



The Effectiveness of Prenatal Yoga on Ballard Score and Newborn Babies Anthropometry

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ABSTRACT

A preliminary study at the Sriwaty Midwifery Independent Practice Clinic, the number of pregnant women in 2019 was 350-400 deliveries and 45 Premature / LBW. Prenatal yoga has never been implemented in prenatal classes. Aim and Objectives To analyze the effectiveness of prenatal yoga in pregnant women in the I-III trimester on Ballard score and anthropometry of newborns. This study is a pre-experimental study with a randomized controlled trial two group design. The sample size in the study was 40 respondents: the intervention group was 20 respondents, and the control group was 20. The sampling technique was based on the consecutive sample. The statistical test is the independent t-test to determine the difference in mean Ballard score, anthropometry of newborn babies in each group. Because the sample used was <50 respondents, the normality test used was Shapiro-Wilk and the comparative hypothesis test for the numeric variable distribution was not normal is the Mann-Whitney non-parametric test. The prenatal yoga program is effective for Ballard Score, Body Length, Body Weight and Head Circumference of Newborns. It is hoped that it can become a program and be implemented in the prenatal class.

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ABSTRAK

Kata kunci:

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Studi pendahuluan di Klinik Praktik Mandiri Bidan (PMB) Sriwaty, jumlah ibu hamil yang melahirkantahun 2019 sebanyak 350-400 dan 45 Prematur/BBLR. Prenatal yoga belum pernah dilakukandi kelas prenatal. Tujuan Menganalisis efektivitas prenatal yoga pada ibu hamil trimester I-III terhadap skor Ballard dan antropometri bayi baru lahir. Penelitian ini merupakan penelitian pra-eksperimen dengan rancangan randomized controlled trialdua kelompok. Besar sampel dalam penelitian ini adalah 40 responden: kelompok intervensi 20 responden dan kelompok kontrol 20 responden. Teknik pengambilan sampel berdasarkan consecutive sample. Uji statistik adalah independent t-test untuk mengetahui perbedaan rerata skor Ballard, antropometri bayi baru lahir pada masing-masing kelompok. Sampel yang digunakan <50 responden sehingga uji normalitas yang digunakan adalah Shapiro-Wilk dan uji hipotesis komparatif untuk distribusi variabel numerik tidak normal adalah uji non parametrik Mann-Whitney. Program prenatal yoga efektif untuk Skor Ballard, Panjang Badan, Berat Badan dan Lingkar Kepala Bayi Baru Lahir. Diharapkan dapat menjadi program dan diimplementasikan di kelas prenatal.

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INTRODUCTION

Pregnancy is one of the stages of life, in the process of pregnancy there are physiological and psychological changes due to an increase in the hormones estrogen and progesterone. The adaptation process to deal with these changes must have been prepared since the beginning of pregnancy. Careful preparation will have an important role in pregnancy (Guyton and Hall., 2011). Bobak said pregnancy is a maturity crisis that can be stressful, but valuable because the woman is prepared to provide care and has more responsibility. According to Curtis, (2012) Maternal stress and anxiety during pregnancy are associated with negative consequences for fetal development. Fetal exposure to maternal stress and the nervous system programming and brain morphology of fetuses, babies, and children are negatively affected by stress-related peptides. Furthermore, prenatal stress and mother anxiety can be risk factors for later-life detrimental repercussions for the child, such as the development of attention deficit hyperactivity disorder or poor executive functioning ability (Grizenko, et al., 2012).

Activation of the placental stress system, which causes the release and circulation of corticotropin-releasing hormone, or reduced blood and oxygen flow to the uterus, might impact the intrauterine environment and influence fetal growth during this key period. (Fink, et al., 2010).

To increase the quality of life and maximize the health and development of the baby, it is critical to control maternal stress and offer pregnant women with coping methods to deal with stress and changes that occur during pregnancy. Some of the sports that are recommended or allowed during pregnancy are yoga, aerobics, walking, swimming, water exercise, dancing and static cycling. Recommendations from ACOG (The American Congress of Obstetrician and Gynecologists) that all pregnant women exercise at least 30 minutes every day during pregnancy which is beneficial for both mother and fetus. It can also be done walking, swimming, and cycling (Szymanski, Satin; Lynch, McDonald, Magann, et al., 2012). There are several ways to take precautions during pregnancy so that the mother and fetus are in a healthy condition and later a normal delivery process will occur, namely morning walking, static cycling, aerobics, water exercises, dancing, and yoga (Sekar, 2012).

Pregnancy exercise has several training methods including pilates, kegel, hypnotherapy, yoga (Krisnadi., 2010). A popular and beneficial exercise for health is yoga. Babbar, et.al., 2015 RCT study, The effect of yoga on non-pregnant yoga practitioners might reduce stress and inflammation markers; perhaps pregnant women can have the same effect, affecting the mother's circulation to the fetus. There is no evidence that yoga has any negative consequences on the fetus, such as blood flow and increased fetal cardiac flux in response to yoga. Even when compared individually to the reference gestational age ranges, there were no significant alterations in the umbilical Doppler artery. The fetal heart rate and activity parameters are still reassuring. After practicing yoga throughout pregnancy, the mother's blood pressure, heart rate, and Uterine Artery blood flow all stay within normal ranges. Prenatal Yoga Study RCT Rakhshani, et.al, 2015; Babar, et.al, 2016, In 59 high-risk pregnant women who practiced yoga 3 times / week properly or twice a day for 16 weeks, the uterine, umbilical, and fetal cerebral artery indexes were assessed with Doppler at 12, 20, and 28 weeks of pregnancy in 59 high-risk pregnant women who practiced yoga 3 times / week properly or twice a day for 16 weeks, yoga was well tolerated in the fetus as assessed by a standard fetal well-

being index. After practising yoga for the first time during pregnancy, there were no significant changes in fetal blood flow or fetal acute behavior. On average, pregnant women who practice yoga also have normal blood pressure, healthier fetal development and are more likely to have a lower risk of preterm birth / LBW than those who just walk (14% vs 29%).

As a consequence of immature anatomy and physiology, babies tend to experience various problems and developmental disorders (S, et al., 2002). A study was undertaken to analyze the effect of prenatal yoga on the maturity and size of babies' body weight. Women who are not at high risk during pregnancy may benefit from yoga. The ability of the newborn organ system to function at a mature level is required for adaptation to life outside the womb. The immature function of the body's organs is linked to diseases that affect infants. This has to do with the baby's gestational age at the time of birth. The organs are less perfect the younger the gestational age. This study can analyze the differences in Ballard scores, anthropometry of infants in the intervention and control groups.

METHOD

Research participants

All pregnant women at Sriwaty Midwifery Independent Practice (MIP) in Palu, Central Sulawesi, were included in this study. In this study, samples were determined from pregnant woman in the first trimester followed until delivery who were at MIP Sriwaty in 2020. The research subjects were taken based on a consecutive sample, namely the sampling method for all subjects who came and met the sample criteria included in the study until the required number of subjects was met. The expected subjects in the intervention and control groups were 20 subjects each. Sample criteria are: Willing to be researched, don't experience pregnancy complications, Did not experience danger signs of pregnancy.

Research procedure

Subjects were selected according to the research criteria. Pregnant women who were prospective research subjects were given information about this research and then were asked to sign an informed consent form before becoming research subjects. Prospective subjects who refused were not included in the study. After agreeing to participate in the study, an interview was conducted to determine the characteristics of the research subject. In order to divide the intervention and control groups, block 6 was performed using a randomized, single blind table, the subject takes an envelope that has been arranged in a box if the envelope is written A (treatment), the subject is motivated to take part in the Prenatal Yoga Program, if the envelope is written B, the mother enters the control group. Observation is done by checking the pregnancy of pregnant women and checking vital signs before doing yoga. The study was conducted on pregnant women from the first to third trimesters.

The intervention group performed yoga 12 times, namely the first trimester 4 times, the second trimester 4, the third trimester 4 times given for 60 minutes while the control group received the usual antenatal care services without prenatal yoga. When approaching labor, practice yoga according to the ability of the mother. 1 sequence of prenatal yoga, namely focusing 5 minutes, warming up 5 minutes,

breathing exercises (Pranayama) 5 minutes, yoga postures (Asana) 30 minutes, meditation (Dhayana) 10 minutes, cool down 5 minutes. Modification of antenatal yoga movements according to gestational age. After the implementation of prenatal yoga exercises, complaints and vital signs were observed in the treatment and control groups, then an assessment was carried out on the babies born with Ballard Score (BS), Body Length (BL), Body Weight (BW) and Head Circumference (HC).

Instrument

The research instrument used was a questionnaire consisting of questions about the identity of the respondent, the results of measurement of body weight, height of pregnant women, history of disease and vital signs and Hb. And questionnaires at birth that assessed the Ballard Score, body length, weight, head circumference.

Data analysis

The data analysis technique used is univariate analysis with a percentage of the characteristics each group, the independent variable, the dependent variable. Bivariate analysis to determine differences in BS, BL, BW, HC infants in the treatment and control groups used the independent pair t-test mean difference test, if the data were normally distributed. The comparative hypothesis test of numerical variable distribution is not normal, the two groups are not paired, namely the non-parametric Mann-Whitney test. The normality test used was Shapiro-Wilk because the sample used was <50 respondents.

RESULTS AND DISCUSSION

Table 1 describes about age of each group in the period of healthy reproduction, education is mostly secondary education, the occupation of most of the housewives and the intervention group is mostly multigravida, while the control group is mostly primigravida. The physical readiness of women who are pregnant is determined by age, age that is too young or too old is a risk factor for giving birth to a premature baby. According to Rochjati (2003), the age of a mother at the time of pregnancy is one of the risks that can cause dangers and possible complications during pregnancy that can interfere with the health of the pregnant woman and implicate the fetus, she is carrying, so that it requires preparation during the prenatal period.

Table 2
Differences of BS, BW, HC in the intervention and control groups

Variable	Groups	Mean Rank	Sum of Ranks	p-value
BS	Intervention	27,50	550,00	0,000
	Control	13,50	270,00	
BW	Intervention	28,75	575,00	0,000
	Control	12,25	245,00	
HC	Intervention	28,60	572,00	0,000
	Control	12,40	248,00	

The results of the BS, BW, HC data normality test were not normally distributed with p value $< \alpha$ (0.05) so that the hypothesis test used was the comparative hypothesis test, numeric variable distribution was not normal, two groups were

Table 1
Characteristics of the intervention and control groups (N=20)

	Intervention		Control	
	F	%	f	%
Age				
<20	2	10	5	25
20-34	14	70	11	55
≥35	4	20	4	20
Education				
Basic	3	15	4	20
Intermediate	17	85	16	80
Occupation				
Housewife	15	75	16	80
Owner small store/Private	5	25	4	20
Graviditas				
Primigravida	4	20	11	55
Multigravida	13	65	7	35
Grandemultigravida	3	15	2	10

Table 1 describes about age of each group in the period of healthy reproduction, education is mostly secondary education, the occupation of most of the housewives and the intervention group is mostly multigravida, while the control group is mostly primigravida. The physical readiness of women who are pregnant is determined by age, age that is too young or too old is a risk factor for giving birth to a premature baby. According to Rochjati (2003), the age of a mother at the time of pregnancy is one of the risks that can cause dangers and possible complications during pregnancy that can interfere with the health of the pregnant woman and implicate the fetus, she is carrying, so that it requires preparation during the prenatal period.

Based on the results of research, it shows that more education for pregnant women is secondary education, education is the basis for finding the latest information about care during pregnancy so that the mother and the fetus are healthy, respondents have never heard that prenatal yoga is a way for self-help during pregnancy that is beneficial for the mother. and fetuses, also have never heard of prenatal yoga in prenatal classes. Most mothers work as housewives who work from morning to night so that time for themselves and enjoying their pregnancy well is taken up in household chores. Mothers are also obliged to take care of their children because on average multigravida mothers mean they already have children. Heavy workload causes less rest time so that during unstable pregnancy can cause stress and fatigue. This is in line with Rafika's research, 2018 that education can increase respondents' curiosity in seeking information about health services during pregnancy in prenatal classes and prenatal yoga services. Working as a housewife becomes a burden and increases physical complaints due to household chores that must be completed by pregnant women, while physical and psychological conditions require adaptation according to gestational age and fetal development.

not paired, namely the non-parametric Mann-Whitney test while BL normally distributed statistical test used t-test.

The statistical test results describes in table 2 that the rank or average rank of each group, the ballard score (BS)

mean rank is 27.50 higher than the control group's rank 13.50. The intervention group's average rank, infant weight (BW) was 28.75 greater than that of the control group 12.25. In the intervention group, the mean rank of the baby's head circumference (HC) was 28.60 points greater than in the control group. Because the p value 0.05, the Ballard score was obtained significance 0.000, body weight 0.000, and

head circumference 0.000 using the Mann-Whitney test. It can be concluded that there are differences in BS, BW, and HC in the group of pregnant women who gave prenatal yoga and the group of pregnant women who did not. As a result, the prenatal yoga program can be concluded to be useful for BS, BW, and HC.

Table 3
Differences in BL in the Intervention and control groups

Group	Mean	ΔMean	SD	SE	Interval of the Diff. (95%)	p-value
Intervention	47,6	2,5	2,13	0,47	1,30-3,69	0,00
Control	45,1		1,55	0,34		

Table 3 explains that the mean the intervention group's mean is greater than the control group's with a mean difference of 2.5 intervals of difference between the means 1-4 and a p-value of 0.00 can be concluded that there is a significant difference between the intervention group and the control group, the prenatal yoga program is effective for PB babies born.

Fertilization, or the fusing of spermatozoa and ovum, leads to pregnancy, which is followed by nidation, or implantation. According to the international calendar, a normal pregnancy lasts 40 weeks, 10 months, or 9 months from the time of fertilization until the birth of the baby, (Prawirohardjo, 2008). The neuromuscular and physical condition of the newborn depends on the maturation process of the fetus during pregnancy (Wong, 2004). Examination of neuromuscular maturity (Ballard Score) is an indirect method that bases 32 indicators of neuromuscular and physical maturation (Kiamseong, 2012). The Lubchenco curve measures anthropometric measures of neonates from height, weight and head circumference. The use of the Lubchenco curve is to look at the distribution of neonatal size compared to gestational age (Bertino et al., 1996).

Pregnancy is a time of significant change bio-physio-psycho-social that can increase stress levels and responsiveness stressors that can affect fetal growth and development (Littleton, Bye, Buck, 2010; Curtis, et al., 2012). These stresses can lead to negative perinatal outcomes such as perinatal depression, pregnancy-induced hypertension, and pre-eclampsia, all of which are linked to prolonged maternal stress, preterm birth, low birth weight, and a head circumference that is less than normal. (Baibazarova, et al., 2013; Yu, et al., 2013; Bershadsky, et al., 2014). To prevent problems during pregnancy, management of maternal health based on interventions can improve the well-being of both the mother and the fetus (Koh, 2010; USDHHS, 2014); WHO, 2015). Pregnant women can describe public health, community, family and regular antenatal care prevent premature birth or child disability, (Koh, 2010).

The results of our research show that prenatal yoga is effective in preventing preterm birth as assessed by ballard scores, body length, normal weight, head circumference and during pregnancy the results of observations by researchers on the vital signs of normal. Pregnant women who practice prenatal yoga deliver babies who are much heavier at birth than babies born to women in the control group, according to the findings of Chena, et al., 2017. The intervention group's GA was much longer (but only by 40.1 weeks) than the control group's. Prenatal women who do prenatal yoga is useful for improving labor outcomes ie number of preterms birth, gestational age, apgar core, birth weight, (Curtis et

al., 2012; Jiang, et al. 2015; Babbar et al., 2015; Babbar & Shyken, 2016; Rakhshani et al., 2015).

The role of prenatal yoga is also very effective in preparing pregnant women and their fetuses, prenatal yoga sequences are deep relaxation exercises at the somatic level in various postures (asana), breathing (pranayama), the technique of calming the mind with meditation, which is integrated and practiced during the period of pregnancy can increase comfort, decrease breathing rate and produces physiological changes that alter the experience of pain by reducing the activity of the sympathetic nervous system. Increases cortisol and enhances flexibility, strength, circulation, and cardiorespiratory capacity via increasing tumor necrosis factor, interleukin-II, CRP, and stress indicators. The HPA axis is indirectly manipulated to enhance birth weight, minimize premature delivery, and reduce intrauterine growth restriction (Satyapriya et al., 2009; Chuntharapat et al., 2008; Chethana, et al., 2018).

Limitation of The Study

This study did not include mothers who had a high risk of pregnancy, did not analyze economic status, nutrition recall, lifestyle.

CONCLUSIONS AND RECOMMENDATION

Prenatal yoga is effective against ballard scores and anthropometry, namely body length, body weight, and head circumference of newborns. Prenatal yoga recommendations can become a standard in antenatal care services and are carried out every semester in the prenatal class, prenatal yoga sequences according to the age of pregnancy.

Conflict of Interest Statement

There are no competing interests declared, and all authors contributed to the writing of this paper.

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