

## PHYSICAL ACTIVITY AND HYPERTENSION AMONG COMMUNITY AT MUKIM SALAK, SEPANG, SELANGOR, MALAYSIA

Nur Ain S.Z., Afiqah Z., Sarah M.A., Nur Syazwina T., Sarah N.Z., M. Rashidi, Fazal A. H., Sabariah A.H.

Faculty of Medicine, *University of Cyberjaya (UOC)*

Persiaran Bestari, Cyber 11, 63000 Cyberjaya, Selangor, Malaysia

### Corresponding Author:

Sabariah Abd. Hamid

sabar318@gmail.com, +6016 2089887

### Abstract

**Background:** Hypertension is a major cause of premature death worldwide and insufficient physical activity is a key risk for non-communicable disease (NCDs) such as cardiovascular diseases, cancer and diabetes. Therefore, this study has been conducted to determine the prevalence of hypertension and its association with physical activity among community at Mukim Salak, Sepang Selangor.

**Materials and Methods:** A cross sectional study was conducted among Malaysian, aged more than 18-year-old. Respondents who fulfilled the inclusion & exclusion criteria were interviewed with validated questionnaires and data were analysed using SPSS.

**Result:** The prevalence of hypertension was 22.8% with majority from self-reported (15.6%). Those who were more than 40 years-age and had primary education were significantly 3.32 and 12.3 times the risk of having hypertension. Exercise is the most suggested management by healthcare professionals (82.19%) in controlling hypertension and 68.3% of the hypertensive patients were physically active.

**Conclusion:** Most of people aged more than 40 years old were diagnosed with hypertension. It is important to practice healthy lifestyle such as physically active as the prevention and control of hypertension in the community.

**Keywords:** hypertension, physical activity, socio-demography, association, sepang

### 1.0 INTRODUCTION

The World Health Organization (WHO) has reported that an estimated 1.13 billion people worldwide have hypertension. Hypertension - or elevated blood pressure - is a serious medical condition that significantly increases the risks of heart, brain, kidney and other diseases, also a major cause of premature death worldwide (WHO, 2020). Upon comparing Malaysia with other Southeast Asian Countries, Abdul-Razak, et al., (2016) stated that Malaysia ranked first in prevalence of hypertension with 32.7% in comparison with Singapore (26.6%), Indonesia (23.0%)

and Thailand (20.5%) in 2011. The prevalence of hypertension in Malaysia also maintained in the high range from the year 2011 (32.7%) to 2015 (30.3%) and 2019 (30.0%) (NHMS, 2019a).

One of the global targets for non-communicable diseases is to reduce the prevalence of hypertension by 25% by 2025 (baseline 2010) and modifiable risk factors include unhealthy diets (excessive salt consumption, a diet high in saturated fat and trans fats, low intake of fruits and vegetables), physical inactivity, consumption of tobacco and alcohol, and being overweight or obese (WHO, 2020). Regular and adequate levels of physical activity in adults are key contributors to energy expenditure and are essential for energy balance and weight control (Chan, et al., 2017). It also reduces abdominal obesity and results in favorable changes in body composition (Paley & Johnson, 2018). Abdominal obesity was associated with a higher incidence of development of risk factors related to cardiovascular diseases (Barosso, et al., 2017). A study done by Cornelissen, et al, (2013) showed exercise was a successful intervention in reducing blood pressure of the hypertensive subjects ( $p < 0.05$ ).

Therefore, this study aims to determine the prevalence of hypertension and the association with physical activity among community in Mukim Salak, Sepang, Selangor.

## 2.0 MATERIALS AND METHOD

A descriptive cross-sectional study was carried out in a residential area in Salak, Sepang, Selangor, which consisted of approximately 250 populations with majority is Malay. The neighborhood comprises of single and double storey houses with total of 130 houses.

The housing area has been stratified earlier before systematic random sampling was conducted to choose the respondents' houses, followed by simple random sampling to select the respondent within the household. All Malaysian who were living in the area for at least six months, aged more than 18 years, not mentally retarded, deaf and mute, were selected as respondents. Respondents who refused to participate in the survey or were not there during the survey after three visits, will be considered as non-respondents.

Data was collected through face to face interview using a validated questionnaire from National Health Morbidity Survey 2015 (NHMS, 2019b). The data has been analysed using descriptive statistics to get the frequency and relative frequency (percentage) for physical activity, hypertension status and sociodemographic variables. Hypertension is defined as persistent elevation of systolic blood pressure (BP) of 140 mmHg or greater and/or diastolic BP of 90 mmHg or greater, taken at least twice on two separate occasions (CPG, 2018) or a person who has previously been diagnosed with hypertension by health professionals or was prescribed any hypertensive medications. The reading should be taken in a sitting position after 5 minutes of rest, no smoking, alcohol, coffee, tea, stress and exercise at least 30 minutes before taking blood pressure.

The association between physical activity and hypertension, was determined by Odd ratio and Chi square test. The level of significance was set at  $p < 0.05$  and confidence level at 95%.

### 3.0 RESULTS

A total of 180 participants participated in this study, giving an overall response rate of 98.9%.

**Table 1: Prevalence of hypertension among respondents**

Hypertension status		N	%
Yes	Self-reported	28	15.6
	Newly diagnosed	13	7.2
No		139	77.2
<b>Total</b>		<b>180</b>	<b>100</b>

The prevalence of hypertension is 22.8% with majority from self-reported (Table 1).

It is higher among respondents who are more than and equal to 40 years of age (35.6%), male (26.4%), married (25.5%), had primary education (37.5%), retiree (50%) and from a high monthly household income (35.3%) (Table 2). Those who are more than 40 years-age and had primary education are significantly 3.32 and 12.3 times the risk of having hypertension, respectively.

**Table 2: Hypertension status by socio-demographic (N=180)**

Sociodemographic Factors	Hypertension Status		TOTAL n (%)	OR (CI)	P-Value
	Yes n (%)	No n (%)			
<b>Age</b>					
< 40	15(14.3)	90 (85.7)	105(100.0)	1	-
≥ 40	26 (35.6)	47 (64.4)	73 (100.0)	3.32(1.61,6.87)	0.001
<b>Gender</b>					
Male	23 (26.4)	64 (73.6)	87 (100.0)	0.668 (0.331,1.346)	0.07
Female	18 (19.4)	75 (80.6)	93 (100.0)	1	
<b>Marital status</b>					
Married	37 (25.5)	108 (74.5)	145 (100.0)	2.67 (0.88,8.03)	
Single/ Divorcee/Widower	4 (11.4)	31 (88.6)	35 (100.0)	1	0.07
<b>Education level</b>					
Primary education	3 (37.5)	5 (62.5)	8 (100.0)	12.3 (2.36,64.0)	0.03
Secondary education	11 (25.6)	32 (74.4)	43 (100.0)	2.10 (0.56,7.84)	0.27
Tertiary education	27 (20.9)	102 (79.1)	129 (100.0)	1	
<b>Occupational status</b>					
Unemployed	1 (4.2)	23 (95.8)	24 (100.0)	1	
Govt. / Semi-govt.	12 (31.6)	26 (68.4)	38 (100.0)	0.094 (0.011,0.781)	0.029
Private employee	13 (22.4)	45 (77.6)	58 (100.0)	0.151 (0.019,1.223)	0.076
Self-employed	1 (4.8)	20 (95.2)	21 (100.0)	0.870 (0.051,14.822)	0.923

Housewife	6 (27.3)	16 (72.7)	22 (100.0)	0.116 (0.013,1.058)	0.056
Retiree	7 (50.0)	7 (50.0)	14 (100.0)	0.043 (0.005,0.417)	0.007
Student	1 (33.3)	2 (66.7)	3 (100.0)	0.087 (0.004, 1.981)	0.126
<b>Monthly income (RM)</b>					
≤ RM 4849	18 (24.7)	55 (75.3)	73 (100.0)	0.60 (0.19, 1.85)	0.98
RM 4850 - RM 10, 959	17 (18.9)	73 (81.1)	90 (100.0)	0.43 (0.14, 1.32)	0.14
≥ RM 10, 960	6 (35.3)	11 (64.7)	17 (100.0)	1	

**Table 3: Treatment facilities visited by self-reported hypertensive respondents**

<b>Treatment facilities</b>	<b>n</b>	<b>%</b>
Private clinic	13	46.4
Government clinic	12	42.9
Private hospital	2	7.1
Government hospital	1	3.6
<b>Total</b>	<b>28</b>	<b>100</b>

Private clinic is the highest treatment facility that has been visited (46.4%) followed by government clinic (42.9%).

**Table 4: Management suggested by healthcare professionals to self-reported hypertensive respondents (N=28)**

<b>Treatment facilities</b>	<b>Yes n (%)</b>	<b>No n (%)</b>
Advice to start exercise	23 (82.1)	5 (17.9)
Advice to lose body weight	19 (67.9)	9 (32.1)
Drugs	18 (64.3)	10 (35.7)
Advice to reduce salt intake	17 (60.7)	11 (39.3)

Table 4 shows that exercise is the most suggested management by healthcare professionals (82.19%) in controlling hypertension and it is consistent as the most common activity among hypertensive respondents (38.5%) (Table 5).

**Table 5: Activities in controlling hypertension among self-reported hypertensive respondents**

Activities	n	%
Exercise	9	38.6
Diet	7	26.9
Drugs	7	26.9
Rest	1	3.8
None	1	3.8
<b>Total</b>	<b>25</b>	<b>100</b>

\*3 missing

**Table 6. Association between physical activity and hypertension status**

Physical activity Status	Hypertension status		Total n (%)	Odd ratio (CI)	P-value ( $\chi^2$ value)
	Yes n (%)	No n (%)			
Active	28 (22.6)	96 (77.4)	124 (100.0)	1	0.925
Inactive	13 (23.2)	43 (76.8)	56 (100.0)	0.965 (0.456, 2.042)	(0.009)

Among respondents who physically active, only 22.6% have hypertension. However, statistically there was no significant association ( $P > 0.05$ ) between physical activity and hypertension.

#### 4.0 DISCUSSION

The population in Mukim Salak is not representing Malaysian population. The sociodemographic profile of this community differed from the 2019 Malaysian population of the Department of Statistics Malaysia in terms of sex and ethnic distribution (DOSM, 2019). The sex ratio of males to females in Mukim Salak was 29:31 while in Malaysian population it was 107:100. Our population was 100% Malays, while the nationally-representative population showed an ethnic distribution of 69.3% Bumiputera, 22.8% Chinese, 6.9% Indians, and 1% from other ethnic groups.

The overall prevalence of hypertension among our community was higher in comparison to the national prevalence, NHMS (2019a) at 15.9% as well as prevalence in China (23.2%) (Baiting, et al., 2019). Our study showed that the prevalence of hypertension weighted among respondents age  $\geq 40$  were 35.6%, which consistent with study by NHMS (2019a) and Zhengyi, et al., (2019). The risk of hypertension increases in aging groups because of artery stiffness due to luminal enlargement with wall thickening and a reduction of elastic properties at the level of large elastic arteries which contributes to increases in systolic blood pressure (Lee & Oh, 2010).

Agho, et al., (2018), reported that males have higher prevalence of hypertension (20.4%) as compared to females, which was consistent with our finding. This might be due to the estrogen level in females, exert some beneficial cardiovascular effect such as vasodilation, sympatho inhibition and also decreased in aortic stiffness (Doumas, et al., 2013).

Primary education has the highest prevalence of hypertension compared to secondary and tertiary education (46.8%, 29.1% and 24.7%, respectively) (Dégano, et. al., 2017), which was similar as our result. Afroz, et al., (2019) reported low educational level was significantly associated with less awareness, low self-management behaviors, low self-efficacy, and low continuity of care. Lack of education might also adversely influence self-seeking behavior or access to health care (Di Chiara, et al., 2015).

Most of our hypertensive respondents choose private clinics as their main health facility because majority of them have high income, thus they could choose a higher quality service clinic regardless of the cost (Mosadeghrad, 2014). According to Javed & Ilys, (2017), the most important attributes of service quality were empathy, assurance, reliability and responsiveness. Besides, the skill level and expertise of professionals were also an important factor in the selection choice (Aydin & Karamehmet, 2017).

A study done among the self-reported hypertension in rural community by Wang, et al., (2013) reported that only 4.9% received formal counselling or education and 48.0% did not receive any antihypertensive medication from health professionals. This might be due to a long-term need for medication and a fear of side effects (Devkota, et al., (2016). Furthermore, Valderrama, et al., (2010) stated majority (24.4%) of the hypertensive patients received advice to exercise, consistent with our result, as physical inactivity can contribute to chronic diseases such as hypertension and diabetes mellitus (Booth, et al., 2012)

The NHMS (2019a), showed top 20% and income of higher than RM 5000 have the highest prevalence of physical inactivity (46.6%) due to sedentary behaviour, long working hours and family responsibilities (Ying, et al., 2014). Waheeda, et al., (2018) and Samir, et al., (2011) reported that time constraints due to work as one of the barriers to physical activity.

Although treatment and control of hypertension reduce the excess risk of cardiovascular disease, the risk remains higher than in ethnicity, age and gender sex-matched normotensive individuals (Struthers, 2013). Thus, cardiovascular health equity will require implementation of effective strategies that reduce the excess incidence.

The World Health Organization has developed a series of recommendations based on lifestyle risk factors to prevent and control disease (WHO, 2013). Increasing physical activity is one of these recommendations because it is considered a widely accessible, inexpensive, and effective intervention. Physical activity can be recreational, performed during free time and to meet personal interests and needs, and occupational which associated with the activity required for one's job (Barengo, et al., 2007)

Regular aerobic exercise adequate to achieve moderate fitness can lower blood pressure, enhance weight loss, and reduce mortality (Petrella, 1998). Diaz, et al. (2017) also reported that recommended levels of moderate-vigorous physical activity reduce incident hypertension in African American adults by an estimated 24% (95% confidence interval 1%–42%).

Our result showed among respondents who physically active, only 22.6% have hypertension, however it was not statistical significant. This was supported by a meta-analysis study on physical activity and hypertension by Pengcheng, et al (2013), which suggested that there was an inverse dose-response association between levels of recreational physical activity and risk

of hypertension, whereas there was no significant association between occupational physical activity and hypertension.

## 5.0 CONCLUSION

The prevalence of hypertension was higher among people with more than 40 years-age and they were significantly 12.3 times the risk of having hypertension. Majority of them were using physical activity to control their hypertension.

Therefore, it is important to have a comprehensive intervention such healthy lifestyle that target the general population, as well as focus on improving awareness, treatment and control among the population.

## ACKNOWLEDGEMENTS

We are grateful for the financial help furnished by University of Cyberjaya (UoC). We would also like to express our deep gratitude and acknowledgement towards the respondents who were willing to become part of our study, the students of Group 1 Batch 2016 UoC in Community Medicine posting, as the data collectors and Group 5 Batch 2018 in helping to analyse the data.

## References

- Abdul Razak, S., Mohammad Daher, A., Ramli, A. S., Ariffin, F., Mazpuspavina, M. Y., Ambigga, K. S., Miskan, M., Abdul Hamid, H., Mat Nasir, N., Nor Ashikin, M. N. K., Ng, K. K., Nawawi, H., & Yusoff, K. 2016. Prevalence, awareness, treatment, control and socio demographic determinants of hypertension in Malaysian adults. *BMC Public Health*. **16**: 351.
- Agho, K. E., Osuagwu, U. L., Ezeh, O. K., Ghimire, P. R., Chitekwe, S., Ogbo, F. A. 2018. Gender differences in factors associated with prehypertension and hypertension in Nepal: A nationwide survey. *PloS one*. **13**(9): e0203278.
- Afroz, A., Ali, L., Karim, M. N., Alramadan, M. J., Alam, K., Magliano, D. J., & Billah, B. 2019. Glycaemic Control for People with Type 2 Diabetes Mellitus in Bangladesh - An urgent need for optimization of management plan. *Scientific Reports*. **9**(1): 1–10.
- Aisyah Waheeda, R., Rhesara, S., Nik Nasreen, N. K., Sabariah A. H. 2018. Physical Activity Status of Community in Kg Hulu Chuchoh, Sg pelek, Sepang, Malaysia. *International Journal of Education & Research*. **6**(10): 37-46.
- Aydin, G., & Karamehmet, B. 2017. Factors affecting health tourism and international health-care facility choice. *International Journal of Pharmaceutical and Healthcare Marketing*. **11**(1): 16-36.

- Baiting, L., Hainiang, L., Rongmei, Na., Xiaofei, Li., Qianxiao, L., Libo, C., Wencheng, T., Jiahui, H., Dong, C., Yalan, C., Zhu, L., Weiyi, F., Ning, Z., Qin, Y. 2019. A Comparison on Prevalence of Hypertension and Related Risk Factors between Island and Rural Residents of Dalian City, China. *International Journal of Hypertension*. **2019**: 8
- Barengo, N.C., Hu, G., Tuomilehto, J. 2007. Physical activity and hypertension: evidence of cross-sectional studies, cohort studies and meta-analysis. *Curr Hypertens Rev*. 3:255–263.
- Barroso, T.A., Marins, L.B., Alves, R., Gonçalves, A.C.S., Barroso, S.G., Rocha, G.D.S. 2017. Association of central obesity with the incidence of cardiovascular diseases and risk factors. *Int J Cardiovasc Sci*. **30**:5.
- Booth, F. W., Roberts, C. K., & Laye, M. J. 2012. Lack of exercise is a major cause of chronic diseases. *Comprehensive Physiology*. **2**(2): 1143–1211.
- Chan, Y.Y., Lim, K.K., Lim, K.H., The, C.H. 2017. Physical activity and overweight/obesity among Malaysian adults: Findings from the 2015 National Health and morbidity survey (NHMS). *BMC Public Health*. **17**(733): 1-12.
- CPG. 2018. Clinical Practice Guidelines on Management of Hypertension 2018, 5th ed. 5. 1. Kuala Lumpur: Kementerian Kesihatan Malaysia (KKM).
- Cornelissen, V. A., Buys, R., & Smart, N. A. 2013. Endurance exercise beneficially affects ambulatory blood pressure: A systematic review and meta-analysis. *Journal of Hypertension*. **31**(4): 639-48.
- Dégano, I. R., Marrugat, J., Grau, M., Salvador-González, B., Ramos, R., Zamora, A., Martí, R., & Elosua, R. 2017. The association between education and cardiovascular disease incidence is mediated by hypertension, diabetes, and body mass index. *Scientific reports*. **7**(1): 12370.
- Devkota, S., Dhungana, R.R., Pandey, A.R., Bista, B., Panthi, S., Thakur, K.K., and Gajurel, R.M. 2016. Barriers to Treatment and Control of Hypertension among Hypertensive Participants: A Community-Based Crosssectional Mixed Method Study in Municipalities of Kathmandu, Nepal. *Frontiers in Cardiovascular Medicine*. **3**:1-9.
- Diaz, K.M., Booth, J.N., Seals, S.R., Abdalla, M., Dubbert, P.M., Sims, M., Ladapo, J.A., Redmond, N., Muntner, P., Shimbo, D. 2017. Physical activity and incident hypertension in African Americans: the Jackson Heart Study. *Hypertension*. **69**:421–427.
- Di Chiara, T., Scaglione, A., Corrao, S., Argano, C., Pinto, A., & Scaglione, R. 2015. Association between low education and higher global cardiovascular risk. *Journal of clinical hypertension (Greenwich, Conn.)*. **17**(5): 332–337.

- DOSM. 2019. Department of Statistics Malaysia (DOSM) 2019. Current Population Estimates, Malaysia, 2018-2019.
- Doumas, M., Paademetriou, V., Faselis, C., & Kokkinos, P. 2013. Gender Differences in Hypertension: Myths and Reality. *Springer Science+Business Media New York*. **15**(4): 321–330.
- Javed, S. A., & Ilyas, F. 2017. Service quality and satisfaction in healthcare sector of Pakistan- the patients' expectations. *International Journal of Health Care Quality Assurance*. **31**(6): 1-13.
- Lee, H.Y. & Oh, B. 2010. Aging and arterial stiffness. *Circulation Journal*. **74**(11): 2257-2262.
- Mosadeghrad, A. M. 2014. Factors influence healthcare service quality. *International Journal of Health Policy and Management*. **3**(2): 77-89.
- National Health and Morbidity Survey (NHMS). 2019a. Volume II: Non-Communicable Diseases, Risk Factors & Other Health Problems. *Institute for Public Health, Ministry of Health, Malaysia*.
- National Health & Morbidity Survey (NHMS). 2019b. Vol I: Methodology and General Findings. *Institute for Public Health, Ministry of Health, Malaysia*.
- Paley, C.A., Johnson, M.I. 2018. Abdominal obesity and metabolic syndrome: exercise as medicine? *BMC Sports Sci Med Rehabil*. **10**: 7.
- Pengcheng, H., Huanmiao, Xun., Kathleen, H.R., Yiguan, W., Wei, M., Bo, X. 2013. Physical Activity and Risk of Hypertension: A Meta-Analysis of Prospective Cohort Studies. *Hypertension*. **62**(6):1021–1026
- Petrella RJ. 1998. How effective is exercise training for the treatment of hypertension? *Clin J Sport Med*. **8**:224–31.
- Samir, N., Mahmud, S., & Khuwaja, A. K. 2011. Prevalence of physical inactivity and barriers to physical activity among obese attendants at a community health-care center in Karachi, Pakistan. *BMC Research Notes*. **4**(1):174.. <https://doi.org/10.1186/1756-0500-4-174> (14 November 2020).
- Struthers, A.D. 2013. A new approach to residual risk in treated hypertension—3P screening. *Hypertension*. **62**:236–239.
- Valderrama, A.L., Tong, X., Ayala, C. and Keenan, N.L. 2010. Prevalence of Self-Reported Hypertension, Advice Received From Health Care Professionals, and Actions Taken to Reduce Blood Pressure Among US Adults—HealthStyles, 2008. *The Journal of Clinical Hypertension*. **12**: 784-792.

- World Health Organization 2020. Hypertension 2020.
- World Health Organization. 2013. World Health Day 2013.
- Wang, Y.-B., Kong, D.-G., Ma, L.-L., & Wang, L.-X. 2013. Patient related factors for optimal blood pressure control in patients with hypertension. *African Health Sciences*. **13**(3).
- Ying, C., Kuay, L. K., Huey, T. C., Hock, L. K., Abd Hamid, H. A., Omar, M. A., & Cheong, K.C. 2014. Prevalence and factors associated with physical inactivity among Malaysian adults. *Southeast Asian Journal of Tropical Medicine and Public Health*. **45**(2):467.
- Zhengye, L., Xingyu, L. Zhongan, Z., Li, H., Qing, Z., Renlin, H., Pei, C., Ailin, L., Jun, L., Jianbo, L. 2019. Epidemiology of Hypertension in a Typical State-Level Poverty-Stricken County in China and Evaluation of a Whole Population Health Prevention Project Intervention. *International Journal of Hypertension*. **2019**: 10.