

# The Importance Of Spirituality, Physical Activity and Sleep Duration to Prevent Hypertension among Elderly in Aceh-Indonesia

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## ABSTRACT

**Introduction:** Hypertension is a condition that is common in the elderly population. Unlike physical activity and sleep duration, only a small proportion of studies have assessed the association of spirituality with hypertension.

**Aims:** This study was aimed at looking at the relationship between spirituality, physical activity, and sleep duration with hypertension.

**Methods:** This research is a cross-sectional study and data collection was conducted through a survey of 483 elderly people aged 60 years or over in 2019 in Aceh, Indonesia. To answer the research hypothesis, we used a logistic regression test.

**Results:** Although we found an association between spirituality ( $p=0.007$ ), physical activity ( $p<0.001$ ) and sleep duration ( $p=0.006$ ) and hypertension, we did not find an association between coffee drinking habits ( $p=0.204$ ) and hypertension in the elderly. in Aceh. The study results showed that physical activity had a stronger relationship with hypertension

**Conclusions:** This study concludes that spirituality, physical activity, and sleep duration can prevent or reduce hypertension in the elderly in Aceh.

**Keywords:** Elderly, Hypertension, Physical Activity, Spirituality, Sleep Duration

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## INTRODUCTION

It was recognized that hypertension is a risk factor for heart and blood vessel disease. It is a trigger for heart failure, stroke and kidney disease, and even death (1). It is estimated that 9.4 people die every year in the world as a result of complications rather than the number of hypertension (2). Globally in 2015, it is estimated that the adult population suffering from hypertension will be 1.13 billion and this number has increased compared to 1975 which only amounted to 594 million people (3). Most of them or two-thirds live in low and middle-income countries (2).

It is common knowledge that hypertension often occurs in the elderly. Age is considered as a risk factor for hypertension. The longer a person lives, the higher the chances of developing hypertension. Until now, hypertension is still a big challenge in the world of health. This study aims to assess the relationship between spirituality, physical activity, and sleep duration with hypertension in the elderly in Aceh Province, Indonesia. We suspect that spirituality, physical activity, and sleep duration have a specific role in preventing hypertension and lowering blood pressure.

## MATERIALS AND METHODS

### Study Design

This study was conducted using a cross-sectional approach and a population of 60 years or more. The sample size required was based on the rule of thumb formula, where the sample was accounted for 5-10 times the indicator (observed variables), namely 43 indicators. Hence the minimum sample size was 430 respondents. The actual sample size taken was 483 respondents. The inclusion criteria for participants were: able to communicate, signing a statement of consent to be a respondent, and were not severely ill or admitted to a health service at the time of the study.

in Indonesia (4). Hypertension cases among elderly people in Indonesia are also increasing. Based on the results of the Basic Health Research in 2013 the incidence of hypertension in the elderly population was 57.6% and the results of Riskesdas 2018 hypertension in the elderly population was 63.5% (5). There is an increase in the incidence of hypertension in the elderly by 5.6% over five years. The Institute for Health Metrics and Evaluation (IHME) in 2017 stated that hypertension was a risk factor for the cause of death (23.7%) of a total of 1.7 million deaths in Indonesia in 2016 (5). To detect the incidence of hypertension, the Indonesian government through the ministry of health determines the detection/examination of blood pressure in the elderly population as an indicator of health services for the elderly. Besides, although drugs that are effective for hypertension are widely available, control of hypertension has not been adequate (6).

### Measure And Instrument

Four independent variables were measured, namely spiritual well-being, physical activity, coffee drinking habits, and sleep duration. Assessment of spiritual well-being used was the spirituality orientation inventory previously validated (7). Likert scale was used for assessment, namely strongly disagree, disagree, agree, and strongly agree. The higher the score obtained, the better the respondent's spiritual welfare. Measurement of physical activity using questions about the activity carried out at least 30 minutes. Physical activity was divided into four groups, including no activity, light, moderate, and heavy physical activity. The form of each physical activity referred to the guidelines from the Ministry of Health of the Republic of Indonesia. Strenuous physical activity was activities that expend energy  $> 7$  Kcal / minute (for example lifting / carrying wood, rice, sandstone; hoeing; cutting trees; fast cycling, single tennis/badminton, sprinting, marathon, pedaling pedicabs, climbing mountains. and cycling with loads. Moderate physical

activity was an activity that emits energy from 3.5 to 7 Kcal/minute (for example: sweeping the yard, mopping the floor, washing clothes, drawing water, farming, cleaning the bathroom, jogging, double badminton, swimming. Mild physical activity was an activity that releases energy <3.5 Kcal/minute (for example: walking at home or shopping center, reading, writing, painting, cooking, fishing, washing dishes and ironing. Coffee drinking habit was measured using “yes” or “no” question. The sleep duration assessment also used an open question such as: “how many hours do you sleep on average at night?”. Meanwhile, the measurement of hypertension, which was the dependent variable, was carried out by measuring systolic blood pressure. The tool used was the digital tension meter OMRON HEM-8712. The implementation was following the Posbindu technical guidelines, where measurements were taken twice with an

## RESULTS

The presentation of demographic characteristics as seen in Table 1 showed that the average age of the respondents was 69.76 years and more in the 60-69 age group (56.5%). More respondents were women (68.9%) than men and did not work (58.2%) than those who worked. The results of step 1 logistic regression analysis (Table 2) showed that there were three variables associated with hypertension which were: spiritual well-being ( $p=0.007$ ), physical activity ( $p<0.001$ ), and sleep duration ( $p=0.006$ ). The

interval of 1-2 minutes. If the results of the first and second measurements was differed of >10 mmHg, then the third measurement was performed after resting for 10 minutes by removing the cuff on the arm (6).

## Data Analysis

A descriptive analysis was conducted to see the demographic characteristics of the respondents. Logistic regression analysis was performed using SPSS version 21 to determine the correlation between spiritual well-being, physical activity, coffee drinking habits, and sleep duration with hypertension.

## Ethical Approval

Ethical approval for this study was obtained from the health research ethics committee of the Faculty of Nursing, Airlangga University on December 18, 2018, No. 1229-KEPK.

habit of drinking coffee did not show a correlation with hypertension ( $p=0.204$ ). Furthermore, the second stage logistic regression test was carried out by removing the habit of drinking coffee (Table 3). After the coffee drinking habit was excluded from the analysis, it was found that all variables had a significant value related to hypertension (spiritual well-being ( $p=0.007$ ), physical activity ( $p<0.001$ ) and sleep duration ( $p=0.006$ ). The three variables showed physical activity had the strongest relationship with hypertension (Figure 1 and Figure 2).

Table 1: Demography Characteristics of Respondents

Respondents Characteristics (n=483)		n	Mean/%	SD
Age			69.76	8.41
	Age 60-69	273	56.5	
	Age ≥ 70	210	43.5	
Gender				
	Male	150	31.1	
	Women	333	68.9	
Employment				
	Not Working	281	58.2	
	Farmer/ Laborer/Fisher	133	27.5	
	Pensioners	24	5.0	
	Private Employee	45	9.3	
Income			520559.01	856194.59
	No Income	198	41.0	
	IDR < 1,000,000, -	184	38.1	
	IDR 1,000,000, - s.d <2,000,000,-	50	12.4	
	IDR ≥ 2,000,000, -	41	8.5	

Table 2: Logistic Regression Analysis Stage 1

Variables	B	SE	Wald	p-value	Adj. OR	95%CI	
						Lower	Upper
Spiritual well-being	-.060	.022	7.244	0.007*	.941	.901	.984
Physical Activity	-.594	.145	16.881	<0.001*	.552	.416	.733
Coffee drinker	-.246	.194	1.614	0.204	.782	.535	1.143
Sleep duration	-.519	.190	7.457	0.006*	.595	.410	.864
Constant	3.513	.983	12.764	<0.001	33.557		

Abbreviations: B = Beta coefficient, SE = Standard Error, CI = Confidence Interval, Adj OR = Adjusted odds ratio, \* = significant p-value

Table 3: Logistic Regression Analysis Stage 2

Variables	B	SE	Wald	p-value	Adj. OR	95%CI	
						Lower	Upper
Spiritual well-being	-.061	.022	7.293	0.007*	.941	.901	.984
Physical Activity	-.584	.144	16.430	<0.001*	.558	.420	.740

Variables	B	SE	Wald	p-value	Adj. OR	95%CI	
						Lower	Upper
Sleep duration	-.523	.190	7.591	0.006*	.593	.409	.860
Constant	3.413	.977	12.201	<0.001	30.351		

Abbreviations: B = Beta coefficient, SE = Standard Error, CI = Confidence Interval, Adj OR = Adjusted odds ratio, \* = significant p-value

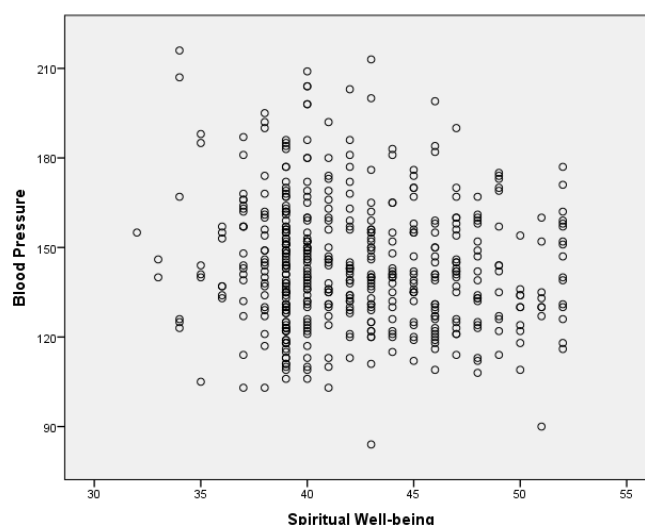


Figure 1: Scatter Plot of Systolic Blood Pressure and Spiritual Well-Being

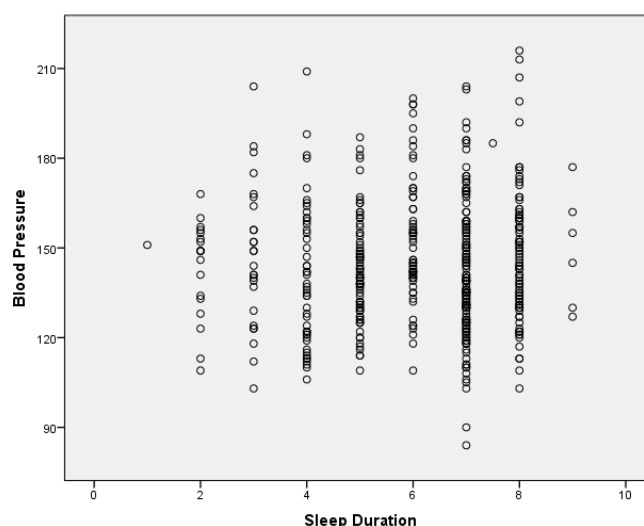


Figure 2: Scatter Plot of Systolic Blood Pressure and Sleep Duration

## DISCUSSION

Our study revealed significant association between spirituality and good management of hypertension. This finding aligned with many studies that showed a significant relationship between spirituality and clinical/laboratory results. Another study showed minor blood pressure reactivity in subjects with greater religiousness, suggesting that religious beliefs can be an important variable for the study of patients with arterial hypertension, particularly the elderly. In addition to spirituality, the act of praying can add optimism to the process of addressing chronic diseases. The practice of

praying was beneficial in several ways because, in addition to requests to God, prayers were often made to thank life, health and family, which results in greater feelings of gratitude.

Religious beliefs and practices can reduce loss of control, stress, and a sensation of helplessness, allowing the cognitive structure reduce suffering and making treatment more effective (8). The results showed that spirituality, religiousness, and faith have a positive influence whilst patients cope with life obstacles and hardships, in addition to increasing patients' resilience, thus, improving their condition. Spirituality can be used as a strategy to tackle

critical life circumstances, because it can increase one's sense of purpose and life meaning, associated with a greater resistance to stress-related diseases (9).

The result showed that physical activity had significant relationship with hypertension. Hypertension affects more than 40% of adults worldwide and is strongly associated with coronary artery disease, stroke, and heart failure. One of the ways to reduce hypertension is by doing physical activity or exercise. Exercise is a one of the important things of life-style therapy for the number one prevention of high blood pressure. A range of research constantly revealed useful outcomes of exercising on high blood pressure with discounts in each systolic and diastolic blood stress with as plenty as 5–7 mmHg reductions in people with high blood pressure (10). Exercise has been related to on-the-spot huge reductions in systolic blood pressure. This on-the-spot reduction in blood stress after exercising can persist for nearly 24 hours and is known as post-exercising hypotension with the maximum reported outcomes visible in people with better baseline blood pressure (11).

The reduction in blood pressure was associated with the attenuation in peripheral vascular resistance, which can be because of neuro hormonal and structural responses with reductions in sympathetic nerve interest and a boom in arterial lumen diameters, respectively (12). The mechanisms underlying blood stress discount with exercising and its related results are nevertheless under research with much research confined with the aid of using length and marked heterogeneity (13). In fact, in comparison to men and women 25–forty-four years of age, mortality chance amongst older adults is increased with the aid of using 100-fold for stroke and continual lung disease, more or less 90-fold for coronary heart disease, pneumonia and influenza, and over 40-fold for cancer. Hypertension in the elderly patients represents a management dilemma to cardiovascular (CV) specialists and another practitioner. Furthermore, with the wide adoption of multiple drug strategies targeting subgroups of hypertensive patients with specific risk conditions to lower blood pressure (BP) beyond traditional goals, difficult questions arise about how aggressive elderly patients should be treated.

The latest data from the Global Burden of Disease Study in 2015 showed that high systolic blood pressure continues to be the largest contributor to global disability-adjusted life-years (DALYs), causing 211 million global DALYs each year (14). According to a previous study, hypertension was a major risk factor for cardiovascular disease (CVD), heart attack, heart failure, stroke, and kidney disease. Studies have shown that sleep duration was associated with hypertension (15). Short sleep duration, usually defined as less than 7 hours, 6 hours or 5 hours per night, was associated with an increased risk of prevalent hypertension (15).

The relationship between self-reported sleep duration and hypertension was first reported as a U-shaped association in the Sleep Heart Health Study (SHHS). In the study, Gottlieb *et al* found that sleep duration of less than 7 hours per night or more than 8 hours per night was associated with an increased prevalence of hypertension (16). The results from the NHANES also demonstrated an association between sleep duration of less than 5 hours per night and an increased risk of hypertension in the same year (17).

One of the cross-sectional studies concluded that they observed an association between short sleep durations

(<7 hours/day) and an increased risk of hypertension in young adults (18–44 years) (18). This association was attenuated by the inclusion in the multivariate models of socio-demographic covariates—BMI and lifestyle factors. Compared with the young adults, an association between short sleep duration and hypertension was not found for middle-aged participants (45–59 years), old participants (60–79 years) or the total sample (18). Furthermore, no association between sleep duration and hypertension was found when male or female participants were analyzed separately (18). A significant result shows that sleep duration and hypertension is having relationship with age especially in elderly. Compared with sleep durations of 7 to < 8 hours per night, self-reported usual sleep durations of less than 7 hours per night or 8 or more hours per night were associated with higher adjusted odds ratio (OR) for hypertension (19).

They suggest that levels of habitual sleep restriction that are common in the adult population may contribute to the high population prevalence of hypertension. Lusardi and colleagues found that a single night of experimental sleep restriction to 4 hours of sleep in the home setting resulted in a 4- to 7-mm Hg increase in mean morning SBP in normotensive and hypertensive subjects, respectively, with smaller increases in mean morning DBP (20).

## CONCLUSION

In conclusion, spirituality, physical activity, and sleep duration can prevent or reduce hypertension among elderly in Aceh. This study showed that spirituality have a positive influence to cope with life obstacles and hardships, in addition to increasing patients' resilience, thus improving their condition.

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## REFERENCES

1. Chobanian, A. V., Bakris, G. L., Black, H. R., Cushman, W. C., Green, L. A., Izzo, J. L., Jr., *et al*. Seventh report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure. *Hypertension*. 2003; 42: 1206–125.
2. WHO. A global brief on hypertension. Geneva; 2013. Available from: [https://apps.who.int/iris/bitstream/handle/10665/79059/WHO\\_DCO\\_WHD\\_2013.2\\_eng.pdf;jsessionid=E490DD6C72928BBC5E5FE804A16D2F2B?sequence=1](https://apps.who.int/iris/bitstream/handle/10665/79059/WHO_DCO_WHD_2013.2_eng.pdf;jsessionid=E490DD6C72928BBC5E5FE804A16D2F2B?sequence=1)
3. NCD Risk Factor Collaboration (NCD-RisC). Worldwide trends in blood pressure from 1975 to 2015: a pooled analysis of 1479 population-based measurement studies with 19•1 million participants. *Lancet* (London, England). 2017; 389(10064): 37–55. [https://doi.org/10.1016/S0140-6736\(16\)31919-5](https://doi.org/10.1016/S0140-6736(16)31919-5).
4. Kementerian Kesehatan RI. Profil Kesehatan Indonesia Tahun 2018. Jakarta; Kementerian Kesehatan RI: 2019. Available from: [https://www.kemkes.go.id/resources/download/pusdatin/profil-kesehatan-indonesia/PROFIL-KESEHATAN\\_2018\\_1.pdf](https://www.kemkes.go.id/resources/download/pusdatin/profil-kesehatan-indonesia/PROFIL-KESEHATAN_2018_1.pdf)

5. Kementerian Kesehatan RI. Hari hipertensi dunia 2019: "Know your number, kendalikan tekanan darahmu dengan CERDIK". 2019. Accessed in November 21<sup>st</sup> 2019 at <http://p2ptm.kemkes.go.id/kegiatan-p2ptm/pusat-/hari-hipertensi-dunia-2019>.
6. Kementerian Kesehatan RI. Profil Kesehatan Indonesia 2016. Jakarta; Kementerian Kesehatan RI: 2017. Available from: <https://www.kemkes.go.id/resources/download/pusdatin/profil-kesehatan-indonesia/Profil-Kesehatan-Indonesia-tahun-2017.pdf>
7. Wahyuningsih H. Validitas konstruk alat ukur spirituality orientation inventory (SOI). Jurnal Psikologi. 2009; 36 (2): 116-129.
8. Peres, J. F. P., Newberg, A. B., Mercante, J. P., Simão, M., Albuquerque, V. E., Peres, M. J. P., & Nasello, A. G. Cerebral blood flow changes during retrieval of traumatic memories before and after psychotherapy: A SPECT study. Psychological Medicine, in press. 2007.
9. Elkins, D. N., Hedstrom, L. J., Hughes, L. L., Leaf, J. A., & Saunders, C. Toward a humanistic-phenomenological spirituality: Definition, description, and measurement. Journal of Humanistic Psychology. 1988; 28(4): 5-18
10. Díaz, A. Intercultural understanding and professional learning through critical engagement. Babel. 2013; 48(1): 12-19.
11. Pestacello LS, MacDonald HV, Lamberti L, Johnson BT. Exercise for hypertension: A prescription update integrating existing recommendations with emerging research. Curr Hypertens Rep. 2015; 17: 7
12. Hamer, Mark & Taylor, Adrian & Steptoe, Andrew. The effect of acute aerobic exercise on stress related blood pressure responses: A systematic review and meta-analysis. Biological psychology. 2006; 71: 183-90.
13. Semlitsch, T., Jeitler, K., Hemkens, L. G., Horvath, K., Nagele, E., Schuermann, C., Siebenhofer, A. Increasing Physical Activity for The Treatment of Hypertension: A Systematic Review and meta-analysis. Sports Medicine. 2013; 43(10): 1009-1023
14. WHO. GLOBAL HEALTH RISKS: Mortality and burden of disease attributable to selected major risks. Geneva; 2009. Available from: [https://www.who.int/healthinfo/global\\_burden\\_diseases/GlobalHealthRisks\\_report\\_full.pdf](https://www.who.int/healthinfo/global_burden_diseases/GlobalHealthRisks_report_full.pdf)
15. Grandner M, Mullington JM, Hashmi SD, Redeker NS, Watson NF, Morgenthaler TI. Sleep Duration and Hypertension: Analysis of > 700,000 Adults by Age and Sex. Journal of Clinical Sleep Medicine. 2018 June 15; 14(6): 1031-1039.
16. Gottlieb DJ, Redline S, Nieto FJ, Baldwin CM, Newman AB, Resnick HE, et al. Association of usual sleep duration with hypertension: The Sleep Heart Health Study. Sleep 2006; 29(8):1009-1014.
17. Gangwisch JE, Heymsfield SB, Boden-Albala B, Buijs RM, et al. Short Sleep Duration as a Risk Factor for Hypertension: Analyses of the First National Health and Nutrition Examination Survey. Hypertension 2006; 47(5): 833-839.
18. Li M, Yan S, Jiang S, Ma X, Gao T, Li B. Relationship between sleep duration and hypertension in northeast China: a cross-sectional study. BMJ Open 2019;9.
19. Hall MH, Muldoon MF, Jennings JR, Buysse DJ, Flory JD, Manuck SB, et al. Self-Reported Sleep Duration is Associated with the Metabolic Syndrome in Midlife Adults. Sleep 2008; 31(5): 635-643
20. Lusardi P, Zoppi A, Preti P, Pesce RM, Piazza E, Fogari R. Effects of insufficient sleep on blood pressure in hypertensive patients: a 24-hour study. Am J Hypertens 1999; 12:63-8.