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The Correlation between Insomnia with Blood Pressure in the Elderly in Banjar Wangaya Kaja the Work Area of Public Health Center III North Denpasar

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Abstrak

Lansia merupakan istilah bagi individu yang telah memasuki periode dewasa akhir atau usia tua. Jumlah lansia di Provinsi Bali tahun 2018 mencapai 572,518 jiwa. Lansia mengalami proses kemunduran baik dari segi aspek psikologis dan aspek fisiologi. Salah satu bentuk kemunduran yang terjadi adalah gangguan tidur (insomnia). Insomnia adalah gangguan pada kuantitas dan kualitas tidur yang menghambat fungsinya. Lansia yang mengalami insomnia akan terjadi peningkatan aktivitas simpatis yang akan meningkatkan tekanan darah dan penurunan aktivitas parasimpatis yang akan menurunkan tekanan darah, dimana tekanan darah tersebut dipengaruhi oleh system secara otonom yakni simpatis dan parasimpatis. Penelitian ini bertujuan untuk mengetahui hubungan insomnia dengan tekanan darah pada lansia di Banjar Wangaya Kaja Wilayah Kerja Puskesmas III Denpasar Utara. Penelitian ini merupakan penelitian analitik korelasional yang bertujuan untuk melihat ada atau tidaknya hubungan insomnia dengan tekanan darah pada lansia dengan menggunakan pendekatan cross sectional. Sampel terdiri dari 88 responden dengan tehnik pengambilan sampel menggunakan purposive sampling. Pengumpulan data menggunakan kuesioner insomnia dan pengukuran tekanan darah menggunakan sphygmomanometer air raksa. Sebagian besar lansia mengalami insomnia berat yaitu 68 orang (77,3%), dan sebanyak 58 orang (65,9%) lansia mengalami hipertensi tingkat 1. Berdasarkan hasil uji korelasi rank-spearman di dapatkan hasil p (value) = 0,000 < 0,05 maka Ho ditolak dan Ha diterima yang berarti terdapat hubungan signifikan antara insomnia dengan tekanan darah pada lansia di Banjar Wangaya Kaja. Hasil koefisien korelasi menunjukkan r = 0,702 yang berarti korelasi ini dalam tingkat hubungan yang kuat, arah korelasi positif yaitu semakin tinggi insomnia pada lansia, maka semakin tinggi pula tekanan darah pada lansia.

Kata Kunci*: lansia, insomnia, tekanan darah*

Abstract

The Elderly is a term for an individual who has entered the period of late adolescence or old age. The number of elderly in the province of Bali in 2018 reached 572.518 inhabitants. Elderly degeneration in terms of both aspects of the psychological and physiological aspects. One form of setbacks is a sleep disorder (insomnia). Insomnia is a disorder of the quantity and quality of sleep that inhibits its function. The elderly who suffer from insomnia to be an increase in sympathetic activity will increase blood pressure and decreased parasympathetic activity lowers blood pressure, in which blood pressure is influenced by the autonomous system that is sympathetic and parasympathetic. This study aims to determine the correlation between insomnia with blood pressure in the elderly in Banjar Wangaya Kaja the work area of Public Health Center III North Denpasar. This research is analytic correlational research aimed to see whether or not the correlation insomnia with blood pressure exists in the elderly by using the cross-sectional approach. The

sample consisted of 88 respondents to the sampling technique used purposive sampling. Collecting data using questionnaires insomnia and blood pressure measurements using a mercury sphygmomanometer. Most elderly people experience severe insomnia that 68 (77.3%), and as many as 58 people (65.9%) of elderly hypertensive level 1. Based on the results-Spearman rank correlation test in getting the results p (value) = 0,000 < 0,05 then Ho is rejected and Ha accepted which means there is a significant correlation between insomnia with blood pressure in the elderly in Banjar Kaja Wangaya. The results showed a correlation coefficient of r = 0,702,, it means the correlation is in a strong level, the positive direction of correlation means the higher insomnia in the elderly, the higher blood pressure will be.

Keywords: *elderly, insomnia,blood pressure.*

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INTRODUCTION

Increased life expectancy in Indonesia has implications for the increasing number of elderly people, some have expressed the 21st century was the century of the elderly (the era of population aging) (1), Elderly stage is the final stage of the human life cycle and it is part of the process of life that can't be avoided and will be experienced by every individual (2), The aging process is a biological process that is unavoidable and will be experienced by all the elderly (3).

The number of elderly in the world according to the World Health Organization (2016), has increased by 13.4% in 2016 compared from ages below and increased to 25.3%in 2017. The increase of the elderly population in Indonesia increased dominated by young elderly (age group 60-69 years) reached 63.39%, the rest are middle elderly (age group 70-79 years) amounted to 27.92%, and old elderly (age group 80 years or older) of 8.69%. The number of elderly people in Bali in 2018 as many as 572.518 people. Denpasar City is in the rank 6th with the elderly population aged 45-59 years as many as 44.172 people, age over 60 years as many as 49.776 inhabitants and over 70 years as many as 15,800 inhabitants (4).

Regarding the aging process, the body function of the elderly will be decreased, the more problems that arise in the elderly is caused by gradual physiological changes, it will lead to a decrease in the physical, psychological and social, one of the effects of psychological changes often experienced by the elderly is the sleep disorders (insomnia) (5) and (6), elderly over the age of 60 years often lodge complaints of sleep disorders (insomnia) (7).

Insomnia (a sleep disorder) is a disorder of the quantity and quality of sleep that inhibit the function (8), Insomnia in the elderly is a situation where elderly people often complain of difficulty sleeping, difficulty maintaining sleep, difficulty staying awake, difficulty getting back to sleep after waking in the night, waking too early and excessive daytime sleep (9).

National Sleep Foundation In 2010 reported that approximately 67% of the 1,508 elderly people in the United States aged 65 years and over reported having trouble sleeping (insomnia) and 7.3% of the elderly had disturbances in beginning to sleep and maintain sleep. Research conducted in Taipei shows that 40% of individuals aged over 60 years, experience insomnia where they often wake up and it's hard to start

sleeping (10), The prevalence of insomnia in Indonesia affects about 50% of people aged 65 years, every year is estimated at 20% - 50% of elderly reported insomnia and approximately 17% had serious insomnia. The prevalence of insomnia in the elderly is high at approximately 67% (11). Insomnia in the elderly in the province of Bali, where the study was conducted at the Integrated Implementation Unit of Public Health Ubud I showed as much as 57% of the elderly suffer from severe insomnia, 44% had moderate insomnia and 29% had mild insomnia at age 55-74 years (19). The same study conducts in Sanglah Hospital showed as much as 55.8% of the elderly experienced mild insomnia and 23.3% had moderate insomnia (12).

Elderly patients with insomnia tend to increase levels of the hormone cortisol and adrenocorticotropic hormone (adrenocorticotropic hormone, ACTH)(13), Increased levels of cortisol will increase heart and blood vessels in response to the effects of catecholamines, increased catecholamine activity will increase cardiac output and vasoconstriction of blood vessels that lead to increased peripheral resistance. Both processes will work in synergy to increase blood pressure (14).

Blood pressure normally decreases during normal sleep (about 10-20% is considered normal), this situation occurs because of a decrease in sympathetic activity during sleep, but in sleep disorders (insomnia) there is no decrease in blood pressure during sleep so there will be an increase in blood pressure that causes the risk of hypertension, normally every 5% decrease was supposed to happen and not experienced by someone who is having trouble sleeping (insomnia), then the possibility of 20% would be an increase in blood pressure (15), stages of insomnia in a person can affect blood pressure. Elderly who fall into the category of mild insomnia will have normal blood pressure, otherwise, the elderly who fall into the category of severe and very severe insomnia will lead to low or high blood pressure (16).

If *insomnia* not treated it will adversely affect the health of the elderly. Physiologically impact causes daytime sleepiness, impaired attention and memory, mood, depression, frequent falls, decreased quality of sleep and an increase in blood pressure (17). The right treatment to overcome sleep disorders (insomnia) in elderly with acts of non-pharmacological such as avoiding and minimize the use of coffee, tea, soda and alcohol, and smoking before bedtime can interfere with sleep elderly, avoid naps, especially after 2:00 pm, go to bed only when sleepy, urination before going to sleep, maintain a comfortable temperature in the bedroom, noise, light, and temperature can disturb sleep (18). This study was supported by research (19), where factors affecting insomnia that is as much as 63.36% is a habit of drinking coffee, 57.1% is a habit of smoking, and 78.6% are not comfortable with the environment.

Based on the above phenomenon, the researchers are interested to research with title Correlation between *insomnia* with Blood Pressure in the Elderly in Banjar Wangaya Kaja the Work Area of Public Health Center III North Denpasar.

MATERIALS AND METHODS

The type of this research is correlational analytical research with a cross-sectional study design. This research was conducted in Banjar Wangaya Kaja the Work Area of Public Health Center III North Denpasar from September to November 2019. The population in this study were all elderly aged ≥60 years amounted to 114 respondents, using non-probability sampling techniques with purposive sampling to obtain 88 respondents. This study uses primary data, where all data collected by using an insomnia questionnaire and blood pressure measurement device using a mercury sphygmomanometer. The

analysis method used in the testing hypothesis in this study is univariate and bivariate analysis. The correlation test used is the Spearman rank test.

RESULTS AND DISCUSSION

Characteristics of respondents in this study can be seen in the following table:

Table 1. Demographic data of the respondents

Characteristics	F	%
Age		
60-74 years	76	86.4
75-90 years	12	13.6
Gender Status		
Male	46	52.3
Female	42	47.7
Education Status		
Elementary School	7	8.0
Middle School	22	25.0
High School	40	45.5
Bachelor	14	21.6
Occupation Status		
Working	2	2.3
Nonworking	86	97.7
Smoking		
Yes	18	20.5
No	70	79.5
Drinking coffee		
Yes	80	90.9
No	8	9.1
Home Environment Status		
Noisy	47	53.4
Calm	41	46.6
	88	100

Based on Table 1. The obtained results are 88 elderly people, the majority of elderly aged 60-74 years as many as 76 people (86.4%), the elderly with male sex as many as 46 people (52.3%), the elderly with high school educators as many as 40 people (45, 5%), the elderly with nonworking status as many as 86 people (97.7%), the elderly do not smoke as much as 70 people (79.5%), the elderly to drink coffee as much as 80 people (90.9%) and the elderly who have a noisy home environment as many as 47 people (53.4%).

This study found the average elderly who have severe *insomnia* at the age of 60-74 years as many as 76 people (86.4%). This research is in line with research (22)showed mostly elderly people who have poor sleep quality are at the age of 60-74 years as many as 49 people (65.3%). The aging in the elderly basically will be followed by changes in sleeping (7). Estimated that more than half the number of elderly people aged over 60 years had trouble sleeping. In this study, the majority of the elderly male sex as many as 46 people (52.3%). This research is in line with research(23), states that the majority of elderly respondents who experienced severe insomnia is male sex as much as (57.1%). In adulthood, the man began to decrease REM (Rapid Eye Movement), they are often awakened by cement congestion in the penis so that interrupt the cycle during REM sleep (21).

In this study, the majority of senior high school educated many as 40 people (45.5%) with an average nonworking elderly as many as 86 people (97.7%). This research is in line with research(19) that showed as many as 3 people (21%) are in high school educated with the majority of nonworking elderly as much as 8 (57.1%). The level of education and work becomes one of the sociocultural factors that could affect insomnia. The level of education and work may allow individuals to access and understand information about health so that they can choose a strategy in treating insomnia (11). In this study, the results of as many as 80 elderly (90.9%) had a habit of drinking coffee, as many as 70 elderly (79.5%) do not have the habit of smoking, and as many as 47 elderly (53.4%) are affected by a noisy home environment. This study is in line with research conducted by (11). Showed the majority of the elderly have a bad lifestyle that is smoke and drink coffee as much (78.6%) experienced severe insomnia, while based on the environmental conditions uncomfortable as many (78.6%) experienced severe insomnia. The nicotine contained in cigarette smoke can make coughs and problems associated with breathing problems at night that led to sleep disturbances. Caffeine can make

people stay alert, anxious, tense which lead to insomnia (21), Sounds also affect sleep, they need a calm environment to sleep and keep away from noise (9).

Based on Table 2 is obtained from the 88 elderly people, the majority of elderly people experiencing severe insomnia as many as 68 people (77.3%), the elderly who experience very severe insomnia as much as 1 (1.1%) and the elderly who have mild insomnia as many as 19 people (21.6%). This research is in line with research (20), showed the majority of the elderly have poor sleep quality as many as 40 people (76.9%).

Table 2. Characteristics of Respondents Based on their Insomnia

Insomnia	Frequency (f)	Percentage (%)
Mild	19	21.6
Severe	68	77.3
Very Severe	1	1.1
Total	88	100.0

The brain changes due to aging result in excitation and inhibition in the nervous system. Part of the cerebral cortex may act as an inhibitor on the system awake and this inhibition function declines with age also affect the frontal cortex regulatory tool. Decreased blood flow and changes in neurotransmitters and synaptic mechanisms play an important role in sleep and wakefulness change associated with the increasing age factor. Extrinsic factors, such as pensions also can cause sudden changes in needs (26). Insomnia in the elderly is associated with memory loss, impaired concentration and changes in functional performance. Changes are very prominent, namely a reduction in slow-wave, especially stage four, alpha waves decreased and increased frequency of waking at night or increased sleep fragmentation due to frequent waking (21).

Insomnia in the elderly is associated with memory loss, impaired concentration and changes in functional performance. Changes are very prominent, namely a reduction in slow-wave, especially stage four, alpha waves decreased and increased frequency of waking at night or increased sleep fragmentation due to frequent waking (21), Other factors can also cause insomnia such as the elderly experience physical factors.

Based on Table 3 the results obtained from the 88 elderly people, the majority of the elderly with hypertension grade 1 as many as 58 people (65.9%), the elderly who have blood pressure hypertension grade 2 were 3 people (3.4%). This research is in line with research (20), showed the majority of elderly people have blood pressure with grade 1 hypertension category as many as 19 people (36.5%) this happened because if the elderly stress, the brain will give the cue to the entire body through the nerves attached to the arteries that cause narrowing of the arteries that can interfere with the flowing blood. Blood pressure describes the relation between cardiac output, peripheral resistance, blood volume, blood viscosity and elasticity of arteries (24).

Table 3. Characteristics of Respondents Based on Blood Pressure

Blood Pressure	Frequency (f)	Percentage (%)
Low	5	5.7
Normal	17	19.3
Normal High	5	5.7
Hypertension1	58	65.9
Hypertension 2	3	3.4
Total	88	100.0

Based on Table 4 showed as many as 57 elderlies (64.8%) experienced severe insomnia and hypertension level 1, a total of 17 elderly (19.3%) experienced mild insomnia with normal blood pressure, as many as five elderly (5.7%) experienced severe insomnia with low blood pressure. Results p-value obtained 0,000 <α (0.05), then Ho is rejected and Ha accepted, which means there is a significant association between insomnia with blood pressure in an elderly person with the results of Rank Spearman

Table 4. The Correlation between Insomnia and Blood Pressure in the Elderly

Insomnia	Blood pressure												Total		Correlation Coefficient	P-Value
	Low		Normal		Normal High		hypertension 1		hypertension 2		hypertension 3					
	F	%	f	%	f	%	f	%	f	%	f	%	f	%		
Normal	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Mild	0	0	17	19.3	1	1.1	1	1.1	0	0	0	0	19	21.6	0,702	000
Severe	5	5.7	0	0	4	4.5	57	64.8	2	2.3	0	0	68	77.3		
Very Severe	0	0	0	0	0	0	0	0	1	1.1	0	0	1	1.1		
Total	5	5.7	17	19.3	5	5.7	58	65.9	3	3.4	0	0	88	100		

test values obtained Correlation Coefficient is 0.702, which means there is a strong relationship between insomnia with pressure blood in the elderly in Banjar Wangaya Kaja the Working Area of Public Health Center III North Denpasar**,** as well as the positive direction means that the higher level of insomnia, the higher the level of blood pressure in the elderly.

This research is in line with research (27), With the title, Sleep Disorders Relationships With High Blood Pressure In Elderly stating that after the results obtained Spearman rank p-value is 0.00 (<0.05), which means there is a significant relationship between sleep disturbances with blood pressure in the elderly. This research is in line with research (28), With the title, Relationship Quality With High Blood Pressure In Elderly Hypertension In Yogyakarta Sleman Gamping stating that after Pearson test results obtained p-value is 0.00 (<0.05), which means there is a significant relationship between sleep quality with blood pressure in elderly hypertension in Gamping Sleman.

Blood pressure is affected by the autonomous system, namely sympathetic and parasympathetic. People who experience sleep disturbances showed an increase in sympathetic activity which will increase blood pressure, on another side the decreased parasympathetic activity will lower blood pressure (25). The insomnia severity of a person can affect blood pressure. Elderly who fall into the category of mild insomnia will have normal blood pressure, otherwise, the elderly who fall into the category of severe and very severe insomnia will lead to low or high blood pressure (16).

Blood pressure decreases during sleep normally (about 10-20% is considered normal), this situation occurs because of a decrease in sympathetic activity during sleep, but if sleep disorders (insomnia), then there is no decrease in blood pressure during sleep so will be an increase in blood pressure (15). According to research (13), In patients with insomnia increased levels of the hormone cortisol and adrenocorticotropic hormone (adrenocorticotropic hormone, ACTH). Increased levels of cortisol will increase heart and blood vessels in response to the effects of catecholamines, increased catecholamine activity will increase cardiac output and vasoconstriction of blood vessels that lead to increased peripheral resistance. Both processes will work in synergy to increase blood pressure(14).

Based on these results, researchers assume that their insomnia relationship with blood pressure in the elderly because most elderly have severe insomnia. Severe insomnia can affect the system autonomously the sympathetic and parasympathetic. When the elderly suffer from insomnia then be obtained an increase in an increase in sympathetic activity which will increase blood pressure, on another side the decreased parasympathetic activity will lower blood pressure. The elderly still less active to follow the elderly gymnastics held in Banjar Kaja Wangaya because many elderly people

spend their time at home to take care of their grandchildren besides, the elderly also unable to drive to join the elderly gymnastics held in Banjar.

CONCLUSIONS AND RECOMMENDATION

88 respondents showed a majority of elderly people experiencing severe insomnia as many as 68 people (77.3%). The blood pressure of 88 elderly people showed the majority of the elderly with hypertension grade 1 as many as 58 people (65.9%). The result of Rank Spearman test result p-value = 0.000 <α (0.05), then Ho is rejected and Ha accepted, which means there is a significant association between insomnia with blood pressure in the elderly with a value of correlation coefficient was r = 0,702 which means there is a strong relationship between insomnia with blood pressure in the elderly in Public Health Center III North Denpasar.

The Public Health Center should make a more positive activity for the elderly, such as adding some new activities in Posyandu Lansia which can improve the quality of sleep for elderly i.e. gymnastics, acupuncture or acupressure, socialization and education on the importance of quality sleep for the elderly so that the elderly can sleep 6 hours/day. The results of this study can be used as reference material for further research using different research methods. The following researcher should develop this research by distinguishing the specific factors that affect the quality of sleep in the elderly.

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