali, and SDN 5 Bedali in Bedali Village, Lawang District, Malang Regency who met the inclusion and exclusion criteria, were obtained 44 sample. The research instruments were sphygmomanometers, weight scales, height measurement (microtoise), and the perceived stress scale questionnaire instrument. ***Results:*** Of the 44 respondents, 26 respondents were adults, 17 respondents were pre-elderly, and 1 respondent was elderly. Respondents consisted of 12 male teachers and 32 female teachers. A total of 9 respondents were classified as obese. Based on the stress level using the Perceived Stress Scale questionnaire instrument, 15 respondents had mild stress and 29 had moderate stress. There were 15 respondents who had hypertension. The results of the analysis showed significant results between obesity (p=0.044) and hypertension and significant results between stress levels) with the incidence of hypertension (p=0.037). ***Conclusion:*** The results of this study indicate that there is a relationship between obesity and stress levels with the incidence of hypertension in public elementary school teachers in Bedali Village, Lawang District, Malang Regency.

Keywords: hypertension; obesity; stress level; elementary school teachers.

INTRODUCTION

Hypertension is a non-communicable disease with the most prevalence in the world. In 2021, it is estimated that there will be 1.4 million residents and adults experiencing hypertension [12]. In Indonesia, the incidence of hypertension in the age group >15 years reached 34.1% [5]. According to data from the Bedali Polindes in 2020, hypertension is included in the top 10 most common diseases in Bedali Village. Obesity and stress levels often occur in elementary school teachers due to the lack of implementation of good diet and physical activity at school and the high workload [9].

Factor The risk of obesity in teachers can be associated with older age and stress due to work [2]. Additionally, in a study by Lanier et al (2010) regarding factors related to school teacher awareness basics and implementation of eating patterns and physical activity in schools, it was found that of 1,243 teachers, 56% had no awareness of the importance of diet and physical activity. A study by Kafi and Dyah (2022) explains that 93.7% of respondents who experience moderate levels of work stress can increase the risk of high blood pressure while low work stress is only 28.5%.

Some factors associated with the occurrence of hypertension, include obesity, salt consumption excess, a diet rich in saturated fat, consumption of alcohol, and cigarettes, and stress levels [20; 5].

Obesity is one of the main risk factors for cardiovascular disease, diabetes, musculoskeletal disorders, and cancer [5].

The purpose of this study was to determine the relationship between obesity and stress with the incidence of hypertension in public elementary school teachers in Bedali Village, Lawang District, Malang Regency.

Based on preliminary survey data conducted in Bedali Village, Lawang District, Malang Regency, East Java found that the incidence of hypertension is 30%, which is above the national prevalence of hypertension is 8.1% [8].

RESEARCH METHODS

The method of this research is analytic observational with a cross-sectional research design. The research sample was 44 respondents at SDN 1 Bedali, SDN 2 Bedali, SDN 4 Bedali, and SDN 5 Bedali in Bedali Village, Lawang District, Malang Regency who met the inclusion and exclusion criteria. The research was conducted from 7 – 13 May 2023. The research instruments were sphygmomanometers, weight scales, height gauges, and the Perceived Stress Scale questionnaire instrument. The data taken was collected by an Unair medical student who was on station at Murnajati Lawang of Public Health Training Center, with guidance from Unair academic supervisors and "The Latkesmas field supervisor who has received official permission. The Independent variables are obesity and stress level, dependent variable is hypertension. Obesity is defined if the BMI is more than 25, Stress levels are categorized as mild stress, moderate stress, and severe stress, and Hypertension is diagnosed when sistole is more than 120 and diastole is more than 90. This research uses the chi-square test to find the relationship between independent and dependent variables.

RESULT

TABLE 1: Distribution Age, Gender, Marital status, income, employment status, and smoker of research samples.

Distribution	Frequency	Percentage (%)
Age (n)		
Adult (19-44 years old)	26	59,1
Pre-Elderly (45-64 years old)	17	38,6
Elderly (> 65 years old)	1	2,3
Total	**44**	**100**
Gender		
Male	12	27,3
Female	32	72,7
Total	**44**	**100**
Marital status		
Married	37	84,1
Not married yet	**7**	15,9
Total	**44**	**100**
Income		
<Rp 500.000	5	11,4
Rp 500.000 – minimum wage	8	40,9
>Minimum wage	21	47,7
Total	**44**	**100**
Employment status		
honorary employee	19	43,2
P3K (government employees with a work agreement)	6	13,6
Government employees	19	43,2
Total	**44**	**100**
Smoker		
Yes	**2**	**4,5**
Not Smoker	**42**	**95,5**
Total	**44**	**100%**

TABLE 2: Distribution of Body Mass Index and Stress Level of Research Samples.

Distribution	Frequency (n)	Percentage (%)
Body Mass Index		
<18.5 (underweight)	2	4.5
18.5-24.9 (Normal)	19	43.2
25-29.9 (Pre-Obesity)	14	31.8
30-34.9 (Obesity grade I)	5	11.4
35-39.9 (Obesity grade II)	2	4.5
≥40 (Obesity grade III)	2	4.5
Total	**44**	**100**
Stress Level		
Mild	15	34,1
Moderate	29	65,9
Severe	0	0
Total	**44**	**100**

Table 1 Shows the of distribution Age, Gender, Marital status, income, employment status, and smoker of research samples, the largest number of respondents was found in the adult age group with a range of ages 19 – 44 years were 26 respondents (59.1%). There 32 (72.7%) respondents were female and 37 respondents (84.1%) were married. Respondent's income with the largest proportion was above the minimum wage, 21 respondents (47.7%). Status respondents' employment as honorary teachers and civil servant teachers respectively amounted to 19 respondents (43.2%). Most of the respondents do not smoke 42 respondents (95.5%). Table 2 shows that 43.2% of respondents had a normal BMI and 31.8% were pre-obese 20.4 % obesity and 65.9 % had moderate stress levels.

Bivariate Analysis of Research Results

TABLE 3: Analysis of the Relationship between Obesity and the Incident of Hypertension.

Variables Obesity	Hypertension		*p*-Value	C
	Yes	No		
Not Obesity	26(89,7%)	9(60,0%)		
Obesity	3 (10,3%)	6(40,0%)	0,044	0,329
Total	**29 (100 %)**	**15 (100 %)**		

TABLE 4: Analysis of the Relationship between Stress Levels and the Incident of Hypertension.

Variables Obesity	Hypertension		*p*-Value	C
	Yes	No		
Mild	2(13,3%)	13(44,8%)		
Moderate	13(86,7%)	16(55,2%)	0,037	0,300
Severe	0 (0%)	0(0%)		
Total	**15**	**29**		

Table 3 and Table 4 show the result of the bivariate analysis showing that there is a relationship between stress and hypertension with a p-value of 0.044 and a relationship between obesity and hypertension with a p-value of 0.037.

DISCUSSION

This research discusses factors related to the incident hypertension in State Elementary School teachers in Bedali Village, District Lawang, Malang Regency. Analysis results research shows that there is a significant relationship between obesity with hypertension (p=0.044) and a significant relationship between stress and hypertension (p=0.037). The pathophysiology of hypertension in obese patients includes Increased body mass causes blood to be needed to transport oxygen and nutrients to body tissues increasingly. Obesity is associated with increased intravascular volume and cardiac output. The pumping ability of the heart and circulating blood volume of hypertension sufferers is higher than that of hypertensive sufferers with normal body weight. Weight loss is a one-way prevention and treatment of hypertension. Every kilogram of weight loss can reduce systolic blood pressure by 1.05 mmHg and diastolic as much as 0.92 mmHg [15].

The mechanism causing neural activation Sympathy in obesity includes abnormal adipokine secretion from tissues adipose (leptin); stimulation via the

renin-angiotensin-aldosterone system; insulin resistance; and baroreceptor dysfunction. In addition, obesity is common along with obstructive sleep apnea (OSA), which causes chronic intermittent hypoxia and leads to activation of the body's chemoreceptors carotid which reflexively increases sympathetic nerve activity [17]. In addition, renal sodium reabsorption and volume expansion increase play an important role in initiating associated hypertension with obesity. Visceral adiposity and retroperitoneal overload can cause mechanical compression of the kidney. In addition, perirenal fat accumulation can induce inflammation and expansion of the extracellular matrix of the renal medulla, which causes compression of the renal medulla. This causes reduced blood flow in renal tubules, which lengthens the duration of time during which sodium is reabsorbed fractional can occur.

Risk factors for work stress include excessive workload, disruption of time management, ambiguous employee roles, internal conflicts in work, as well as uncontrolled changes in work. Research studies clear that in adult individuals also show that stress can increase catecholamine levels and diastolic blood pressure [10].

In stressful conditions, the human body synthesizes catecholamine neurotransmitters such as dopamine, adrenaline, and noradrenaline, as well as stress hormones, one of the main stress hormones is cortisol [12]. Increases in catecholamines and stress hormones can cause activation of the sympatho-adreno-medullary system, which results in increased systemic vascular resistance and narrowing of the vascular lumen resulting in an increase in blood pressure [10].

Hormone Adrenaline is one of the causes of severe stress and can trigger increased blood pressure and potential blood clots causing a heart attack. Adrenaline also speeds up the heart rate and narrows the coronary arteries. Different psychological conditions everyone can also affect blood pressure. Emotions are not controlled and negative thoughts can cause high blood pressure, even though they do not show physical symptoms [1]. In individuals who experience poor sleep quality and prolonged sleep disturbances, apart from activation of the sympathetic nervous system, circadian rhythms also cause disruption and activation of the hypothalamic-pituitary-adrenal axis resulting in a state of metabolic dysfunction that predisposes to hypertension [4].

CONCLUSION

(1) Obesity is related to the incidence of hypertension in elementary school teachers in Bedali Village, Lawang District, Malang Regency with p=0.044.

(2) Stress levels are related to the incidence of hypertension in school teachers based in Bedali Village, Lawang District, Malang Regency with p=0.037.

ACKNOWLEDGMENT

The authors would like to thank all the supervisors and all the research participants who willingly attended the data collection, enabling the successful implementation of this study. Thank you to the ethics committee of the Faculty of Medicine, Airlangga University, for providing ethical approval for this research.

REFERENCES

[1] Ardrian, I., Haiya, N. N., & Sari, T. U. (2018). Signifikansi tingkat stres dengan tekanan darah pada pasien hipertensi. Buku Proceeding Unissula Nursing Conference: Nurse Roles in Providing Spiritual Care in Hospital, Academic, and Community. https://doi.org/10.26532/.v1i1.2907.g2114

[2] Banudi, L., Ischak, W., Koro, S., & Leksono, P. (2018). Prediction model of obesity among teachers in senior high school in Kendari. Belitung Nursing Journal, 4(4), 411–419. https://doi.org/10.33546/bnj.501

[3] Bell, K., & Twiggs, J. (2015). Hypertension: The silent killer: Updated JNC-8 guideline recommendations. Alabama Pharm Assoc.

[4] Calhoun, D. A., & Harding, S. M. (2010). Sleep and hypertension. Chest, 138(2), 434–443. https://doi.org/10.1378/chest.09-2954

[5] World Health Organization. (2021). Hypertension. https://www.who.int/news-room/fact-sheets/detail/hypertension

[6] Kafi, D. S., & Nawawinetu, E. D. (2022). A description of the relationship between occupational stress and blood pressure changes in workshop mechanics. The Indonesian Journal of Public Health, 17(2), 297–304. https://doi.org/10.20473/ijph.v17i2.2022.297-304

[7] Kementerian Kesehatan Republik Indonesia. (2019). Kendalikan faktor risiko hipertensi dengan membatasi asupan natrium. https://p2ptm.kemkes.go.id/infographic/kendalikan-faktor-risiko-hipertensidengan-membatasi-asupan-natrium

[8] Kementerian Kesehatan Republik Indonesia. (2020). Profil kesehatan Indonesia 2019. Jakarta: Kementerian Kesehatan RI.

[9] Lanier, P., Jonson-Reid, M., Stahlschmidt, M. J., Drake, B., & Constantino, J. (2010). Child maltreatment and pediatric health outcomes: A longitudinal study of low-income children. Journal of Pediatric Psychology. https://doi.org/10.1093/jpepsy/jsp086

[10] Motta, E., Motta, J., Souza, L. N., Vieira, B. B., Delle, H., Consolim-Colombo, F. M., Egan, B. M., & Lopes, H. F. (2021). Acute physical and

mental stress resulted in an increase in fatty acids, norepinephrine, and hemodynamic changes in normal individuals: A possible pathophysiological mechanism for hypertension—Pilot study. Journal of Clinical Hypertension, 23(4), 888–894. https://doi.org/10.1111/jch.14190

[11] Monica, S. J., John, S., & Madhanagopal, R. (2018). Risk of obesity among female school teachers and its associated health problems. Current Research in Nutrition and Food Science, 6(2), 404–411. https://doi.org/10.12944/CRNFSJ.6.2.15

[12] Pradhan, T., Jung, H. S., Jang, J. H., Kim, T. W., Kang, C., & Kim, J. S. (2014). Chemical sensing of neurotransmitters. Chemical Society Reviews, 43(12), 4684–4713.

[13] Rasmun. (2004). Stres, koping dan adaptasi teori dan pohon masalah keperawatan. Jakarta: CV Sagung Seto.

[14] Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan Republik Indonesia. (2018). Laporan nasional riset kesehatan dasar. Jakarta: Kementerian Kesehatan RI.

[15] Rohkuswara, T. D., & Syarif, S. (2017). Hubungan obesitas dengan kejadian hipertensi derajat 1 di Pos Pembinaan Terpadu Penyakit Tidak Menular (Posbindu PTM) Kantor Kesehatan Pelabuhan Bandung tahun 2016. Jurnal Epidemiologi Kesehatan Indonesia, 1(2), 13–18. https://doi.org/10.7454/epidkes.v1i2.1805

[16] World Health Organization. (2023). Salt intake. https://www.who.int/data/gho/indicator-metadata-registry/imr-details/3082

[17] Shariq, O. A., & McKenzie, T. J. (2020). Obesity-related hypertension: A review of pathophysiology, management, and the role of metabolic surgery. Gland Surgery, 9(1), 80–93. https://doi.org/10.21037/gs.2019.12.03

[18] Shumba, J., Rembe, S., Maphosa, C., Sotuku, N., Adu, E. O., Drake, M. L., Duku, N., & Okeke, C. I. O. (2016). Causes of work-related teacher stress in early childhood development: A qualitative analysis. Journal of Social Sciences, 46(3), 214–223. https://doi.org/10.1080/09718923.2016.11893529

[19] Singh, A., et al. (2013). A descriptive study of perceived stress among North Indian nursing undergraduate students. Iranian Journal of Nursing and Midwifery Research, 18(4), pp.

[20] Spruill, T. M. (2010). Chronic psychosocial stress and hypertension. Current Hypertension Reports, 12(1), 10–16. https://doi.org/10.1007/s11906-009-0084-8

[21] World Health Organization. (2021). Guideline for the pharmacological treatment of hypertension in adults: Web annex A: Summary of evidence.

[22] World Health Organization. (2010). A healthy lifestyle—WHO recommendations. https://www.who.int/europe/newsroom/fact-sheets/item/a-healthy-lifestyle---who-recommendations

[23] World Health Organization. (2020). Doing what matters in times of stress: An illustrated guide. https://apps.who.int/iris/bitstream/handle/10665/331901/9789240003910-eng.pdf

[24] World Health Organization. (2021). Obesity and overweight. https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight