## HEA-OR-102

# THE EFFECT OF *STIMULUS CUTANEOUS SLOW STROKE BACK MASSAGE* TO *BETA ENDORPHIN* LEVELS AND BLOOD PRESSURE CHANGES AMONG PREGNANT WOMEN WITH PREECLAMPSIA IN DEMAK, INDONESIA

Tri Maghfiroh[1], Onny Setiani[1], Sri Sumarni[2], Supriyana[2], **Friska Adiani[2]**

[1]*Diponegoro University, Semarang, Indonesia*
[2]*Semarang Health Polytechnic, Semarang, Indonesia*

Corresponding author's email : vye_r@yahoo.com or frisk108aem@gmail.com

Eclampsia caused 50,000 deaths annually worldwide and counted for 10% of total maternal deaths. This study aims to determine the stimulus effects of stimulus cutaneous slow stroke back massage to Beta Endorphin levels and blood pressure changes of pregnant women with preeclampsia in Demak. This was a quasi-experimental research study design with one group pre and post-test design. This study used a treatment group of 15 pregnant women with mild pre-eclampsia. Stimulus cutaneous slow stroke back massage affects Beta Endorphin levels of pregnant women with mild preeclampsia by increasing Beta Endorphin levels of 0.9816 ng/ml. The treatment also has a positive effect to blood pressure, with 21.0 mmHg reduction in systolic and a decrease of 15.7 mmHg of diastolic after the intervention.

This study suggests, therapy stimulus cutaneous slow stroke back massage can be used as an alternative for blood pressure management of pregnant women.

**Keywords:** Stimulus Cutaneous Slow Stroke Back Massage, Beta Endorphin Levels, Blood Pressure, Preeclampsia

## 1. INTRODUCTION

Preeclampsia or eclampsia is a major cause of morbidity and mortality among mothers and infants, especially in developing countries (Hanifa W, 2005). Indonesian Demographic and Health Survey in 2012 states that the Maternal Mortality Rate (MMR) in Indonesia was increasing, and preeclampsia and eclampsia was suspected as the major cause since its prevalence was reported at 1.5 to 25% (Manuaba, 1997). Globally, eclampsia causes 50,000 deaths annually in worldwide, or counted for 10% of total maternal deaths (Caroline H, 2008).

Preeclampsia is an organic multi specific disorder in pregnancy, childbirth and postpartum which characterized by an increase in blood pressure, proteinuria and edema after 20 weeks gestation or fetal weight of 500gr (Brayshaw,2008; Achadiat,2004; Bothamley and Maureen,2012). Alternative treatment of high blood pressure in pregnant women with mild preeclampsia, is to use non-pharmacological treatment which one of them is a relaxation technique (Jain, 2012; Muttaqin, 2009; Klein and Thomson, 2008).

One of the relaxation technique is known as cutaneous stimulus of slow stroke back massage with the ultimate objective to release endorphins which important to relax the muscle tension and improve circulation to accelerate healing (Potter and Perry, 1997; Morgan and Hamilton, 2009).

Meek's research as stated in st.Scholastica (1992) showed that the intervention of slow stroke back massage can lower blood pressure and body temperature.

Obviously, the relaxation technique is very beneficial for pregnant women because stress in pregnancy can disrupt the body's metabolism, lowers the immune system and can lead to high blood pressure which becomes one of the risk factor of preeclampsia among pregnant women This study aims to confirm the stimulus cutaneous effects of slow stroke back massage to beta endorphin levels and blood pressure changes among pregnant women with preeclampsia in Demak.

## 2. METHOD

This research uses a quasi-experimental research with one group pre and post design which aims to determine the effect of cutaneous stimulus of slow stroke back massage on Beta Endorphin levels and blood pressure of 1 (one) group of pregnant women with mild preeclampsia. The data collection was performed in Demak during December 2013 until January 2014.

Based on data from public heatlh office of Demak, the populations in this research was all pregnant women with pregnancy over 20 weeks and have mild preeclampsia in Demak regency at December 2013-January 2014, counted for 17 respondents. Since 2 of 17 pregnant women were not willing to be respondents, therefore only 15 were involved in the study.

The variables of this research consisted of cutaneous stimulus of slow stroke back massage, Beta Endorphin levels and blood pressure including systolic and diastolic. Data were processed and analysed using SPSS series 15. Analysis in this research consists of univariate and bivariate analysis, where the bivariate analysis was employed to find out cutaneous stimulus slow stroke back massage effect on Beta Endorphin levels and blood pressure with systolic and diastolic score as an indicator.

This study meets the requirements of ethics and has been approved to carry out with regard to principles that stated in Code Ethics of the National Health Ethics Research Manual of Indonesian Health Ministry in 2007 which accordance with the certificate of worthiness from Health Research Ethics Committee of Public Health Faculty in Diponegoro University, Semarang.

## 3. RESULT AND DISCUSSION

Table 1 shows that the majority of respondents (53.3%) were women at the reproductive age (20-35 years), entering the third trimester of gestation (73.3%), have parity of 2 until 5 (66.7%), less educated (66.7%), unemployed (66.7%), have Antenatal Care check up <4 times (53.3%), had a history of hypertension (66.7%) and haven't received massage therapy during pregnancy (53.3%).

Table 1. Characteristics of Respondents

| Characteristic | Category | N | % |
|---|---|---|---|
| Age (Year) | 20-35 | 8 | 53,3 |
| | >35 | 7 | 46,7 |
| Gestation (Trimester) | 2 | 4 | 26,7 |
| | 3 | 11 | 73,3 |
| Parity | 1 | 2 | 13,3 |
| | 2-5 | 10 | 66,7 |
| | > 5 | 3 | 20 |
| Education | Elementary School | 10 | 66,7 |
| | Junior High School | 4 | 26,7 |
| | Senior High School | 1 | 6,7 |
| Ocupation | Labourer | 3 | 20 |
| | Farmer | 2 | 13,3 |

| | | | |
|---|---|---|---|
| | Unemployed | 10 | 66,7 |
| Antenatal Care Frequency | ≤ 4 | 8 | 53,3 |
| | > 4 | 7 | 46,7 |
| Hypertension History | Have | 10 | 66,7 |
| | Doesn't have | 5 | 33,3 |
| Massage History | Have | 7 | 46,7 |
| | Doesn't have | 8 | 53,3 |

Table 2 shows that Stimulus Cutaneus Slow Sroke Back Massage affected pregnant women's endorphin levels and blood pressures. Endorphin levels increased to 0.9816 ng/ml, whilst systolic blood pressure decreased by 21.0 mmHg and diastolic blood pressure decreases by 15.7 mmHg. Paired T-test confirmed that the treatment can significantly increased Endorphin levels and reduce systolic and diastolic blood pressure ($p < 0.001$).

Table 2. Result Analysis of Stimulus Cutaneus Slow Sroke Back Massage to Beta Endorphin Levels and Blood Pressures in Pregnant Women with mild Preeclampsia (N=15)

| | Treatment | Mean ± SD | D | IK95% | *P* |
|---|---|---|---|---|---|
| Beta Endorphin Levels | Pre | 1.0839 ± 0.23209 | 0,9816 | 1,0607-0,9026 | < 0.001 |
| | Post | 0.1022 ± 0.11005 | | | |
| Systolic | Pre | 145.9 ± 4.76 | 21.0 | 24,3-17,8 | < 0.001 |
| | Post | 124.9 ± 7.40 | | | |
| Diastolic | Pre | 95.8 ± 5.53 | 15.7 | 19,4-12,2 | < 0.001 |
| | Post | 80.1 ± 8.99 | | | |

Endorphin is a pain suppression system that can be activated by stimulated the regions of endorphin receptors in periaqueductal gray substance of middle brain. Cutaneous Slow Stroke Back Massage Stimulation on 10 to 12 area of torakal and lumbar 1 which is the source of innervation of uterus and cervix can stimulate receptors of nerve ascending, where the stimulus will be sent to the hypothalamus to travel through the spinal cord, forwarded to the pons proceed to section gray on the middle brain (periaqueductus), the stimulus that received by periaqueductus is later delivered to the hypothalamus. And for the result hypothalamus will produce Corticotrophin Releasing Factor (CRF). CRF stimulates the pituitary gland to increase the production of pro-opiomelanocortin (POMC) that increases Endorphin production by adrenal medulla. Endorphins are secreted into bloodstream affect the mood to relax (Steven 1982), (Ganong and William F 1999). That relaxing mood decreases norepinephrine and Anti Diuretic Hormone (ADH) production, and increases the secretion of endorphins. All of these will have benefits in the reduction of blood pressure (Tiran and Mack 1995).

This results are consistent with research from Badawi (2009) in Lakshmi (2011) that stated massage can affect body to increase endorphin secretion. Endorphins have narcotic effect that naturally reduce pain and enhance the excitement. Research of Meek in St. Scholastica (1992) also show the same result that the intervention of slow stroke back massage can lower blood pressure and body temperature. According to Turchinov in Arifin (2012), the mechanical pressure of a back massage will stimulate the formation of peizeo-electric effect which helps loosen, stretch and lengthen muscle fibers that will improve blood circulation and bring back the $O^2$ and nutrients back to tense area of body. This muscle stretching effect also occurs in vertebral arteries are prone to vasoconstriction so that blood circulation to spinal cord return to normal that results blood pressure to physiologically decrease. The return of blood circulation also reduces muscle pain due to lactic acid heap so sensitivity of the receptor ASIC3 (Acid-Sensing Ion Channel Number 3) decreases and

cause feelings of calm, relaxed and better. Mechanism of feeling calm and relax is then also induced by decreasing activity of α and β waves and increased δ wave activity in CNS during and after back massage, note that δ waves are brain waves that normally occur when a person has fallen asleep. Relaxing effect through the reduction of hormone catecholamine will continue to decrease sympathetic nerve activity accompanied by blood pressure decrease.

Sense of Comfort will be achieved that psychological positive for a sense of calm, comfortable, relaxed, and decrease of stress. This positive response through Hypothalamic Pituitary Adrenal (HPA) axis will be stimulated hypothalamus and Locus Coerulus (LC). Hypothalamus would decrease the secretion of corticotrophin-releasing hormone (CRH) so Adrenocorticotropic Hormone (ACTH) decreases and stimulating Pro-opimelanocortin (POMC), which will also reduce the production of ACTH and stimulate the production of endorphins. LC is responsible for handling many sympathetic effects during stress, in a relaxed state will lower norepinephrine synthesis in the adrenal medulla that will stimulate AVP (arginine vasopressin) decreasing. APV decreasing along with an increase of endorphin and ACTH will decrease peripheral resistance and cardiac output that effect blood pressure decreasing (Arifin, 2012)..

Effect of slow stroke back massage is proven and in accordance with the theory that stated slow-stroke back massage can also increase the level of serotonin, reduces the psychological effects of stress and reduces the risk such as hypertension and affect the most important hormones in blood pressure that secreted by adrenal medulla during times of stress namely norepinephrine and epinephrine that are released by the adrenal glands into the blood. Both hormones are increasing the response of "fight or flight".

Thus, the results of this research indicate that cutaneous stimulus of slow stroke back massage can actually lower blood pressure in pregnant women with mild preeclampsia. Because with this intervention, blood pressure of pregnant women with mild preeclampsia can be controlled every day, so if mild preeclampsia in pregnant women can be cured, the disease will not be sustainable to be more severe, such as severe preeclampsia and even eclampsia, either during pregnancy, childbirth and postpartum.

## 4. CONCLUSION

Stimulus Cutaneous slow stroke back massage effected Beta Endorphin levels and reduce blood pressure of pregnant women with mild preeclampsia. This study suggests, therapy *stimulus cutaneous slow stroke back massage* can be used as an alternative for blood pressure management of pregnant women.

## REFERENCE

1. Achadiat, Chrisdiono M. (2004). *Prosedur Tetap Obstetri dan Ginekologi*. Jakarta: EGC.
2. Arifin, Rizal. (2012). *Perbedaan Communication Back Massage dan Back Massage dalam Menurunkan Tekanan Darah Pada Klien dengan Lansia dengan Hipertensi*. Fakultas Keperawatan Universitas Airlangga. Surabaya.
3. Bothamley, Judy & Maureen, Boyle. (2012). *Patofisiologi Dalam Kebidanan*. Jakarta: EGC.
4. Brayshaw, Eileen. (2008). *Senam Hamil dan Nifas*. Jakarta: EGC
5. Caroline H, (2008). *Terapi Preeklampsia, Jurnal Cermin Dunia Kedokteran* Vol. 35, Nomer 1, Grup PT Kalbe Farma Tbk, Jakarta.
6. Ganong. William F. (1999). *Buku Ajar Fisiologi Kedokteran Edisi 17*. Alih Basaha. Jakarta: EGC.
7. Hanifa. W. (2005). *Ilmu Kebidanan*. Jakarta: Yayasan Bina Pustaka. Prawiroharjo.
8. Jain, R. (2012). *Pengobatan Alternatif Untuk Mengatasi Tekanan Darah*. Jakarta: Gramedia Pustaka Utama.

9. Klein, Susan and Thomson, Fiona. (2008). *Panduan Lengkap Kebidanan*. Yogyakarta: PALMALL.
10. Laksmi. (2011). *Pengaruh Foot Massage Terhadap Ankle Brachial Index(ABI) Pada Pasien DM Tipe 2 di PKM 11 Denpasar Barat*. Denpasar : Udayana
11. Manuaba, Ida Bagus Gede. (1997). *Ilmu Kebidanan, Penyakit Kandungan dan Keluarga Berencana*. Jakarta: EGC.
12. Meek, S. Sandra. (1992). *Effects of slow stroke back massage on relaxation in hospice clients.university of pittsburgh school of nursing.journal of nursing scholarship* volume 25, Number 1, Spring 1993.
13. Morgan, Geri and Hamilton, Carole. (2009). *Obstetri & Ginekologi Panduan Praktik*. Jakarta: EGC.
14. Muttaqin, A. (2009). *Buku Ajar Asuhan Keperawatan Klien Dengan Gangguan Sistem Kardiovaskuler dan Hematologi*. Jakarta: Salemba Medika.
15. Potter, Patricia A and Perry, Anne Griffin. (1997). *Buku Ajar Fundamental Keperawatan; Konsep, Proses, dan Praktik Edisi 4 Volume 2, Renata Komalasari (Translator), 2005*. Jakarta: EGC.
16. Steven, A. Stratton. (1982). *Role Of Endorphin in Pain Modulator*. *American Physical Therapy Assosiation*. *The Journal Of Orthopaedic and Sports Physical Therapy*.
17. Tiran, Denise and Mack Sue. (1995). *Complementary Therapies For Pregnancy And Childbirth*. London: Bailliere Tindall.