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Effect of Hypno-Pressure on Mean Arterial Pressure in Patients with Cardiovascular Disorders

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ABSTRACT

Background: The mean arterial pressure (MAP) is the average arterial pressure during one cardiac cycle (systole and diastole). MAP is affected by cardiac output and systemic vascular resistance, each of which is affected by several factors. **Objective:** The aim of this study is to determine the effectiveness of hypno-pressure on Mean Arterial Pressure (MAP) in patients with cardiovascular disorders. **Methods:** A quasi-experiment research design with pretest- posttest with control group design was used in this study. Purposive sampling was used to select 56 respondents for this study, and twenty-eight respondents were randomly assigned to the experiment and control groups. The bedside monitor was used to measure MAP. Paired *t*-tests and Independent *t*-tests were used for data analysis. **Results:** There was a significant effect of hypno-pressure on the decrease of MAP value in patients with cardiovascular disorder with *p*-value 0.000 (<0.05), $t = 7.217$, and effect size of 1.18. **Conclusion:** Hypno-pressure could reduce MAP in patients with cardiovascular disorder.

Keywords: MAP; Cardiovascular Disorders; Hypnosis; Acupressure

INTRODUCTION

Cardiovascular disorders and changes in the value of MAP (Mean Arterial Pressure), both show a causal relationship (Bahall, 2015; Aaronson, Ward, & Connolly, 2012). Changes in MAP values become a risk factor for cardiovascular disorders and vice versa. Cardiovascular disorders will cause changes in MAP values, this condition will become a serious problem for the patient's prognosis (Nurarif, & Kusuma 2015). Hypnosis is an independent nursing intervention, used to achieve relaxation, reduce anxiety, blood pressure, fear and discomfort by manipulating the mindset (Kubzansky *et al.*, 1998, Ghorpade *et al.*, 2015). Acupressure is a technique of suppression, massage, and /or sequencing along the body's meridian lines that allows the flow of energy, which must be increased to a healthier condition, resulting in physiological changes in the body (Nguyen, *et al.*, 2013; Nowbar, *et.al.*, 2014; Salim, 2015). Hypnopressure will get system support through mindset and neural pathways. System support is given by using positive affirmations in a series of hypnotherapy, with the aim of activating the subconscious while acupressure will be a stimulus that is carried by the peripheral nerve pathways to the central nervous system (Mittleman *et al.*, 2015).

Hypnosis and acupressure are independent nursing interventions that can be carried out by trained and certified nurses. Hypnosis and acupressure can be used to manage a variety of signs and symptoms that arise from a disease or health problem, including increased MAP values that occur in patients with cardiovascular disorders (Grant, *et al.*, 2012, Tully & Baune, 2014). Furthermore, the combination of hypnosis and acupressure is called hypno-pressure.

Measurement of success of the results of interventions in patients is done by looking at the effects before and after hypno-pressure. Therefore, in order to know the presence or absence of hypno-pressure effects on MAP in patients with cardiovascular disorders scientifically, it is necessary to conduct this study.

METHODOLOGY

Research design

This research is a quasi-experiment with pretest-posttest control group research.

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Research Subject

The population in this study were all patients experienced cardiovascular disorders followed by an increase in MAP values that met the inclusion criteria. The number of research subjects was 28 for each group, with the total number of research subjects being 56.

Research Instrument

The research instrument used in this study was a bedside monitor and writing stationery used by researchers to make observations on changes in the MAP value of research subjects.

Intervention

Hypno-pressure on research subjects was conducted by nurses who were well-versed in cardio-vascular disorders, had hypnotherapy and acupressure certificates.

Ethical Consideration

The study received ethical clearance from Health Research Ethics Commission (K.E.P.K), Health Polytechnic Ministry of Health number 028/KEPK/Poltekkes-Smg/EC/2017dated 12 January 2017.

RESULTS

Data analysis was performed with univariate analysis to determine the characteristics of respondents. Bivariate analysis is used paired *t*-test to determine the effect of hypno-pressure on changes in MAP values and independent t-test to determine the effect of hypno-pressure on the intervention and control groups (Sugiyono, 2016; Sanjaka, Aplikasi SPSS Untuk Analisis Data Penelitian Kesehatan, 2015; Aris, 2011).

Table 1: Characteristics of Respondents Based on Age, Sex and Medical Diagnosis (N = 56)

Variable	Group				Total n=56		*p value
	Intervension n=28		Control n=28				
	f	%	f	%	n	%	
Respondents Based on Gender							
Male	10	17.9	14	25.0	24	42.9	0.28
Female	18	32.1	14	25.0	32	57.1	
Age Based Respondents							
Mean ± SD	65.54 ±11.989		66.68±10.449				
Middle Age (45-59)	3	10.70	1	3.60	4	7.14	0.749
Elderly (60-74)	15	53.60	15	53.60	30	53.57	
Old (75-90)	10	35.70	12	42.90	22	39.29	
Respondents Based on Medical Diagnosis							
Non-STEMI	5	21	10	31	15	27	
Heart rhythm disorders	11	46	7	22	18	32	
Heart Disorders	6	25	13	41	19	34	
Vascular Disorders	2	8	2	6	4	7	

** Source: primary data*

Chi-Square Test results showed the homogeneity (p) of gender data = 0.280 or $p > 0.05$ which means the respondent's gender data is homogeneous. Data on the age characteristics of respondents were tested for homogeneity using the Man Whithney test with a significance result of 0.749 > 0.05, which means that the age data of respondents was homogeneous.

Table 2: Analysis of The Effect of Hypno-Pressure on The Value of MAP In the Pretest-Posttest Intervention Group and The Pretest-Posttest Control Group (N = 56)

MAP Value (mmHg.)	Intervention Group				Control Group			
	Pre		*Post*		*Pre*		*Post*	
	n	%	n	%	n	%	n	%
Mean±SD	95.85±11.61		88.01±9.92		99.04±10.98		97.35±5.50	
< 70 (Low)	11	39.30	19	67.90	1	3.60	5	17.90
70-100 (Normal)	0	0.000	0	0.000	4	14.30	0	0.000
> 100 (High)	17	60.70	9	32.10	23	82.10	23	82.10
Total	28	100	28	100	28	100	28	100

** Source: primary data*

The mean difference (Mean ± SD) in the intervention group pre-test 95.85 ± 11.61 post-test 88.01 ± 9.92 with the control group pre-test 99.04 ± 10.98 post-test 97.35 ± 5.50 indicates the presence of hypno-pressure on the MAP value.

Table 3: Results of Paired Sample t-Test Analysis of MAP Values in the Intervention and Control Groups (n = 56)

Variable	Intervension Group	*t*	**p*	Control Group	*t*	**p*
	Mean ± SD			Mean ± SD		
MAP Value						
Pre	95.85 ± 11.61	7.118	0.000	99.04 ± 10.97	0.865	0.394
Post	88.01 ± 9.92			97.35 ± 5.50		

** Significance value p <0.05*

Hypno-pressures performed for 30 minutes in two sessions, statistically had an effect on the MAP value with p = 0.000 and t value of 7.118. There was a decrease in MAP value in the intervention group, so it also happened in the control group that was given education there was decrease in MAP value with a value of p = 0.394 and t value of 0.865.

Table 4: The Results of the Independent Sample t Test Analysis of the MAP Pre-Scores in the Intervention and Control Groups (n = 56)

Variable	n	Mean ± SD	*t*	*'p*
MAP Value (Mean Arterial Pressure				
Intervension	28	95.00 ± 11.61	1.058	0.295
Control	28	99.04 ± 10.97		

** Significance value p <0.05*

For groups that did not get hypno-pressure intervention, only received education, giving the effect of MAP value with $p = 0.295$ and t value of 1.058.

Table 5: Results of Analysis of Independent Sample t Test Post MAP Values between the Intervention Group and The Control Group (n = 56)

Variable	n	Mean ± SD	*t*	*p*
MAP Value (Mean Arterial Pressure)				
Intervension	28	88.01 ± 9.918	4.356	0.000
Control	28	97.35 ± 5.503		

** Significance value p <0.05*

Hypno-pressure performed on patients with cardiovascular disorders within 30 minutes and given in 2 sessions gave effect to the MAP value of the respondents with a value of $p = 0.000$ and t value of 4.356; the value of the effect size was 1.18.

DISCUSSION

Gender

This data is in line with other studies (Florea & Cohn, 2014; Kadir, 2010; Frazier *et al.*, 2003). When an individual is exposed to a stressor, either externally or internally, the stressor is converted into a stimulus that is transmitted to the brain. When the brain receives a stimulus, it activates the sympathetic nervous system, which produces CRH (Corticotropin-Releasing Hormone). CRH will stimulate ACTH (adrenocorticotropic hormone secretion). When ACTH has been produced, ACTH will participate in blood circulation and eventually reach the adrenal cortex. The adrenal cortex will be induced and stimulated to release the hormone adrenaline.

The hormone Adrenalin will impact the working status of several body systems. Cardio-vascular system is a system that is sensitive to changes in the concentration of adrenaline in the body, which can be seen in changes in hemodynamics. The heart will pump faster and stronger, and blood flow will be directly proportional, manifested by an increase in pulse frequency, a stronger pulse, and increased heart rate and blood pressure. Changes in hemodynamics are one of the factors that affect MAP, so increasing or decreasing hemodynamics is followed by increasing or decreasing MAP.

When there is a change in the working status of several organs of the body, women are less able to be active and explorative. Women tend to withdraw and remain silent. The fight-or-flight response in women is lower when compared to men, which results in a lack of energy reserves in the body. Reduced energy reserves in the body, including reduced energy reserves in the brain, will reduce the readiness to receive stressors. Women will become more sensitive to stressors. Women experience anxiety more easily when compared to men. This provides an explanation for why women will be more sensitive to changes in MAP.

Age of respondent

The age of the respondents provides an illustration that the elderly age group (60–74 years) is the largest group of respondents who experience anxiety, which is 30 respondents (53.57%). The findings of this study are consistent with the findings of Maendra *et al.* (2014), who found that respondents aged 66–75 years were the most likely to respond, accounting for 20 of the 60 total respondents (Maendra et al., 2014). A younger person is more likely to experience anxiety than an older person (though this can also be reversed). Sanjoyo (2006) and Siswanto *et al*. (2015) explained that as the human body ages, the working ability of organs from existing systems in the body decreases.These findings imply that more education regarding anxiety and its symptoms is required for the general public, especially older adults (Wetherell *et al.*, 2009).

Moyo *et al.*, (2018), research explains the existence of cognitive and behavioral changes in the ageing process.

The more you age, the more your cognitive abilities, physiological abilities, and behavior will tend to change. This research has a correlation of 0.73 for the changes that occur due to the occurrence of the degeneration process in the cells of the human body organs. Brain cells, kidney cells, lung cells, cardiovascular system cells, and all other cells in the body's tissues are no exception. This study emphasizes the importance of health care providers paying attention to facilities related to these physiological changes for geriatric patients.

Changes in the function of the Gamma-Amino Butyric Acid (GABA) system cause degenerative changes in respondents and affect anxiety scores. As a person ages, the affinity of the GABA system for receptors decreases. If the affinity of the GABA system for the receptors begins to decrease and the chloride ion channel closes more, less chlorine ion flows into the cell. The decrease in the number of chlorine ions in the cell causes cell polarisation to decrease. As the ability of cells to be stimulated increases, a person tends to experience anxiety more easily. This is what explains why people who are older are more likely to experience anxiety when compared to people who are younger.

Conversely, at a younger age, the GABA system's affinity is better. If the affinity of the GABA system for the receptors is better (increased), the chloride ion channel will open, and more chlorine ions will flow into the cell. Increasing the number of chloride ions in cells causes hyperpolarization of the cells. As a result, the ability of cells to be stimulated is reduced. Someone becomes less sensitive to stressors, someone else is more likely to be resistant to stressors, and the incidence of anxiety becomes minimal. This explains why someone with a younger age is better able to withstand anxiety (Moyo *et al.*, 2018).

The age distribution of the research respondents shows that the elderly (60–74 years) experience anxiety more than the younger age group. The incidence of older adults experiencing more anxiety is related to insulin. According to Kadir, as someone ages, all their physiological functions decrease, including insulin production. The decline in the hormone insulin affects the body's ability to enter glucose into cells as a source of energy, thereby reducing blood glucose in the brain because energy is used as part of the body's defense. The result is that someone with low blood sugar levels in his brain cells is more prone to anxiety (Kadir, 2010).

Medical diagnosis

It was found in the current study that out of 28 respondents in the intervention group , the medical diagnosis of heart rhythm disorder was the dominant medical diagnosis with 11 respondents, while of the 28 respondents in the control group, the medical diagnosis of heart failure was the dominant medical diagnosis with 13 respondents. Overall, with 19 respondents, the medical diagnosis of heart failure became the dominant medical diagnosis in this study.

Explanations that can provide clarity to the results of this study are studies conducted by Siswanto et al., and Sanjoyo, they explain that physiologically, if the human body gets older, the working ability of organs in the body's system will be increasingly reduced (Sanjoyo, 2006; Siswanto et al.,2015). In fact, the elderly (60-74 years) made up the majority of respondents in this study.

The effect of the pretest-posttest mean difference on the MAP value

The MAP value indicates the adequacy of tissue perfusion. If the figure shows a normal number (70–100 mmHg), then that number shows that only within that range is the perfusion of body tissue fulfilled. In the intervention group, there is an increase in the number of respondents who have a low MAP value, from 11 respondents (39.30%) to 19 respondents (67.90%), and a reduction in respondents who have high MAP values, from 17 respondents (60.70%) to 9 respondents (32.10%). The presence of hypno-pressure effects MAP which strengthened by the mean value ± SD in the intervention group pre 95.85 ± 11.61 and post intervention 88.01 ± 9.92, the value of $t = 4.356$ with $p = 0.000$. effect size 1.18.

Research conducted by Kuo provides information that is in line with current research that, of the 76 women who became respondents, those who received acupressure had significantly lower cortisol levels (significant difference = 4

mg / dl, p <0.05), heart rate frequency (significant difference = 9.2 beats per minute, p <0.001), anxiety symptoms (significant difference = 3.8, p <0.01). Kuo's research shows that acupressure has a significant effect on heart rate, and the current research shows that the significance value is not only for the heart rate, but that the research is currently showing significance for the MAP value. In Kuo's research, the strength of the effect was not explicitly stated, whereas in the present study, the strength of the effect was explicitly indicated by 1.86. The strength of the effect is quite strong, based on the results of research by researchers who are now in harmony with the theory in Chapter 2 that between hypnosis and acupressure are two nursing interventions that reinforce the physiology of the heart (Kuo *et al.*, 2016).

Other studies provide information that does not support the current research and suggest further studies. The study was conducted by Tseng et al., showed that Shenmen meridian point (MA-TF1) allegedly calms the mind and reduces stress. The hypothesis emerged that the Shenmen meridian point might be effective in increasing vagus nerve activity and/or suppressing the sympathetic regulation of the heart. A randomized crossover method was conducted to observe the effect of one acupoint at the auricular Shenmen point on autonomic nerve activity in 28 healthy women for two weeks. Subjects were randomly divided into two groups; the first group was the control group, and the second group was the intervention group. The results showed that there were no significant differences between the two groups (p = 0.92). Acupuncture at Shenmen acupoints did not significantly influence autonomic modulation of the heart in healthy women (Tseng *et al.*, 2015).

Research conducted by Prasetyaningsih regarding drugs given to patients with cardiovascular disorders include vasodilatator, diuretic, aldosterone, and inotropic antagonists, all of which affect blood pressure and pulse frequency (Prasetyaningsih, 2010). Based on research conducted by Prasetyaningsih, 2010), it was seen that drugs given to respondent become confounding factors related to hypno-pressure.

The current measures the effect of drugs and their influence on hypno-pressure. This can provide a significant effect on MAP and pulse frequency values. Simultaneous hypnosis and acupressure have mutually supporting effects. Hypnosis helps to overcome problems by changing mindset, working directly in the brain, while acupressure helps resolve problems through the nervous system's pathways, which ultimately stimulate the brain.

The point where the two interventions meet, that's where the optimal effect of hypnopressure occurs. The meeting point is in the brain, when the respondent enters into trance. This will make the respondent relaxed, more calm, and more able to regulate heart rate, then sometime after affirmation is given the peak effect of hypnopressure will be reached. The brain's ability to command and regulate target organs becomes stronger. Cardiovascular organs that are ordered by the brain to work towards normality are getting stronger, and that's what makes hypnopressure control cardiovascular function. The more hypnopressure intervention is given continuously and systematically, the more positive affirmations penetrate in the respondent's brain. Eventually it becomes a habit, and the respondent will again have a more controlled MAP value.

Application

Hypno-pressure performed by trained personnel on patients with cardiovascular disorders resulted in increased MAP values. When carried out for 30 minutes with 2 doses, can reduce the MAP value in 12 hours, were found among patients treated at ICCU. Further evaluation of the results is necessary until the respondent is transferred to the usual treatment room.

Research limitations

There is a confounding variable that is not measured for its effect, namely the administration of vasodialator, diuretic, aldosterone and inotropic antagonists. The ability of respondents to follow diets provided by the hospital along with respondent and family adherence to diets and the ability to maintain appropriate activities during treatment is necessary. The provision of drugs in the management of cardiovascular disease is a standard rule (the type and condition of the drug given are adjusted to the medical diagnosis). A regression test is needed to measure the influence of confounding variables on research results.

Conclusion

It was statistically significant that hypnopressure performed on patients with cardiovascular disorders, carried out for 30 minutes with 2 sessions of administration, had the effect of lowering the mean value of MAP. The strength of the effect of the independent variable on the dependent variable is strong, with the value of the effect size of hypnopressure on MAP is 1.18. Education on anxiety given to respondents in the control group, does not decrease the value of MAP. Research conducted at this time has several advantages when compared with research that has been done before. In this study, one intervention was used in four medical diagnoses, this shows explicitly the strength of the relationship between the independent variable and the dependent variable, in other words, the hypnopressure intervention has a statistically significant impact on changing the MAP value.

Recommendation

For nurse practitioners, especially for nurses on duty at ICCU, the realm of hypnosis and acupressure nursing interventions is clearly written on the Nursing Intervention Classification (NIC). There is already scientific research on its benefits with beneficial results, so this can be applied in collaboration with other health teams that handle these patients.

Hospital nursing services, further research needs to be done to update the knowledge and skills for nurses on duty at ICCU, as well as products from ICCU's innovative research results that can be carried out annually on an ongoing basis. The results of the study of the effect of hypnopressure on MAP in patients with cardiovascular disorders are proposed by researchers that this intervention should be used as a pilot project in the management of patients with cardiovascular disorders who have increased MAP values treated at ICCU.

Nursing education institutions must be able to incorporate hypno-preservation interventions into the curriculum while still paying attention to the latest studies of nursing in the intensive care area keeping in mind the existing rules in the KKNI. (Kerangka Kualifikasi Nasional Indonesia/Indonesian National Qualifications Framework).

Subsequent research, related to the confounding variable, makes it necessary to test the effect of confounding variable on regression test; thus the strength of the confounding variable must be calculated.

Conflict of Interests

The authors declare that they have no conflict of interests.

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