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The Effects of Hypnosis Relaxation Towards Fetus Heart Frequency and Vital Signs among Pregnant Women with Pre-eclampsia

Abstract

Background: One of the causes of Maternal Mortality Ratio (MMR) in Indonesia is pre-eclampsia. Mothers with pre-eclampsia disorder who are followed by anxiety tend to have specific vital sign change included increasing blood pressure, heart rate, respiratory rate, and fetus heart rate. Pregnant suffered pre-eclampsia should keep the balance of mind and emotion, as well as to reduce a complication of pre-eclampsia towards mothers and their fetus.

Objective: The objective of this study was to analyze the effects of the relaxation hypnosis on fetus heart rate and vital signs of pregnant women with pre-eclampsia.

Method: This study was a quasi-experiment with a pretest-posttest design. The total subjects were 32 pregnant women with pre-eclampsia, which selected by purposive sampling techniques. The researcher did hypnosis relaxation for three times. a Wilcoxon test was used to analyze the paired bivariate for systolic blood pressure, while the *Mann-Whitney test and independent t-test were used to analyze fetus heart frequency.*

Result: This study shows that hypnosis relaxation can reduce the systole blood pressure (p-value = 0.000; CI=12.185-23.109), reduce diastole (p-value = 0.000; CI= 8.630 – 14.311), reduce heart rate (p value = 0,004; CI= 2.07 – 8.989) and reduce respiratory rate (p value = 0.000; CI = 2.785 – 6.275). In terms of the effect on the fetus, hypnosis relaxation affect the fetus heart rate (p value = 0,000; CI = 5.834 – 13.930).

Conclusion: Hypnosis relaxation influences the change of fetal heart rate and vital signs of pregnant women with pre-eclampsia.

Keywords: Fetal heart rate; Hypnosis relaxation; Pre-eclampsia; Vital signs

INTRODUCTION

Based on the Health Demography Survey of Indonesia in 2015, Maternal Mortality Ratio (MMR) in Indonesia reached 305/100.000 birth of life. Meanwhile, the target of MMR from Sustainable Development Goals (SDGs) was 70/100.000 birth of life (Health Department of Pekalongan District, 2019). In Central Java, in 2019, the MMR reached 76,93/100.000 delivery of life with hypertension and pre-eclampsia as the significant causes (28%) (Health Department of Central Java Province, 2020).

Pre-eclampsia is a specific syndrome suffering pregnant in more than 20 weeks of age gestation-who was healthy tension in previous age. The signs of pre-eclampsia are increasing blood pressure (140/90 mmHg) and following by appearing of protein urine (Cunningham et al. 2010). Pre-eclampsia could affect on fetal well-being. Babies

who are born by mother with pre-eclampsia, tend to have a few problematic temperament styles in the first three months after birth. Moreover, its negative impact was amplified by the mother's antenatal depression (Nomura et al., 2014).

Mothers with pre-eclampsia disorder who are followed by anxiety and stress tend to have specific vital sign change included increasing blood pressure, heart rate, respiratory rate, and fetus heart rate. The physiologic response of fear is activating the center nervous system to enable the hypothalamus-pituitary-adrenal axis and sympathetic nervous system signed by increasing the frequency of heart rate and blood pressure (Agorastos et al. 2019). However, Kafali, Derbent, Keskin, Simavli, & Gözdemir (2011) are evaluating the association between maternal anxiety and baseline FHR claimed that stress-induced high maternal state anxiety increased baseline FHR.

There is a strong relationship between mother psychology and of the fetus. Studies have shown that maternal exposure to stressful events during pregnancy is linked to adverse outcomes in children (Ferrari, Faccio, Peccatori, & Pravettoni, 2018). Antenatal anxiety predicts poor infant physiological, mental, and psychomotor development as well as behavioral and emotional difficulties in early childhood (O'Donnell et al., 2017; Vehmeijer, Guxens, Duijts, & El Marroun, 2019). Thus, the mother should keep the balance if the emotion to gain happiness and peace along with the pregnancy. The healthcare provider can choose Hypnosis relaxation as an alternative way to keep the balance of the body (Andriana, 2011). A combination of standard care and a brief hypnosis intervention holds sufficient promise for antenatal stress relief to justify testing its efficacy in larger groups of pregnant women (Legrand et al., 2017).

In 2014, from 35 District in Central Java, Pekalongan district was the 7th district with the highest MMR up to 29 cases (Health Department of Pekalongan District, 2014). The data of The Health Department of Pekalongan district indicated that the MMR in 2018 was 69/100.000 life birth (11 cases), which pre-eclampsia was one of the causes of MMR (Health Department of Pekalongan District, 2019).

Several measurements have been taken to control pre-eclampsia. In the case of a mother with a high risk of pregnancy, including pre-eclampsia, the ways were a consultation to the obstetricians and hospital visits to monitor blood pressure once a week routinely. However, no psychological and spiritual treatment has been taken. Hypnosis is the kind of appropriate complementary therapy with minimum side effects. Hypnosis is safe, efficient, and economical compared to other complementary therapies because no specific equipment is needed (Saha et. al., 2012; Shorofi, & Arbon, 2017). The other additional therapy methods need more material, such as acupuncture, aromatherapy, and music therapy. Such as lavender aromatherapy in lowering blood pressure, health care should prepare some drops of aromatherapy and diffuser (Maisi, Suryono, Widyawati, Suwondo, & Kusworowulan, 2017); or they need a banana when using ambon banana as the alternative way in reducing blood pressure (Susanti, & Resti, 2019)

Moreover, any drugs, surgery, and special medic equipment are not required to give hypnosis; only use the power of suggestion, which will relax the patients directly and make them comfortable quickly (Iserson, 2014; Larasati & Wibowo, 2012). Yoganita, Sarifah, & Widyastuti (2019) suggested that nape massage and hypnosis can reduce blood pressure, either systolic (15.62 mmHg) or diastolic (6.72 mmHg). Hypnotherapy can also overcome stress, relax the body, inhibit cortisol hormone secretion, and this condition prevents vasoconstriction of blood vessels so that blood pressure decreases (Purnomo, Nur, Rahim, & Pulungan, 2020)

In terms of fetal heart rate (FHR), relaxation reduced the basal fetal heart rate (Akbarzade, Rafiee, Asadi, & Zare, 2015). In regards to this study, hypnosis, which has a function as relaxation, was used to stabilize both fetus heart rate and mother vital signs. The study aimed to analyze the impacts of the relaxation hypnosis on fetus heart rate and vital signs of pregnant women with pre-eclampsia.

METHOD
This study was a quasi-experimental with a pretest-posttest with a control group design. The variables were hypnosis relaxation, fetus heart rate, and

mother's vital signs. The population in this study were pregnant women with pre-eclampsia in the working area of the Health Department of Pekalongan District in 2016. The criteria were under the supervision of the Health Department of Pekalongan District, including in the top eight Community Health Center that had similar regional characteristics and had the highest incidence of pre-eclampsia in 2016. The Community Health Center with the highest prevalence of pre-eclampsia in 2016 is Kedungwuni II, Kedungwuni I, Karangdadap, Bojong I, Wiradesa, Tirto, Wonopringgo, and Buaran.

The number of samples needed for each group was 16 respondents (Federer, 2012). To maintain the number of member groups in enough quantities, the researcher made a correction number by determining a dropout value of 10% (f: 0.1). Based on the sample calculation and drop out correction considerations, the number of respondents needed was 18 respondents in each group. Sample collected by purposive sampling technique.

Patients who were determined to be respondents must have met the inclusion criteria and eliminate the patients who met the exclusion criteria. The inclusion criteria in this study were: did not suffer from an infection, that was defined by fever in the last three days, or signs of inflammation in the body (Color, Dolor, Rubor, Tumor, Functionolaesa), the fetus lives, a single embryo, did not suffer from chronic diabetes mellitus, mothers were willing to be a respondent and were ready to be given standard pregnancy care and hypnosis (for the intervention group), and they were willing to do standard pregnancy care (for the control group).

A random technique used to determine the group members. Both groups then performed initial tests for vital signs and the fetus's heart rate. The intervention group then gets the intervention, i.e., hypnosis relaxation and regular services included vital sign check-up routinely, health education, and emotional support. The hypnotherapy had been done by a certified hypnotherapist using a standardized procedure. The intervention was done in the patient's home and was carried out three times with the distance of each therapy for one day. The researcher re-examined the vital signs and fetus heart rate on day three after treatment. On the other hand, the control group received regular

services included vital sign check-up routinely, health education, and emotional support.

The main instruments in this study were sphygmomanometer, stethoscope, watch, doppler (digital fetus heart rate meter), and questionnaire, which could record: age, gravida, BMI, gestational age, and the data of vital signs and fetus heart rate.

Data collected after obtaining a research permit from all relevant parties, and the researcher coordinated with the Community Health Centers in the Pekalongan District Health Department's working area. Data collection assisted by the midwives and the staff of the Community Health Center selected.

Univariate analysis was used to describe the data in percentage form. The researcher used a test of homogeneity to test whether variants were homogenous or not. Based on the homogeneity test of age and gravida variable, age and gravida showed that they were homogeneous with a p-value of age 0.252 and the p-value of gravida 0.155.

A Shapiro Wilks test was used to test the normality of the data. The test results showed the Asymptotic Significance >0.05 (was normally distributed) or Asymptotic Significance <0.05 (the data distribution was not normal). In the control group, the results of the normality of systolic blood pressure test before treatment were 0.001, diastole before intervention 0.002, diastole after those was 0.002, gravida 0.026, and length of education was 0.001. This study showed that systolic blood pressure before treatment, systole after those, diastole before those, gravida, and education level have abnormal data distribution. Meanwhile, normality test results for systole after intervention were 0.053, age 0.591, BMI 0.36, and gestational age 0.089. This study also showed that systolic blood pressure after hypnosis, age of respondent, BMI, and gestational age have normal data distribution.

In the treatment group, the normality test results for diastole before treatment were 0.002, gravida 0.009, and length of education was 0.001. This research showed that diastole before hypnosis, gravida, and education level had abnormal data distribution. Meanwhile, the results of the normality data of the systole-in the treatment group was 0.096, systole after treatment 0.512, diastole after

treatment 0.058, age 0.598, BMI 0.144, and gestational age 0.54. This study showed that systole before hypnosis, systole after those, diastole after those, age, BMI, and gestational age had normal data distribution.

Wilcoxon test was used to analyze the paired bivariate for systolic blood pressure before and after the control group treatment, diastole before and after the control group treatment. Meanwhile, the bivariate analysis paired the systole before and after the treatment group using paired t-tests because the data had a normal distribution.

The researcher used linear regression analysis for further analysis. In the non-paired data analysis with the normal distribution, the data analysis was carried out using an Independent t-test, while the Mann-Whitney test analyzed the data with the abnormal distribution. Meanwhile, the data of fetus heart frequency appeared normal and abnormal. Thus the Mann-Whitney U test and independent t-test were used to analyze the data. IBM SPSS Statistic version 23 was used to analyze the data.

In this study the implementation of research ethics followed these steps: assigning an informed consent form, using an anonymity form, keeping the confidentiality, caring for self-determination (free to participate or not participate), giving benefits, doing veracity, protecting from discomfort and harm condition, and passing ethical clearance. The ethical issue was obtained from the Research Ethics Commission of the Faculty of Public Health, Diponegoro University, Semarang. Besides, the therapeutic process was carried out by researchers, namely midwives, who have been certified Hypnotherapist (CHt).

RESULTS
We found 18 respondents in the experimental group and 18 respondents in the control group. At the time of the research, process dropout occurred in the experimental group of two respondents because respondents refused to do the second intervention and experienced labor before completing the therapy, and drop out in the control group of 2 respondents because the health care referred patients. The final number of samples was 16 respondents in the experimental group and 16 samples in the control group.

Characteristics of respondents shows in Table 1. Based on age showed that the average age of respondents in the control group was 32 years, with a minimum age of 20 years and a maximum age of 40 years. In the treatment group, the average age of respondents was 32 years, with a minimum age of 21 years and a maximum age of 42 years. Based on the categorical frequency distribution, there were 22 (68.8%) and in the healthy age range (20-35), and 10 (31.2%) were in the high-risk age range (<20 or >35). Based on gravida showed that the average respondent of the third gravida with a minimum of first gravida and maximum of the sixth gravida. In contrast, the treatment group showed the average gravida of the treatment group was the third gravida, with minimum was the first gravida, and the maximum was the sixth gravida. The data frequency was 11 primigravidas (34.4%), 16 multigravidas (50%), and five grande-multiparas (16.6%).

Characteristics of respondents based on length of education showed that the average level of school in the control group was 7.87 ± 2.66, minimum education level at 6 (elementary school), and highest education was 12 (high school). Meanwhile, the average duration of treatment group education was 7.81 ± 3.06, with a period of at least six years (elementary school), and the most extended education period was 17 years (bachelor). Based on body mass index (BMI) showed that BMI in the control group was 24.09, with the lowest BMI 20 and the highest BMI 29. In the treatment group, the BMI average was 23.51, with the lowest BMI 19 and the most elevated BMI 29. Based on gestational age showed that in the control group, the average gestational age was 32.2 weeks with the youngest gestational age of 20 weeks, and the oldest gestational age was 41 weeks. Whereas in the treatment group, the average gestational age was 33.8 weeks with the youngest gestational age of 20 weeks, and the oldest gestational age was 41 weeks. Characteristics of respondents by occupation showed that 16 (60%) respondents worked as textile workers and 12 (37.5mmHg) mothers who did not work.

Table 1. The comparisons of blood pressure pre-post intervention (n= 32)

Variable	Pre		Post		Blood pressure change			P-Value
Blood pressure	Mean±SD	Min-Max	Mean±SD	Min-Max	Decreased	Increased	No change	
Control group								
Systole	155.31±27.415	130 – 240	150.06±36.852	86 - 245	9 (56.3%)	2 (12.5%)	5 (31.3)	0.059ᵃ
Diastole	95.5±15.535	80 – 140	95.5 ± 15.535	80 - 140	6 (37.5%)	0 (0%)	10 (62.5%)	0.02ᵇ
Experiment group								
Systole	146.88±13.889	130 – 170	126.88 ± 13.765	106 - 160	15 (93.8%)	0 (0%)	1 (6.3%)	0.025ᶜ
Diastole	9.50 ± 7.746	80 – 100	81.88 ± 12.230	60 - 100	13 (81.3%)	1 (6,3%)	2 (12.5%)	0.002ᵈ

Table 2. The comparison of the frequency of the pulse, respiratory, and fetus heart between the pre-post intervention (n = 32).

Variable	Mean ± SD	Min-Max	Univariate test n (%)			Paired sample	P-Value
			Decreased	Increased	No change	pre-post intervention test value	
Pulse rate among mothers in the control group							
Pre	91.25 ±10.927	74-110	9 (56.25%)	6 (37.5%)	1 (6.25%)	1.485	0.158ᵍ
Post	88.50 ±8.929	76-100					
Pulse rate among mothers in the experiment group							
Pre	92.25 ± 10.376	72-116	14 (87.5%)	1 (6.3%)	1 (6.3%)	3.159	0.002ʰ
Post	84.69 ± 10.268	6610-14670					
The respiratory rate among mothers in the control group							
Pre	24.06 ±3.151	18-30	11 (68.8%)	5 (31.3%)	0%	0.871	0.397ᵍ
Post	23.38 ±3.557	16-30					
The respiratory rate among mothers in the experiment group							
Pre	24.50 ±3.615	18-30	15 (93.8%)	1 (6.3)	0%	5.537	0.000 ᵍ
Post	18.69 ±3.198	16-25					
Fetus heart rate among mothers in the control group							
Pre	141.94±9.344	128-155	9 (56.3%)	6 (37.5%)	1 (6.3%)	0.405	0.692 ᵍ
Post	141.38 ±8.229	130-152					
Fetus heart rate among mothers in the experiment group							
pre	143.81 ±12.411	115-160	14 (87.5%)	1 (6.25%)	1 (6.25%)	5.870	0.000 ᵍ
post	132.50 ±8.602	110-145					

Table 3. The comparison of the delta value of the frequency of the pulse, respiratory, and fetus heart between control – experiment group (n = 32).

Variable	Value		CI
	Score	P-Value	
Differences between pulse rate in control and experiment group	3.159	0.016ⁱ	undefined
Differences between respiratory rate in control and experiment group	-3.903	0.000ʲ	(-7.807) - (-2.443)
Differences between fetus heart rate in control and experiment group	-4.524	0.000ʲ	(-15.603)- (-5.897)

Table 1 shows that in the experiment group, there were significant differences between systole and diastole pre and post-intervention with p-value 0.025 and 0.002. Meanwhile, in the control group, the only diastole that was considerable indifference with the p-value was 0.02, and there was no significant difference in systole (p-value 0.059).

Table 2 indicates that there were no significant differences between pre-intervention and post-intervention in the control group either for pulse rate (p-value= 0.158), respiratory rate (0.397) or fetus heart rate (0.692). Meanwhile, there were significant differences between pre-intervention and post-intervention in the experiment group either for a pulse, respiratory, and fetus heart rate; these were 0.002, 0.000, and 0.000, respectively. Table 3 suggests that there were significant differences between the delta value of the pulse rate between the control and experiment group (0.016), respiratory rate (0.000), and fetus heart rate (0.000).

DISCUSSION

Hypnosis gives positive effects on blood pressure decrease within pregnant mothers with pre-

eclampsia. Findings showed that there was a significant effect of hypnosis towards those. Hypnosis is an effective communication method which passes directly to the critical factor. Hypnosis reduces blood pressure through steps (1) relaxation; (2) parasympathetic nerve activation; (4) reducing cardiovascular activity; (5) increasing vasodilatation; (6) increasing VEGF; (7) reducing SFlt-1 in the plasma and; (8) reducing blood pressure (Olendzki, Elkins, Slonena, Hung, & Rhodes, 2020).

On the hypnosis treatment, pregnant women-subjects- were lied on the left side of the stomach; two small pillows were put under the abdomen and between two legs. Rested on the left side of the abdomen gives benefits both for mother and baby. On the one hand, the baby will get the maximal flow of blood and nutrition to the placenta since the vena cava inferior located at the back right side of spin flow back the blood flow from the lower part of the heart. On the other hand, the mother with high blood pressure will get the maximum effect of blood pressure decrease, and this is suitable with a statement that people in lay positions are having lower blood pressure (Grindheim, Estensen, Langesaeter, Rosseland, & Toska, 2012). When the women turned from the left lateral to supine to the right lateral positions, the blood pressure invariably rose slightly as the women were (Cicolini et. all., 2011).

Therefore, this study suggested that hypnosis effecting on blood pressure decrease both in systole and diastole among pregnant women with pre-eclampsia, furthermore, it will drop mortality risk on mother affected by pre-eclampsia. The mean of the systole and diastole decrease was 20 mmHg and 7.5 mmHg, respectively. Clinical hypnosis-called hypnotherapy also makes a mother more relax, stabilizes the pulse frequency, respiratory rate, and fetus heart rate frequency. Hypnosis relaxation creates a depth rest, either physical rest or spiritual and emotional rest. Relaxation is a technique used to support and obtain depth relaxation to low the unwanted signs and the symptoms in the body (e.g., pain, muscle stress, and anxiety). This result supports the research conducted by Holdevici (2019) that Ericksonian hypnosis can reduce essential and secondary hypertension with p-value < 0.005 (U = 23.7; N = 52).

Furthermore, the stress perceived by the patients in the experimental group is lower than the scores reported at the beginning (U = 109.5, N = 52; p = 0.003). Another study find that hypnosis reducing hypertension both in a short time, middle, and long-term (Kekecs, Szekely, & Varga, 2016). A significant lowering of both systolic and diastolic pressures was obtained in both the no drug and drug groups receiving hypnosis treatment (Deabler et al., 2011).

People in hypnosis relaxation state will have an entirely relaxed body, calmed, similar to sleep condition, but they do not have a total loss of conscious (Beevi, Low, & Hassan, 2016). Moreover, Vanhaudenhuyse, Laureys, & Faymonville, (2014) argued that in hypnotherapy states, there is a stimulus to the reticular activator system in the brain. It causes nervous autonomy response, including pulse decrease, blood pressure decrease, and respiratory rate decrease. Besides, it will also control the feeling, emotion, and stress. Relaxation will inhibit the increase of the sympathetic nerve activity; therefore, it can reduce the number of the hormone caused dysregulation of the body. The parasympathetic nervous system has a contradiction function with the sympathetic nerve system, and it slows the work of internal body systems. The effects of the relaxation are reducing pulse, respiratory rhythm, blood pressure, muscle tension, metabolic level, and the production of the stress hormone. As a result, the whole of the body starts to get maximum function and healthier circumstances with the higher of the healing energy, restoration, and rejuvenation (Pal, Pal, & Wal, 2019). Hypnosis relaxation stabilizes fetus heart rate in pregnant women with pre-eclampsia. Fetal heart rate (FHR) monitoring is an essential tool for fetal welfare assessment (Reddy, & Jim, 2019). Relaxation during pregnancy is associated with salutogenic effects that include regulation of emotional states, physiology, and positive impact both on fetal behavior and on obstetric and neonatal outcomes (Fink, Urech, Cavelti, & Alder, 2012).

Fetus heart rate illustration shows how the condition of the fetus's health. Based fetus heart rate decreases sharply along with the increasing gestation age as the result of the maturity of parasympathetic tonus. The researcher measured the fetus's heart rate (FHR) in one full minute

(Baston & Jennifer, 2012). However, in the reality of service, that FHR measurements on prenatal care are only to find out whether there is a sound, without knowing the frequency, so that it cannot detect if there is a possibility of irregularities or rates lower than 110x/minute and higher than 160x/minute (Chabibah & Laela, 2017). Bradycardia is a condition when the FHR is less than 110 x/minute) is defined as bradycardia. In contrast, tachycardia is a condition when the FHR is higher than 160 x/minute, which is caused by factors such as fetus hypoxia, anemia, and drugs (Holmes & Baker, 2011).

There are various factors influencing fetus heart rate, including the mother's position, uterine activity, and the age of the mother's pregnancy due to the balance of maturity of the sympathetic and parasympathetic nerves, fetus stress, and anxiety felt by pregnant women (Gondo & Suwardewa, 2011). Relaxation hypnosis conditions will make pregnant women relaxed and calm. Someone who has a quiet mind, his heart rate will be regular and not too fast. In contrast, a stressed mother, his heart rate will tend to be faster. Mother and baby have strong bonds since in the womb, what the mother feels is also felt by the fetus. Therefore if the mother feels calm, the fetus can feel it, and one of the responses is a slowing down but regular and stable heartbeat (Ghodrati & Akbarzadeh, 2018). Also, in previous research hypnosis can reduce anxiety and heart rate (Legrand et al., 2017)

Data analysis showed that there were significant differences between FHR before and after hypnosis relaxation, with a significance value (p-value) of 0.000. In conditions before hypnosis relaxation, the frequency of FHR tends to be high at an average of 144.59x/minute, the lowest 115x/minute, and the highest frequency 160x/minute. Even though this is still within normal limits, this value is at the upper limit of average numbers, so there is a risk of tachycardia. After hypnosis relaxation, the DJJ frequency looks more stable with an average of 134 x/minute, with the lowest rate being 134.71 x/minute and the highest frequency of 155x/minute.

This study suggested that relaxation hypnosis affects the stabilization of the fetus's heart rate. At least the heart rhythm does not beat fast but slows down regularly. The length of time study became

the limitations of this study. This study took about six months, just for taking the data. It occurred because of the difficulties in finding respondents who met inclusion criteria.

CONCLUSION

Hypnosis relaxation influences the change of fetus heart rate and vital signs of pregnant women with pre-eclampsia, including blood pressure, heart rate, and respiratory rate. Hypnosis relaxation also influences the stabilization of the fetus's heart rate in pregnant women with pre-eclampsia. Health care services should include hypnosis relaxation as an alternative way for caring for pregnant women with pre-eclampsia so that the fetus and mother's welfare can be improved.

ACKNOWLEDGEMENTS

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