Original Article

doi:10.31674/mjn.2022.v14i01.010

Association between Holistic Nursing Intervention Combined with Self-Administered Reiki and Changes in Mean Arterial Blood Pressure among Pregnant Women Diagnosed with Mild Hypertensive Disorder

Preeya Keawpimon[1]*, Wilaiporn Samankasikorn[2]

[1]*Faculty of Nursing, Prince of Songkla University, Pattani Campus 94000, Thailand*
[2]*Faculty of Nursing, Prince of Songkla University, Hatyai Campus 90110 Thailand*

**Corresponding Author's Email: preepimon@gmail.com*

ABSTRACT

Background: Hypertensive disorder leads to maternal death and mortality in Thailand. **Objective:** This quasi-experimental study aimed to test the effect of a holistic nursing program applying Reiki to the mean arterial pressure (MAP) of pregnant women. **Methods:** Purposive sampling method was used to recruit pregnant women diagnosed with hypertensive disorders. A total of thirty-four pregnant women were assigned to either the control or intervention groups. Blood pressure was measured as the baseline prior beginning of the program, then after completing eight-week program intervention. Descriptive statistics were used to demonstrate the characteristics of demographic data and the MAP in each group. Wilcoxon test was used to examine the MAP pre- and post-intervention in each group. Mann-Whitney U test was used to compare the significant difference in the MAP between groups. **Results:** From this study, there was a significant difference in MAP between pre- and post-intervention in the intervention group ($p< 0.020$) while there was no difference in the control group. After the eight-week program, there was no statistically significant difference in the MAP between two groups. **Conclusion:** The program can potentially be an alternative therapy to calm down the sympathetic nervous system resulting in better blood pressure control of pregnant women with the hypertensive disorder.

Keywords: Holistic Nursing Program; Reiki; Pregnant Women; Hypertensive Disorder

INTRODUCTION

During pregnancy, women may develop hypertensive disorders due to physiological changes, which has been shown to be associated with adverse pregnancy outcomes such as preterm delivery, postpartum hemorrhage, HELLP syndrome, placental abruption, disseminated intravascular coagulation (DIC), and maternal death (Wongcharoenrut & Yamasmit, 2014). Hypertensive disorder is associated with emotional stress (Leeners *et al.*, 2007; Morgan *et al.*, 2020), which is also a common experience during pregnancy (Leeners *et al.,* 2007). Therefore, reduction of stress can contribute to reduction of risk of hypertensive disorders, which then contributes to reduction of adverse pregnancy outcomes.

Holistic care has been shown to be associated with reduction in adverse pregnancy outcomes (Steel *et al.*, 2012). Holistic care is a model of care which considers a wide variety of determinants of health, and defines health as consisting of multiple dimensions, including physical, psychological, social, and spiritual health (Wade, 2009). Holistic care has been applied in nursing to prevent hypertensive disorder among pregnant women through assessment and management of physical conditions (Shao *et al.*, 2017; Barakat *et al.*, 2016), emotional stress (Alvarenga & Frizzo, 2017), and dietary stress (Wade, 2009; Motawea *et al.*, 2018; Crosson, 2012). Holistic care may also include ensuring adequate physical activities (Crosson, 2012; Diaz & Shimbo, 2013), adequate rest and sleep (Haney *et al.*, 2013; Magro-Malosso *et al.*, 2017), and stress-relieving activities (Cormack, 2007).

Reiki refers to "a healing technique based on the principle that the therapist can channel energy into the

Received March 10, 2022; Received in revised form March 27, 2022; Accepted June 20, 2022

patient by means of touch, to activate the natural healing processes of the patient's body and restore physical and emotional well-being" (Oxford learner's dictionaries, 2021). Reiki can also be self-administered for restoration of one's own physical and emotional well-being. Studies have shown that Reiki can affect the parasympathetic nervous system (Baldwin *et al.*, 2017; Friedman *et al.*, 2010) and is associated with changes in blood pressure level (Salles *et al.*, 2014; McManus, 2017), including pregnant women with hypertensive disorder (Kaeoseng *et al.*, 2018).

In consideration of potential benefits of holistic care and Reiki, it is of interest of nursing science to assess the effect of holistic care combined with Reiki on changes in blood pressure among pregnant women diagnosed with hypertensive disorder. However, no study has assessed the effect of such combined intervention, data from which can contribute to improvement in maternal nursing and care. The objective of this study is to describe changes in mean arterial blood pressure among pregnant women diagnosed with hypertensive disorder in southern Thailand who did and did not receive a combined holistic care and self-administered Reiki intervention.

METHODOLOGY

Study Design and Setting

A quasi-experimental study was conducted with volunteered intervention group and non-randomized control group. The intervention and data collection processes took place at the antenatal clinic of a district hospital (primary care hospital) in Pattani Province, southern Thailand.

Intervention Design, Pilot-Testing, and Delivery

Investigators reviewed the literature on holistic care among pregnant women (Vandervaart *et al.*, 2011; Beddoe & Lee, 2008; Rakhshani *et al.*, 2012; Soliman *et al.*, 2017; Felton *et al.*, 2021), modified the intervention to suit the local way of life and contexts, pilot-tested the holistic care intervention in a group of 10 pregnant women and modified the intervention accordingly (Keawpimon *et al.*, 2015; Moore *et al.*, 2011). With regard to the Reiki component of the intervention, a principal investigator of the study (PK) was a Reiki master therapist and designed the intervention in accordance with accepted procedures and principles of Reiki with the aim for relaxation and stress reduction. The final model of holistic care intervention combined with Reiki in our study included various activities allocated to 5 themes: 1) Building awareness about hypertension; 2) Patient education on holistic care; 3) Planning and empowerment for holistic practices; 4) Self-administered Reiki for relaxation, and; 5) Building self-monitoring skill and acting of self-balance. The details of the intervention are described in Table 1.

Table 1: Core Content of Holistic Nursing Program Integrating Self-Reiki Healing

Themes	Activities contents
1. Build awareness on the impact of hypertension	Exploring personal understanding of the complication of hypertensive disorder and reflection on factors relating to individual risks.
2. Teaching the knowledge of holistic life	Introduction to the importance of holistic self-care to prevent the progress of hypertension. Education on four dimensions of holistic health activities: a. Physical dimension included a 30 -minute slow walk for three days per week, decreasing salty diet, fat, oily, high sugar, and high carbohydrate food consumption, appropriate rest in both day and night, consume more protein, high magnesium, and high fiber food intake. b. Mental/emotional dimensions included avoid ance of the stressful event and daily practice of 30-minute self-Reiki healing at least three days per week. c. The social dimension included rearranging work and duty to decrease body -mind imbalance. d. Spiritual dimension included maintaining a personal religious practice, i.e. praying.
3. Planning and empowering for holistic practices	Praising on positive holistic self-care behavior Encouraging to decrease and cease an unhealthy lifestyle to fulfill the goal of the action. Comparing the change to strengthen practice.
4. Encouraging to practice self -Reiki healing for maintaining relaxation frequently	Self-monitoring for daily self-Reiki practice to calm body and mind stimulation
5. Building self-monitoring skill and acting on self-balance	Self-observation on daily discomfort symptoms to perform holistic acti vity such as self -Reiki, rest, and recheck blood pressure, immediately.

Patients in the intervention group received interventions in Themes 1 and 2 at baseline, and received interventions in Themes 3 through 5 at later stages of antenatal care appointments during the following eight weeks. Patients in the control group received routine care including blood pressure measurement and advices in self-care, which primarily focused on physical health and dietary recommendations.

Study Participants

Study participants included outpatients who attended antenatal care at the study hospital in 2015 and diagnosed with mild hypertensive disorder, defined as having systolic blood pressure ≥ 140-160 mmHg, or diastolic blood pressure ≥ 90-100 mmHg, or an increase in systolic blood pressure > 30 mmHg from baseline, or increase in diastolic blood pressure > 15 mmHg from baseline. The participants were excluded in case of severe preeclampsia or proteinuria dipstick reading of 2+. Women aged 18 years were excluded or younger and women who were unable to communicate in Thai.

Recruitment Process

Staff nurses at the study hospital helped the research investigators to identify outpatients who had mild hypertensive disorder according to the study definition. Research staff then approached these pregnant women while at the antenatal care unit of the study hospital and introduced the women to the project. Pregnant women who were interested to participate would receive the detailed information from the staff in a private room, after which the research staff measured the women's blood pressure to confirm eligibility and asked the women to sign the informed consent form and choose to be in either the intervention group or the control group.

Data Collection

The outcome in this study was mean arterial blood pressure (MAP) of the study participants, i.e., pregnant women with mild hypertensive disorder. The blood pressure was measured among all study participants using sphygmomanometer and recorded the Korotkoff Phase I and IV sounds (Thai Guideline on the Treatment of Hypertension, 2016), and calculated the MAPs accordingly. At each round of data collection, the intervention group participants were asked to receive their blood pressure measurement first, followed by the control group participants. However, the antenatal care nurses whose blood pressure was measured were blinded to the intervention vs. control status of the participants.

Ethical Considerations and Inform Consent

This study was approved by the ethical committee of the Faculty of Nursing, Prince of Songkla University (Approval Letter No.Mor.Aor.606.1.077; dated 15 May 2012). All eligible participants were required to sign/or verbally inform consent prior to enrolling in this study. The verbal inform consent was conducted in case the participants were illiterate.

Data Analysis

The data were analyzed using the intention-to-treat approach. Descriptive statistics were represented as frequencies and percentages for the demographic data; mean and standard deviation were used for the MAPs. Chi-square was used to test of association. To examine the difference in the MAP pre- and post-intervention in each group, the Wilcoxon test was used. In addition, the Mann-Whitney U test was used to compare the MAP between the control and treatment groups after intervention. The level of significance was set at $p < 0.05$. The data were analyzed using SPSS version 22.

RESULTS

Forty-five participants initially volunteered to participate in the study, but 12 participants failed to follow-up and thus 33 participants remained and were included in the analysis (loss-to-follow-up = 26.67%).

Thirty-three samples who met the criteria were selected for the study: 17 in the intervention group and the other 16 in the control group. All were Muslim, the age of participants in both groups were more than 19 years old. Two-thirds of the control group completed primary school or lower, which was under the average of the Thai population, in contrast, over 80% of the intervention group completed high school or higher. The household income was related to the education. All participants were married. Half of participants in the control group earned income by agriculture. Approximately 35% of the participants in the intervention group earned from wages and 29.4% earned from agriculture. Most participants in the intervention group were nuclear families while majority in the control were extended families (Table 2).

Regarding obstetric data, most of the participants in both groups were multiparity. The majority of

participants had gestational age between 12-28 weeks when recruited into the study. More than half of participants in the control group had two or more children, while participants in the intervention group had only one child or none (Table 2).

In terms of hypertension, pregnant women in both groups were diagnosed with pregnancy-induced hypertension. The risk factors were similar in both groups that were with multiple pregnancy and medical conditions. In addition, over 50% of participants in the intervention group had a family background with the hypertensive disorder (Table 2).

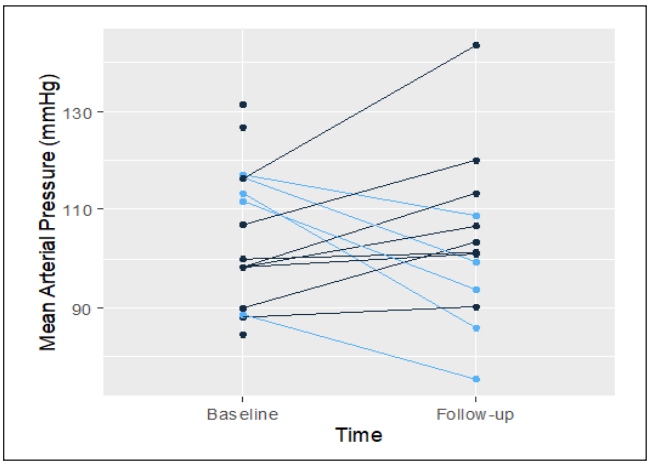
Table 2: Characteristics of the Study Participants in the Control and Intervention Groups at Baseline (n=33)

Variables	Control (n=16)	Intervention (n=17)	*p*-value
Age group			
19-34 years	12 (75.0%)	9 (52.9%)	0.340[a]
≥ 35 years	4 (25.0%)	8 (47.1%)	
Highest Level of Education Completed			
Primary education or lower	10 (66.7%)	2 (11.8%)	0.005[a]
Secondary education or higher	5 (33.3%)	15 (88.2%)	
Household income (Thai Bahts/month)			
<8,000	8 (80.0%)	2 (11.8%)	0.002[a]
≥8,000	2 (20.0%)	15 (88.2%)	
Occupation			
Agriculture	8 (50.0%)	5 (29.4%)	0.411[b]
Employee	5 (31.3%)	6 (35.3%)	
Other	3 (18.8%)	6 (35.3%)	
Type of Family			
Nuclear family	3 (37.5%)	10 (58.8%)	0.571[a]
Extended family	5 (62.5%)	7 (41.2%)	
Gestational Age at Enrollment (weeks)			
<12	1 (6.3%)	2 (12.5%)	0.717[b]
12-28	12 (75.0%)	10 (62.5%)	
>28	3 (18.8%)	4 (25.0%)	
Number of Living Children at Enrollment			
None	0 (0.0%)	6 (35.3%)	0.027[b]
1 child	5 (45.5%)	6 (35.3%)	
≥2 children	6 (54.5%)	5 (29.4%)	
Time of Hypertensive Disorder			
Chronic hypertension	8 (50.0%)	6 (35.5%)	0.616[a]
Pregnancy induced hypertension	8 (50.0%)	11 (64.7%)	
Risk factors*			
Primigravida aged < 20 or > 35 years, or Multipara aged over 35 years	6 (37.5%)	7 (41.2%)	1.000[a]
Family's history of hypertension	4(25.0%)	9 (52.9%)	0.199[a]
History of preeclampsia	3(18.8%)	1 (5.9%)	0.249[b]
Comorbidity (i.e. diabetes, kidney disease, or obesity)	8 (50.0%)	10 (58.8%)	0.874[a]
No risk factor	1 (6.3%)	4 (23.5%)	0.153[b]

*Note. p-value < 0.05 a = continuity correction, b = Likelihood Ratio, * percentages and totals are based on respondents*

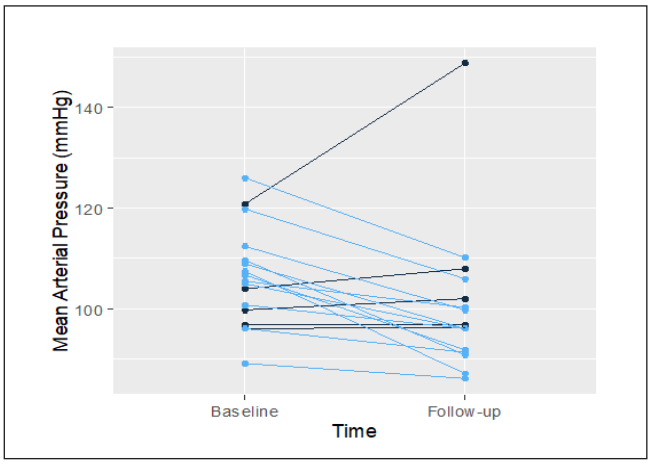
Hypothesis Test

Means and standard deviation (SD) of MAP pre- and post-intervention in each group were represented in Figure 1.



1a. Control Group (n=16 participants)

Black lines denote participants whose MAP rose, blue lines denote participants whose MAP fell; Mean MAP at baseline = 105.4 ± 14.2 mmHg; Mean MAP at follow-up = 103.3 ± 16.8 mmHg; Mean difference (follow-up - baseline) = -0.1 ± 15.8 mmHg; One-sample t-test for mean difference (mu=0) p-value = 0.972. (Figure1a)



1b. Intervention Group (n=17 participants)

Black lines denote participants whose MAP rose, blue lines denote participants whose MAP fell; Mean MAP at baseline = 106.1 ± 9.7; Mean MAP at follow-up = 100.1 ± 14.2 mmHg; Mean difference (follow-up - baseline) = -6.0 ± 11.5; *T*-test where H0: Mean difference = 0, *p*-value = 0.020 (Figure 1b)

Figure 1: Means and Standard Deviation of MAP at Baseline and Follow-Up in the Intervention and Control Groups

There was a significant difference in MAP between pre-and post-intervention in the treatment group (p=0.020). In the control group, there was no significant difference in MAP between baseline and after eight-week of the program (p=0.972).

Nevertheless, the different MAP between groups showed that there was no significant difference in MAP at baseline (p=0.873) and after the eight-week program (p=0.385).

This quasi-experimental with a small pilot study had shown that a holistic nursing program integrating self-Reiki could reduce blood pressure significantly in pregnant women with the hypertensive disorder in non-hospitalization.

DISCUSSION

In this study, the changes in mean arterial blood pressure among pregnant women diagnosed with mild hypertensive disorder who did and did not receive a combined holistic care and self-administered Reiki intervention were studied. It was found that participants in the intervention group had greater reduction in mean arterial blood pressure than participants in the control group. Although the number of participants was relatively small and limited to one primary care facility in southern Thailand. Findings from this study nonetheless could serve as a proof-of-concept for delivery of such interventions at a broader scale.

This study was quasi-experimental and allowed participants to choose exposure allocation by themselves. Participants in the intervention group had higher education and income, and lower prevalence of comorbidity than participants in the control group. All of these characteristics can be considered as either social or biological determinants of the health outcome of interest (i.e., arterial blood pressure / hypertension). Although adjustments were made for the effect of these characteristics in multivariate linear regression model, the low sample size did not allow us to make detailed adjustment across multiple categories, the effect of residual confounding might not have been completely eliminated and might have accounted for parts of the observed difference between the intervention and control group with regard to changes in arterial pressure.

The intervention in our study was the combination of holistic care and Reiki self-administration. The changes were found in arterial pressure between groups, but it was not statistically significant. Nevertheless, the

difference in changes in mean arterial pressure was found in the intervention group. Previous studies have confirmed that Reiki self-administration was associated with increase in perceived inner mind-body balance (Baldwin *et al.*, 2017; Friedman *et al.*, 2010; McManus, 2017; Kaeoseng *et al.*, 2018; Keawpimon *et al.*, 2015) which may then induce positive physiological effects including reduction in mean arterial pressure. Furthermore, Reiki also might have included relaxation of the vagus nerve, which led to vagal-immune interaction and changes in the parasympathetic nervous system (Mackay *et al.*, 2004). Furthermore, the education and empowerment-based holistic health promotion activities in our study also might have promoted mindfulness, emotional coping strategies, and lifestyle management (Povlsen & Borup, 2011), all of which could have further reduced mean arterial blood pressure among the intervention group participants. The increased vagal activity produced a beneficial effect on cardiovascular modulation and inflammation, decrease cortisol, norepinephrine, catecholamine, and lead to reduced blood pressures (Lataro & Sagado, 2018). Also, the holistic program showed the importance of self-care strategy in prevention and control of hypertensive disorder (Rasouli *et al.*, 2019).

Strengths and Limitations

To the best of knowledge, this is the first study that integrated self-administered Reiki with holistic nursing intervention. The staff who measured arterial blood pressure, for the outcome of interest, were unaware of the intervention status which helped to reduce potential observer bias. However, several limitations should be considered in the interpretation of the study findings. First, our study was a pilot trial with small sample size in a specific population in a specific region. The feasibility shown in this study might not be replicable to the same extent in other settings. Secondly, the holistic care component was tailored to the context of the target population, thus generalizability of the feasibility is also limited in this regard. Thirdly, this study was conducted by 7 staff with 33 participants, which might have contributed to the observed level of compliance. The findings in this study may not be replicable in other studies with higher staff-to-participant ratio.

CONCLUSION

The holistic activities in this program were designed by applying the vagal simulation model. Participants in the intervention group had a significantly decrease blood pressure. It can be explained that autonomic dysfunction in arterial hypertension involves the increase of sympathetic activity, and also, reduction of vagal tone. In this study, the vagal activities are trigger by the relaxation to reduce work-life stress, self-Reiki, and good sleep quality. Especially, the knowledge of preeclampsia self-cares includes making lifestyle change, having a healthy diet, learning stress management, performing appropriate exercise and physical activities.

Nursing Implication and Future Research

The success of the implementation of this study encouraged the atmosphere of holistic care. The findings from this study help pregnant women who have a high risk of hypertension during pregnancy to prevent adverse outcomes. However, future studies need more participants to make more strong power analysis. Additional investigation is required for a randomized control trial to confirm the results and provide better explanation of the detailed mechanism of holistic care in this crucial area. Also, the holistic nursing program is non-invasive and simple; then, it is feasible to apply during the prenatal period.

Conflict of Interest

The authors declare that there is no conflict of interest.

ACKNOWLEDGEMENT

This research project was funded by Prince of Songkla University.

REFERENCES

Alvarenga, P., & Frizzo, G.B. (2017). Stressful Life Events and Women's Mental Health During Pregnancy and Postpartum Period. *Paidéia (Ribeirão Preto), 27*(66), 51-59. https://doi.org/10.1590/1982-43272766201707

Baldwin, A.L., Vitale, A., Brownell, E., & Kryak, E. (2017). Effects of Reiki on pain, anxiety, and blood pressure in patients undergoing knee replacement. *Holistic Nursing Practice, 31*(2), 80-89. https://doi.org/10.1097/HNP.

0000000000000195

Barakat, R., Pelaez, M., Cordero, Y., Perales, M., Lopez, C., Coteron, J., & Mottola, M.F. (2016). Exercise during pregnancy protects against hypertension and macrosomia: randomized clinical trial. *American Journal of Obstetrics & Gynecology, 214*(5), 649.e1-e8. https://doi.org/10.1016/j.ajog.2015.11.039

Beddoe, A.E., & Lee, K.A. (2008). Mind-body interventions during pregnancy. *Journal of Obstetrics, Gynecologic, & Neonatal Nursing, 37*(2), 165-175. https://doi.org/10.1111/j.1552-6909.2008.00218.x.

Cormack, C.M. (2019). A multifaceted integrative approach to heart, weight, and blood pressure normalization. https://www.risingtao.ca

Crosson, J.B. (2012). Psychoneuroimmunology: stress and pregnancy. *International Journal of Childbirth Education, 27*(2), 76-79. https://doi.org/10.1177/0963721412453720

Diaz, K. M., & Shimbo, D. (2013). Physical activity and the prevention of hypertension. *Current Hypertension Report, 15*(6), 659-668. https://doi.org/10.1007/s11906-013-0386-8

Felton, M., Hundley, V.A., Grigsby, S., & McConnell, A.K. (2021). Effects of slow and deep breathing on reducing obstetric intervention in women with pregnancy-induced hypertension: a feasibility study protocol. *Hypertension in Pregnancy, 40*(1), 81-87. https://doi.org/10.1080/10641955.2020.1869250

Friedman, R.S.C., Burg, M.M., Miles, P., Lee, F., & Lambert, R. (2010). Effects of Reiki on autonomic activity early acute coronary syndrome. *Journal of American College of Cardiology, 56*, 995-996. https://doi.org/10.1016/j.jacc.2010.03.082

Haney, A., Busse, D.J., & Okun, M. (2013). Sleep and pregnancy-induced hypertension: A possible target for intervention. *Journal of Clinical Sleep Medicine, 9*(12),1349–1356.https://doi.org/10.5664/jcsm.3290

Kaeoseng, R., Chuntharapat, S., Keawpimon, P., & Chongchareon, W. (2018). Effects of a nursing program to promote self-Reiki healing on stress and blood pressure of pregnant women with the hypertensive disorder. *Academic Service Journal of Prince of Songkla University, 29*(1), 133-147. https://doi.org/10.5664/jcsm.3290

Keawpimon, P., Samankasikorn W, Lawantrakul J, Boonsin K, & Nayai U. (2015). The development of the Reiki therapeutic nursing model for promoting the holistic health in pregnant women with hypertension: the pilot study. *Songklanagarind Journal of Nursing, 35*(3), 73-90. https://he02.tci-thaijo.org/index.php/nur-psu/article/view/44345

Lataro, R.M., & Sagado, H.C. (2018). Vagal-immune interactions in the control of hypertension. *Journal Neurology Neuromedicine, 3*(6), 8-12. https://doi.org/10.29245/2572.942X/2018/6.1226

Leeners, B., Neumaier-Wagner, P., Kuse, S., Stiller, R., & Rath, W. (2007). Emotional stress and the risk to develop hypertensive diseases in pregnancy. *Hypertensive in Pregnancy, 26*(2), 211-226. https://doi.org/10.1080/10641950701274870

Mackay, N., Hansen, S., & McFarlane, O. (2004). Autonomic nervous system changes during Reiki treatment: a preliminary study. *Journal of Alternative and Complementary Medicine, 10*(6), 1077-1081.https://doi.org/10.1089/acm.2004.10.1077

Magro-Malosso, E. R., Saccone, G., Di Tommaso, M., Roman, A., & Berghella, V. (2017). Exercise during pregnancy and risk of gestational hypertensive disorders: a systematic review and meta-analysis. *Acta Obstetricia et Gynecologica Scandinavica, 96*(8), 921-931. https://doi.org/10.1111/aogs.13151

McManus, D.E. (2017). Reiki Is Better Than Placebo and Has Broad Potential as a Complementary Health Therapy. *Journal of Evidenced Based Complementary & Alternative Medicine, 22*(4), 1051–1057. https://doi.org/10.1177/2156587217728644

Moore, C. G., Carter, R. E., Nietert, P.J., & Stewart, P.W. (2011). Recommendations for planning pilot studies in

clinical and translational research. *Clinical Translational Science, 4*(5), 332-337. https://doi.org/10.1111/j.1752-8062.2011.00347.x

Morgan, N., Christensen, K., Skedros, G., Kim, S., & Schliep, K. (2020). Life stressors, hypertensive disorders of pregnancy, and preterm birth. *Journal Psychosomatic, Obstetrics & Gynecology, 22*, 1-9. https://doi.org/10.1080/0167482X.2020.1778666

Motawea, H. K., Chotani, M. A., Ali, M., Ackerman, W., Zhao, G., Ahmed, A. A., ... & Buhimschi, I. A. (2018). Human placenta expresses α2-adrenergic receptors and may be implicated in pathogenesis of preeclampsia and fetal growth restriction. *The American Journal of Pathology, 188*(12), 2774-2785. https://doi.org/10.1016/j.ajpath.2018.08.011

Oxford learner's dictionaries. Oxford University Press; © 2021. Reiki. https://www.oxfordlearnersdictionaries.com/definition/american_english/reiki

Povlsen, L., & Borup, I.K., (2011). Holism in nursing and health promotion: distinct or related perspective?: A systematic review. *Scandinavian Journal of Caring Science, 25*(4), 798-805. https://doi.org/10.1111/j.1471-6712.2011.00885.x.

Rakhshani, A., Nagarathna, R., Mhaskar, R., Mhaskar, A., Thomas, A., & Gunasheela, S. (2012). The effects of yoga in prevention of pregnancy complications in high-risk pregnancies: A randomized controlled trial. *Preventive Medicine, 55*(4), 333-340. https://doi.org/10.1016/j.ypmed.2012.07.020

Rasouli, M., Pourheidari, M., & Gardesh, Z.H. (2019). Effects of self-care before and during pregnancy to prevention and control preeclampsia in high risk women. *International Journal of Preventive Medicine, 10*, 21. https://doi.org/10.4103/ijpvm.IJPVM_300_17

Salles, L.F., Vannucci, L., Salles, A., & da Silva, M.J.P. (2014). The effect of Reiki on blood hypertension. *Acta Paulista de Enfermagem, 27*(5), 479-484. https://doi.org/10.1590/1982-0194201400078

Shao, Y., Qiu, J., Huang, H., Mao, B., Dai, W., He, X., ... & Zhang, Y. (2017). Pre-pregnancy BMI, gestational weight gain and risk of preeclampsia: a birth cohort study in Lanzhou, China. *BMC Pregnancy and Childbirth, 17*(1), 1-8. https://doi.org/doi.org/10.1186/s12884-017-1567-2

Soliman, G.H., Elalem, S.M.A., & Elhomosy, S.M. (2017). The effect of relaxation techniques on blood pressure and stress among pregnant women with mild pregnancy induced hypertension. *Journal of Nursing Education and Research, 7*(3), 321-329. https://doi.org/10.5958/2349-2996.2017.00065.9

Steel, A., Adams, J., Sibbritt, D., Broom, A., Gallois, C., & Frawley, J. (2012). Utilisation of complementary and alternative medicine (CAM) practitioners within maternity care provision: results from a nationally representative cohort study of 1,835 pregnant women. *BMC pregnancy and childbirth, 12*(1), 1-8. https://doi.org/10.1186/1471-2393-12-146

Thai Hypertension Society. (2016). https://www.thaihypertension.org/files/GL%20HT%202015.pdf

Vandervaart, S., Berger, H., Tam, C., Goh, Y. I., Gijsen, V. M., de Wildt, S. N., Taddio, A., & Koren, G. (2011). The effect of distant reiki on pain in women after elective Caesarean section: a double-blinded randomised controlled trial. *BMJ Open, 1*(1), e000021. https://doi.org/10.1136/bmjopen-2010-000021

Wade, D.T. (2009). Holistic health care, what is it and how can we achieve it? Holistic health care. November 25th. https://pdfs.semanticscholar.org/80af/edfca2ffe3c96054aac6a85cf940a9c63a56pdf

Wongcharoenrut, K., & Yamasmit, W. (2014). Outcomes of pregnancy with chronic hypertension. *Thai Journal of Obstetrics and Gynaecology,* 8-14. https://he02.tci-thaijo.org/index.php/tjog/article/view/11682