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The Effect of Slow Deep Breathing Exercise on Headache and Vital Sign in Hypertension Patients

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Abstract

Prevalence hypertension was estimated 1.13 billion people in the world and 2.027.006 (20.0%) people in DKI Jakarta. Headache was a common symptom related to high blood pressure levels. Slow Deep Breathing Exercise was non pharmacological therapy to reduce consumption of oxygen, metabolism, frequency of respiration, frequency of heart, muscle tension and blood pressure. This research was a pre-experimental one group pre-test post-test design and the respondents performed slow deep breathing exercise fourth time in one day during fourth days. Before and after intervention, the respondents measured vital sign and assessed headache scale with subjective and objective (a numerical scale 1-10). The number of samples in this study were 30 respondents who were selected by probability random sampling and were included in the inclusion and exclusion criteria. Research time December 2019-January 2020 at UKI General Hospital and Cawang District Health Center, East Jakarta. The results showed differences before and after Slow Deep Breathing Exercise on the decrease in headache scale with p-value = 0.000 and on the decrease in blood pressure with p-value = 0.000 and on the pulse rate of 0.014, breathing frequency 0.008 and temperature 0.000 (<0.001). Before intervension, patients feels headache on 7 scale and after intervention, respondents felt no headache on 0 scale. Conclusion are Slow Deep Breathing Exercise have an effect to reduce headache scale and vital sign for four days . The suggestion for the nurse teachs Slow Deep Breathing Exercise to hypertensive patients so that patients can do these exercises at home as an independent exercise.

Keywords: Headache, hypertension patients, slow deep breathing exercise, vital signs.

Introduction

Non-communicable diseases are the leading cause of death globally and one of the major health challenges of the 21st century (WHO, 2018). Non-communicable disease are estimated to account for 71% of the 57 million global death which consisting of cardiovascular disease (31%), cancers (16%) and chronic respiratory diseases (7%) and diabetes (3%) (WHO, 2018).

Cardiovascular disease is the number one cause of death globally (AHA, 2019). In 2012, Cardiovascular disease killed 17,5 million people and the equivalent of every 3 in 10 deaths. One of these 17 million deaths of a year, over half 9,4 million are caused by complications in hypertension. Hypertension is a risk factor for coronary heart disease and the single most important risk factor for stroke. It is responsible for at least 45% of deaths due to heart disease and the least 51% of the deaths due to stroke (IFPMA, 2016). Hypertension is a persistent elevation of systolic blood pressure (TDS) at a level of 140 mmHg or more and diastolic blood pressure (TDD) at a level of 90 mmHg or more (Black & Hawks, 2014).

Prevelence hypertension was estimated 1.13 billion people worldwide and living in low-and middle-income countries (WHO, 2019). One of the chronic diseases in the world that causes 9.4 million deaths annually (WHO, 2013 in Dendy, Helwiyah, & Urip, 2018). Asia is the world's largest and most populous continent with approximately 4.3 billion people, hosting 60% of the world's current human population, and has a high growth rate (Chun et al., 2013). In 2013 there were 65.048.110 (25.8%) people suffering from hypertension with an Indonesian population more than 252 million people where the elderly age group had more hypertension with a prevalence of 57.6% compared to other age groups (RISKESDAS, 2013). The prevalence of hypertension sufferers in DKI Jakarta province is 2.027.006 (20.0%) of people affected by hypertension (RISKESDAS, 2013).

Hypertension that is not handled properly can lead to coronary heart disease, heart failure, stroke, kidney failure, hypertension retinopathy and blindness so that patients open a nursing management that can deal with hypertension (Wijaya & Putri, 2013).

In a sample of 11.710 hypertensive patients, reported that headache was a common symptom related to high blood pressure levels. 31% of patients with untreated severe hypertension complained of headache compared with 15% of treated hypertensive patients and controls without hypertension (Cortelli et al., 2016).

Non pharmacological therapy that must be carried out by hypertension sufferers is controlling food intake and sodium, losing weight, limiting alcohol and tobacco consumption, doing sports training, foot reflexology therapy and Slow Deep Breathing Exercise (Smeltzer & Bare, 2011; Liota, Dwi, & Tulus, 2018). Slow Deep Breathing Exercise is breathing technique with frequency of respiration less than 10 time per minute and long inhalation phase (Tarwoto, 2012). Benefits of Slow Deep Breathing Exercise are reduce level of pain and stress, to control of tension and fear. Slow deep breathing exercise can reduce consumption of oxygen, metabolism, frequency of respiration, frequency of heart, muscle tension and blood pressure (Kozier et al., 2010). Pain is a condition that affects a person whose existence is known only if that person has experienced it (Aziz & Musrifatul, 2014).

The results of research conducted by Mulyadi, Supratman, and Yuni (2015) of 36 respondents of hypertension in Puskesmas Baki Sukoharjo found a significant influence in the administration of Slow Deep Breathing Exercise therapy on reducing the intensity of headache in hypertensive patients with p-value = 0.001 (<0.5) . This is evidenced by the intervention of headache intensity before being on a medium scale and headache intensity intervention was done on a mild scale (Mulyadi, Supratman, & Yuni, 2015).

The results of another study conducted by Putu, Ayu, and Ketut (2016) on 28 respondents of hypertension in Puskesmas I East Denpasar found significant influence in the administration of Slow Deep Breathing Exercise therapy in reducing systolic blood pressure and diatolic blood pressure in patients with p-value = 0.000 (<0.001).

The different between privous study and

this study that privous study show short term to perform slow deep breathing exercise. But this study show long term to perform slow deep breathing exercise so that more accurate for the results. Privous study showed a little respondent but this study show many respondent to do this study so that the results more accurate and variated.

This research was conducted at East Jakarta UKI General Hospital and Cawang Village Health Center, East Jakarta. Researchers conducted a study at the Jakarta Public Hospital because of the phenomenon of a high incidence of 1,066 patients (January-December 2018). The study was also conducted with the Cawang Village Health Center in East Jakarta because the incidence of hypertensive patients who visited was 778 (November 2019-January 2020).

This research was conducted with 30 respondents of hypertension patients who experience headaches. The respondents were taught slow deep exercise four times a day for four consecutive days. Data were taken on a scale of headache and vital signs (blood pressure, pulse, respiration and temperature) before and after the intervention.

The phenomenon of researcher observations that occur in UKI public hospitals and Cawang UKI health centers is the treatment of hypertensive elderly patients using only hypertension medication and analgesic medication so that headaches reappear when patients do not use these drugs. Therefore, researchers are interested in conducting research on Reduce The Scale Of Headache And Vital Signs With Slow Deep Breathing Exercise In Hypertension Patients In East Jakarta. The purpose of this study was to determine efforts to administer Slow Deep Breathing Exercise to reduce the scale of headache and vital signs in hypertensive patients in East Jakarta.

Method

This research is a pre-experimental research with one group pre test design and post test design. This research was conducted by measuring vital signs (blood pressure, pulse, respiration and temperature) and assessing the headache scale subjectively and objectively (using a numerical scale 1–10) in hypertensive patients before being given a Slow Deep Breathing Exercise and comparing it with a scale pain and the results of vital signs (blood pressure, pulse, respiration, temperature) hypertensive patients after the Slow Deep Breathing Exercise for 4 days. Research respondents conducted slowly in training four times a day. This research was conducted for 4 days when inpatients at the RSU UKI East Jakarta and outpatients in Puskesmas Kelurahan Cawang, East Jakarta were then visited at the patient's home for 4 days. After the data is collected, the researcher enters the data into the master table and then tests the normality of the data. For univariate analysis using SPSS frequency and bivariate analysis pre-test & post-test using the Wilxocon test. For analysis data to show before and after intervention for headache scale, blood pressure, pulses, respiration frequency and temperature.

The population of this study was 1,844 hypertensive patients who experienced headaches who visited the UKI General Hospital and the Cawang District Health Center in East Jakarta. The sampling technique in this study is probability random sampling which the researcher took responden randomly. The inclusion criteria were only hypertension patients who experienced headaches, patients who were hospitalized in UKI General Hospital and patients who visited the health center at Cawang Village Health Center. Exclusion criteria were patients who were not willing to do Slow Deep Breathing Exercise 4 times a day in 4 days and and patients who did not routinely take hypertension medication. The sample size in this study used a paired hypothesis test formula of average difference, totaling 30 hypertension patients who experienced headaches. The formula to get 30 hypertension patients from the rule of thumb (Sastroasmoro & Ismail, 2011) which between 5–50 times the number of independents.

The first day of the study respondents will be asked to scale the headache and taken vital signs (blood pressure, pulse, respiration and temperature). After that, respondents were taught slow deep exercise techniques. Then the respondent again took a headache scale

and vital signs. The first day, respondents performed slow deep breathing exercise 4 times in a day.

Steps The slow deep exercise technique consists of adjusting the position of the patient by sitting or sleeping, the patient's hands are placed above the stomach, the patient inhales through the nose while developing the stomach, hold breath for three seconds then the breath is released slowly through the mouth while feeling the stomach move down (deflate the stomach).

The second to fourth day, respondents did the same thing accompanied by the researcher and the headache and vital signs data before and after the intervention was still taken by the researcher. The second day to fourth day, respondents performed slow deep breathing exercise 4 times in a day.

The fourth day, researchers still took the scale of the level of headaches and vital signs before the intervention. After that, respondents do slow deep breathing exercises. Then, the researchers took data on the headache level scale and vital signs after intervention as a post test.

To measure the headache scale, researchers used a 0–10 headache scale. Level 0–1 if there is no headache. Level 2–3 if the respondent feels mild headache. Level 4–5 if the respondent feels moderate headache. Level 6–7 if the respondent feels severe headache. level 8–9 if the respondent feels very severe headaches. Level 10 respondents felt unbearable headache. Headache scale data is taken subjectively and objectively. Subjective data is taken when the respondent mentions a headache level scale. Objective data taken from data on blood pressure, pulse, respiration and temperature and facial expression of the respondent. If the respondent's blood pressure is below 90/60 mmHg, the respondent's is hypotensive. Blood pressure below 120/80 mmHg, it is said to be normal blood pressure. When systolic blood pressure between 120–139 and diastolic between 80–89 mmHg, it is said prehypertension. If systolic blood pressure is between 140–159 mmHg and diastolic between 90–99 mmHg, it is said to be grade 1 hypertension. If systolic blood pressure is more than and equal to 160 mmHg and diastolic is more than and equal to 100 mmHg, it is said to be grade 2 hypertension.

If the pulse is less than 60 times per minute, it is said bradycardia. If the pulse rate is between 60–100 times per minute, it is said to be normal. If the increase in pulse rate exceeds 100 times per minute, it is said tachycardia.

If the respiratory frequency is less than 12 times per minute, it is said bradiapnea. If the respiratory frequency is 12–20 times per minute, it is said to be normal. If the respiratory frequency is more than 20 times per minute, then say takiapnea. When the body temperature between 36–37.4, it is said to be normal body temperature. If the body temperature is above or equal to 37.5, it is said to be fever or hyperthermia. The variables studied in this study were headache scale and vital signs including systolic and diastolic blood pressure, pulse, respiration and temperature as the dependent variable and deep breathing relaxation techniques as independent variables. The instrument used in this study was the mercury blood pressure meter as a tool to measure blood pressure, a wristwatch to measure pulse and pain scale 1–10 and an observation sheet to collect characteristic data along with the results of blood pressure measurements of respondents. Respondents measured their vital signs in a seated position and then were given exercises to breathe relaxation techniques for 15 minutes.

Slow Deep Breathing Exercise is done four times a day for 4 days. The last day of slow deep breathing exercise measurements of vital signs and assessing the scale of headache to assess the scale of headache after exercising deep breathing relaxation techniques in the afternoon. After the data is collected, the researcher enters the data into the master table and then tests the normality of the data.

For univariate analysis using SPSS frequency and bivariate analysis pre-test & post-test using the Wilxocon test. Univariate analysis consists age, gender job, blood pressure systolic and diastolic, pulses, respiratory and temperature. Bivariate analysis consists p-value before and after intervention for scale headache, blood pressure systolic and dyastolic, pulses, respiratory, temperature and the meaning of Slow Deep Breathing

Exercise in Hypertension Patients From Day 1 to Day 4.

Results

Tabel 1 Demographic Characteristic (n=30)

Characteristic	Frequency	%
1. Age		
26–45	8	26.7
46–65	17	56.7
Above 65	5	16.6
2. Gender		
Man	11	63.3
Woman	19	36.7
3. Job		
Working	9	30
Does not work	21	70

Tabel 2 Clinical Information

Hypertension Characteristics	Before Slow Deeep Breathing Intervention		After Slow Deeep Breathing Intervention	
	Frequency	%	Frequency	%
1. Systolic				
Normal	-	-	17	56.7
Prehypertension	3	10	11	36.7
Hypertension Stage 1	10	33.3	2	6.6
Hypertension Stage 2	17	56.7	-	-
2. Dyastolic				
Hypotension	-	-	1	3.3
Normal	1	3.3	23	76.7
Prehypertension	8	26.7	4	13.3
Hypertension Stage 1	11	36.7	2	6.7
Hypertension Stage 2	10	33.3	-	-
3. Pulse				
Normal	22	73.3	29	96.7
Tachycardia	8	26.7	1	3.3
4. Respiratory Rate				
Normal	22	73.3	27	90
Tachyapnea	8	26.7	3	10
5. Temperature				
Normal	27	90	30	100
Hyperthermia	3	10	-	-
6. Scale of Headache				
Scale 0 (No pain)	-	-	16	53.3
Scale 1 (No pain)	-	-	10	3.3

Scale 2 (Mild Pain)	-	-	3	1
Scale 3 (Mild Pain)	3	10	1	3.3
Scale 4 (Moderate Pain)	5	16.7	-	-
Scale 5 (Moderate Pain)	4	13.3	-	-
Scale 6 (Great pain)	5	16.7	-	-
Scale 7 (Great pain)	8	26.7	-	-
Scale 8 (Very great pain)	4	13.3	-	-
Scale 9 (Very great pain)	1	3.3	-	-
Scale 10 (The most intense pain)	-	-	-	-

Table 3 Headache And Vital Sign Score Before And After Intervention

Variable	P-Value
1. Difference in Scale of Headache Before and After Slow Deep Breathing Exercise Interventions	0.000
2. Systolic Blood Pressure Differences Before and After Slow Deep Breathing Exercise Interventions	0.000
3. Diastolic Blood Pressure Differences Before and After Slow Deep Breathing Exercise Interventions	0.000
4. Difference in pulse rate before and after the intervention of Slow Deep Breathing Exercise	0.014
5. Difference in the Frequency of Breathing Before and After Intervention of Slow Deep Breathing Exercise	0.008
6. Temperature Difference Before and After Slow Deep Breathing Exercise Intervention	0.000

Table 4 Meaning of Slow Deep Breathing Exercise in Hypertension Patients From Day 1 to Day 4

	Hari 1	Hari 2	Hari 3	Hari 4
Subjective data:				
Scale of Headache After Slow Deep Breathing Exercise	0.000	0.000	0.000	0.000
Objective Data:				
Systolic Blood Pressure After Slow Deep Breathing Exercise	0.007	0.007	0.001	0.000
Diastolic Blood Pressure After Slow Deep Breathing Exercise	0.012	0.180	0.005	0.000

1. Univariate Analysis

Based on table 1, the majority of respondents aged 46–65 years were 17 people (56.7%) and the minority of respondents aged over 65 years were 5 people (16.6%). For the majority of the sexes there were 19 female respondents (36.7%) and the minority of the male sex were 11 people (63.3%). For job characteristics, the majority of hypertensive respondents do not work as many as 21 people (70%) and the minority of respondents work as many as 9 people (30%).

According to Table 2, it was found that before the Slow Deep Exercise intervention the majority of systolic blood pressure in stage 2 hypertension were 17 respondents (56.7%), diastolic blood pressure in stage 1 hypertension were 11 respondents (36.7%), the majority of normal pulse was 27 respondents (73.3), the majority of normal respiratory frequency was 22 respondents (73.3%), the majority temperature was normal as many as 27 people (90%) and the majority of headache scales on a scale of 7 (severe pain scale) were 8 people (26.7%). After the Slow Deep Exercise intervention, the majority of

systolic blood pressure in normal was 17 respondents (56.7%), the majority of diastolic blood pressure was normal in 23 respondents (76.7%), the majority of normal pulse was 29 respondents (96.7%), the frequency of breathing was majority in as many as 27 respondents (90%), the majority of normal temperatures were 30 people (100%) and the majority of the headache scale was on a scale of 0 (no headache) of 16 respondents (53.3%).

2. Bivariate Analysis

Bivariate analysis consists p-value before and after intervention for scale headache, blood pressure systolic and dyastolic, pulses, respiratory, temperature and the meaning of Slow Deep Breathing Exercise in Hypertension Patients From Day 1 to Day 4 using the Wilxocon test.

Based on Table 3, there are differences in the scale of headache before and after the Slow Deep Breathing Exercise intervention with a p-value of 0.000 (<0.001). Based on Table 4, there are differences in systolic and dyastolic blood pressure before and after the intervention of Slow Deep Breathing Exercise with a p-value of 0.000 (<0.001). There is a difference in the pulse rate before and after the Slow Deep Breathing Exercise intervention with a p-value of 0.014 (<0.001). There is a difference in the respiratory rate before and after the Slow Deep Breathing Exercise intervention with a p-value of 0.008 (<0.001). There is a temperature difference before and after the Slow Deep Breathing Exercise intervention with a p-value of 0.000 (<0.001).

Based on table 5 showed that the significance of the Slow Deep Breathing Exercise intervention is on the third day where from the subjective data the headache scale p-value = 0.000 (<0.001) and objective data on systolic blood pressure p-value = 0.0001 (<0.001) and diastolic blood pressure with p-value = 0.005 (<0.001).

Discussion

This study found that slow deep breathing exercise could decreased headache scale. The Researcher assume slow deep exercise can reduce the scale of headache because slow deep exercise can reduce blood pressure, relax tense muscles around the neck and head, diverting attention from headaches so that patients can calm down and not grimace in pain in the head.

This is evidenced by the Slow Deep Breathing Exercise widely used to reduce chronic pain. Inhale deeply can relax a group of toto in sequence and focus attention on the differences in feelings experienced between when the muscle groups relax and when the muscles are tense (Kozier et al., 2010).

This was consistent with previous study conducted by Mulyadi, Supratman, and Yuni (2015) on 36 respondents of hypertension in Puskesmas Baki Sukoharjo found a significant influence in the administration of Slow Deep Breathing Exercise therapy on reducing the intensity of headache in hypertensive patients with p-value = 0.001 (< 0.001). This is evidenced by the intervention of headache intensity before being on a medium scale and headache intensity intervention was done on a mild scale (Mulyadi, Supratman, & Yuni, 2015).

The different between privous study and this study that privous study show short term (only one day) to perform slow deep breathing exercise. But this study show long term (fourth day) to perform slow deep breathing exercise so that this study produced the results more accurate than provious study. This study found that slow deep breathing exercise could decreased systolic and diastolic blood pressure. Researchers argue that slow deep breathing exercises make the heart work optimally so that there is no decrease in cardiac output and blood pressure returns to normal.

This was consistent with previous study conducted by Putu, Ayu, and Ketut (2016) on 28 hypertension respondents at the East Denpasar Health Center I found a significant influence in the administration of Slow Deep Breathing Exercise therapy to decrease systolic and diatolic blood pressure in hypertensive patients with p-value = 0.000 (<0.001).

This study found that slow deep breathing exercise could decreased pulses. researchers believe that slow deep breathing exercise can reduce blood pressure back to normal so

that the pulse returns to normal too. This was consistent with Kozier et al. (2010), Slow Deep Breathing Exercise can reduce heart frequency, muscle tension and systolic and diastolic blood pressure.

This was consistent with previous study which conducted by Arif, S.U., & Agis, T. (2019) on 25 hypertension respondents at Kembaran Timur Purwokerto health center which found there was a different decreased pulses before and after slow deep breathing exercise. Before slow deep exercise, mean's pulse 90,16x/minute and after slow deep breathing, mean's pulses 87,84x/minute.

This study showed that slow deep breathing exercise could decreased respiratory rate and temperature normal. Researchers argue that slow deep breathing exercise can make fill the lungs with oxygen so that reduce shortness of breath and make respiratory rate to be normal. Slow deep breathing exercise can relax muscles so that make temperature to be normal.

This was consistent with Kozier et al. (2010), Slow Deep Breathing Exercise can reduce oxygen consumption, metabolism, respiratory frequency, heart frequency, muscle tension and systolic and diastolic blood pressure.

From table 4, it can be analyzed on days 1 and 2 based on subjective data, the pre and post intervention headache scale shows a significant difference but the objective data of blood pressure pre and post intervention on the first and second day do not show there is a significant difference which means that there are no maximum results in administering Slow Deep Breathing Exercise on days 1 and 2 to reduce the scale of headache and systolic and diastolic blood pressure. But on days 3 and 4 showed the maximum results in the administration of Slow Deep Breathing Exercise in reducing the scale of headache in hypertensive patients on third and fourth days.

The Researchers argue that slow deep breathing exercise works optimal with oxygen filled the lungs. The heart also works optimal to out the blood to the body, make blood pressure to be normal and there is no headache. This was consistent with Kozier et al. (2011), relaxation techniques Breathing deeply is a technique used to reduce levels of chronic stress and pain. Deep relaxation techniques allow the patient to control his body's response to tension and anxiety. Relaxation techniques Breathing deeply can reduce oxygen consumption, metabolism, respiratory frequency, heart frequency, muscle tension and blood pressure.

Implication this study are for nurses always teach slow deep breathing exercise for hypertension patients to make relax and reduce the headches scale, blood pressure, heart frequency, respiratory frequency and temperature. The other implication are for hypertension patients who must performed slow deep breathing exercise as a regular exercise in their home so that they didn't felt headache again, blood pressures, heart frequency, respiratory frequency and temperature to be normal.

This study has several limitations and therefore needs to be refined so that future researchers can further develop the characteristics and number of respondents to be reproduced so that the results obtained are more precise.

Conclusion

Efforts to Giving Slow Deep Breathing Exercise for 4 days four times a day have an effect on the decrease in the scale of headache and vital signs consisting of systolic and diastolic blood pressure, pulse, pulse frequency, respiratory rate and temperature of the respondent. Suggestions for further researchers to add factors counfounding BMI, smoking and exercise.

References

AHA. (2019). Heart disease and stroke statistics 2019 update. *AHA Statistical Update*, 139, 56–528. doi: 10.1161/CIR.0000000000000659.

Arif, S.U., & Agis, T. (2019). The Different of Finger Handheld and Deep Breathing Relaxiation Techniques Effect on Reducing Heart Rate and Stress Levels in Primary Hypertension Patients. *Jurnal Keperawatan Padjadjaran, 7* (3), 266–273.

doi: 10.24198/jkp.

Aziz & Musrifatul. (2014). *Pengantar kebutuhan dasar manusia (Edisi 2)*. Jakarta: Salemba Medika.

Black & Hawks. (2014). *Keperawatan medikal bedah.* Singapore: Elsevier.

Chun, N.J., Cheuk, M.Y., Jing, P.S., Fang, F., Yong, N.W., Ming, L., & Alex, P.W.L. (2013). The healthcare burden of hypertension in Asia. *Healthcare Policy, 5*, 238–243. doi: 10.1136/heartasia2013010408.

Cortelli, P., Grimaldi, D., Guaraldi, P., & Pierangeli, G. (2016). Headcahe and hypertension. *Nourogical Science*, *25,* 132–134. doi: 10.1007/s10072-004-0271-y.

Dendy, Helwiyah, & Urip. (2018). The factors that are related self care agency in patients with hipertension. *Jurnal Keperawatan Padjajaran, 6*(1), 1–14. doi: 10.24198/jkp.

IFPMA. (2016). *Hypertension: Putting the pressure on the silent killer*. Retrieved from: https://www.ifpma.org/wp-content/uploads/2016/05/2016-Hypertension-putting-the-pressure-on-the-silent-killer.pdf.

Kozier, Erb, Berman, & Snyder. (2016). *Fundamental keperawatan (Edisi 7)*. Jakarta: EGC.

Liota, Dwi, & Tulus. (2018). The effect of the foot reflection therapy toward systolic blood pressure in patients with primary hypertension. *Journal of Nursing Care, 1*(3), 1–5. DOI: 10.24198/jnc.v1i3.17069.

Mulyadi, Supratman, & Yuni. (2015). *Efektifitas relaksasi napas dalam pada pasien hipertensi dengan gejala nyeri kepala di Puskesmas Baki Suharjo (Skripsi)*. Universitas Muhammadiyah, Surakarta.

Putu, N., Ayu, I., & Ketut, N. (2016). Pengaruh slow deep breathing terhadap tekanan darah pada penderita hipertensi di Wilayah Kerja Puskesmas 1 Denpasar Timur. *Jurnal Keperawatan dan Pemikiran Ilmiah, 2*(4), 1–10.

Riskesdas. (2013). *Penyajian pokok-pokok hasil riset kesehatan dasar 2013.* Jakarta: Kementrian Kesehatan.

Sastroasmoro & Ismail. (2011). *Dasar-dasar metodologi penelitian klinis (Edisi 4)*. Jakarta: CV Sagung Seto.

Smeltzer & Bare. (2011). *Textbook of medical-surgical nursing (12th Ed.)*. China: Lippincott.

Tarwoto. (2012). Latihan slow deep breathing exercise dan kadar gula darah penderita diabetes mellitus tipe 2. *Jurnal Health Quality, 3*(2), 69–140.

WHO. (2018). *Non communicable disease.* Retrieved from: http:// apps.who.int>bitstream>handle>9789241514620-eng.

WHO. (2019). *Hypertension.* Retrieved from: http://www.who.int/news-room/fact-sheet/detail/hypertension

Wijaya & Putri. (2013). *Keperawatan medikal bedah 1*. Yogyakarta: Nuha Medika.