



THE EFFECT OF KUNDALINI ON MUAC AND BODY WEIGHT IN 1ST TRIMESTER WITH EMESIS GRAVIDARUM

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Abstract

Background: Emesis gravidarum is a discomfort that occurs in mothers during early pregnancy. If emesis gravidarum is not adequately managed, children are more likely to experience stunting. There may be negative impact on health from stunting. Stunting is a health problem that is still the government's current focus. Kundalini yoga is a physical activity that focuses on breathing, so it is hoped that it can divert nausea. When the nausea disappears it will be increase appetite so it can impact to a person's nutritional intake, which can be seen from an increase in MUAC and body weight. The purpose of this study is to evaluate whether kundalini yoga is associated with increased MUAC and body weight in women who have emesis gravidarum. **Method:** This study used a pre-test and post-test control group design as a quasi-experiment that provided kundalini yoga intervention for 15 minutes every day for 30 days. The study population comprised 20–35 year old pregnant women experiencing mild–moderate nausea and vomiting throughout the 1st trimester of their pregnancy. Using the total sampling technique, samples were collected. In this study, body weight gain (BW) and upper arm circumference (MUAC) were the dependent variables, whereas kundalini yoga was the independent variable. The tools used are body measuring tape and body scales. The independent t-test used to examine variations in body weight and upper arm circumference. **Result:** In the intervention group, the MUAC addition was 0.096 cm, while in the control group, it was 0.012 cm ($p = 0.08$). Weight gain was 0.512 kg in the control group and 0.952 kg in the intervention group ($p = 0.096$). **Conclusion:** Kundalini yoga was not significant in increasing MUAC and body weight.

keyword : kundalini, yoga, MUAC, body weight

INTRODUCTION

Stunting is the condition of a child who has a lower body length or height than the average age, namely < -2 standard deviation based on the WHO chart (WHO, 2024). Stunting is a nutritional problem that is still often found in Indonesia. Based on SSGI 2022 data, the incidence of stunting in Indonesia is 21.6%. Compared to 2021, this percentage is lower—24.4%. However, this figure is still far from the 2024 RPJMN target of 14%. Apart from stunting, the incidence of wasting and underweight is also found in Indonesia at 7.7% and 17.1% (Kemenkes,

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2022). Children with stunting get sick easily, experience developmental delays and are at high risk of suffering from chronic diseases (WHO, 2015; Mustakim *et al.*, 2022). Maternal factors that can contribute to stunting include inadequate nutrition in pregnant women and uncontrolled emesis gravidarum (WHO, 2015).

Emesis gravidarum is a condition that commonly occurs in mothers early in pregnancy (more than 6 weeks). The cause of emesis gravidarum is currently unclear. There are several theories that are thought to be the cause of emesis gravidarum, such as hormonal changes, genetics, gastrointestinal factors, and psychological factors (Fitria *et al.*, 2023). An increased level in the hormone chorionic gonadotropin (hCG) has been associated with severe emesis gravidarum (Lowe *et al.*, 2019). Chorionic gonadotropin hormone is a hormone used to detect pregnancy. hCG is secreted by the placental syncytiotrophoblast which stimulates progesterone production (Kaňková *et al.*, 2023). The increase in estrogen and progesterone during pregnancy has an impact on reducing gastrointestinal motility, so that gastric emptying becomes slow. Apart from that, an increase in progesterone also causes the esophageal sphincter to relax. This causes an increase in gastroesophageal reflux and increased stomach acid (Varsa *et al.*, 2021).

The predicted peak of emesis gravidarum occurs between weeks 10 and 16 of gestation, while the decrease occurs around week 20 (Liu *et al.*, 2022). Emesis gravidarum actually does not harm the fetus if it is balanced with appropriate lifestyle changes such as eating small but frequent portions, avoiding foods high in fat, managing stress and so on (ACOG, 2020). However, if the mother is reluctant to eat, the mother is at risk of experiencing nutritional deficiencies. A person's upper arm circumference and body weight provide information about their nutritional health. A fetus that is malnourished may not grow and develop to full potential, which increases the risk of intrauterine growth retardation, low birth weight, abnormalities, and other problems (Macias, 2024). Emesis gravidarum becomes more severe and prolonged if the mother is primigravida and under 20 years during pregnancy, obesity, and using oral contraceptives before pregnancy (Liu *et al.*, 2022). Other risk factors, such as mothers who do not work, sitting too much before pregnancy, frequently drinking cold drinks, having a history of gastrointestinal tract



disease and lack of exercise can also worsen emesis gravidarum (Zhang *et al.*, 2020).

Physical activity is defined as any movement of the body requiring the expenditure of energy and made possible by the skeletal muscles. A minimum of 150 minutes a week of physical activity is required for pregnant women (WHO, 2022). People who work or stand for more than twenty hours a week are linked to a decreased incidence of emesis gravidarum, according to previous study (Connolly, Mudd and Pivarnik, 2019). One of the physical activity that pregnant women can do is yoga.

With origins in Indian philosophy, yoga is a profound, ancient practice. Although yoga was once practiced as a spiritual discipline, it is today widely used to enhance both mental and physical health (NIH, 2024). Kundalini yoga is a type of yoga that focuses on breathing. The incidence of emesis gravidarum in women who did kundalini yoga for 15 minutes every day decreased when compared with controls (Khusmitha *et al.*, 2023). Reducing emesis gravidarum can increase maternal food intake. Adequate food intake can increase maternal weight during pregnancy (Dolatian *et al.*, 2020).

Based on the background above, researchers want to examine the relationship between kundalini yoga and increased body weight and upper arm circumference in pregnant women with emesis gravidarum.

METHOD

This study uses a pre-test and post-test control group design and is quasi-experimental. The control group was the group that received routine ANC, while the treatment group was the group that received routine ANC and kundalini yoga independently. The study population comprised 20–35 year old pregnant women experiencing mild–moderate nausea and vomiting throughout the 1st trimester of their pregnancy. Using the total sampling technique, samples were collected. In this study, body weight gain (BW) and upper arm circumference (MUAC) were the dependent variables, whereas kundalini yoga was the independent variable. The Wilangan Community Health Center's operating area served as the research site, Nganjuk for 4 weeks. Kundalini yoga is done for 15 minutes every day for 4 weeks

with the help of videos from a certified yoga instructor. The procedures for practicing Kundalini yoga are as follows: two minutes of deep, prolonged breathing; two minutes of basic spinal flexion; and eleven minutes of pregnant meditation. The tools used are body measuring tape and body scales. The independent t-test used to examine variations in body weight and upper arm circumference. This research has received ethical approval number 110/fkes/EP/2023.

RESULT AND DISCUSSION

Table 1. Distribution of the increase in arm circumference in pregnant women in the 1st trimester

	Group	N	Average increase (cm)
MUAC	Treatment	25	0,096
	Control	25	0,012

According to Table 1, there was an average 0.096 cm increase in MUAC in the treatment group and 0.012 cm in the control group.

Table 2. Results of the independent t-test for increase in arm circumference in pregnant women in the 1st trimester

	N	t	Sig (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
MUAC	50	2.766	0.08	0.184	0.05	0.318

Table 2 shows there was no significant difference ($p = 0.08$, $p > 0.05$) in the rise in upper arm circumference between the treatment group and the control group.

Table 3. Distribution of weight gain in 1st trimester pregnant women

	Group	N	Average increase (kg)
Weight gain	Treatment	25	0,952
	Control	25	0,512



Based on Table 3, there was an average 0.952 kg rise in body weight in the treatment group and 0.512 kg in the control group.

Table 4. Results of the independent t-test pre-post-test level of change in weight of pregnant women in the first trimester in the control and treatment groups

	N	t	Sig (2- tailed)	Mean Difference	95% Interval Difference Lower	Confidence of the Difference Upper
Weight gain	50	-0.096	0.924	-0.04	-0.8803	0.8003

A 2-tailed test indicated no significant difference between the weight gains of the groups ($p > 0.05$). The t value of -0.096 shows that the control group's weight gain was lower than the treatment groups.

Between 35 and 91% of pregnant women feel uncomfortable sensations that early-pregnant women experience, such as nausea and vomiting. Pregnant women with emesis gravidarum generally experience a decrease in appetite (Muchtar and Rasyid, 2023). Appetite is the desire to obtain certain foods. Appetite is related to the aroma, taste, appearance and attractiveness of food which can be considered a metaphor for feelings of wanting or liking valuable things in life. An improved appetite will increase a person's food intake, both energy intake and protein intake ($p=0.008$; $p=0.004$) (Meylina Djafar and Heny Sulistyowati, 2016). A low appetite will reduce energy, protein, fiber, solid food, fruit and vegetable intake (van der Meij *et al.*, 2017).

Prolonged emesis gravidarum can result in poor nutrition. Pregnant women with poor nutrition are at risk of increasing the incidence of anemia, preeclampsia, postpartum hemorrhage, infectious diseases and maternal death (WHO, 2011; UNICEF, 2024). A low nutritional index causes a high incidence of preeclampsia (Wei *et al.*, 2022).

Poor nutrition during pregnancy can cause stillbirth, low birth weight, wasting, malformations, mental retardation and delayed child development (delays in language, motor, and cognitive development) in children under 24 months (Neves *et al.*, 2020). The newborn's birth weight decreases with the mother's anthropometric status (Woldeamanuel *et al.*, 2019). MUAC research conducted on pregnant women in Cambodia had a significant correlation with the prevalence of

stunting in children born, pregnant women with low MUAC values had a high risk (>10%) of having stunted children ($p=0.032$) (Kpewou *et al.*, 2020). Stunting has negative effects in the short or long term, affecting children's health and development.

This issue is still a concern, given the high percentage—50%—of pregnant women in Indonesia who have dietary problems. Pregnant women's nutritional status can be assessed by measuring or weighing their body weight, height, and MUAC and by examining their mother's hemoglobin (Hb) levels. The mother gained weight during her pregnancy; her normal BMI was 10–12 kg, her normal MUAC was 23.5 cm, and her normal Hb level was 11–13 grams/dL (Budiono, Dewi and Dewi, 2022).

4.1 Kundalini yoga on changes in upper arm circumference

An easy-to-measure indicator of nutritional status is upper arm circumference, particularly in pregnant women. A person's upper arm circumference is a good measure of their protein and energy intake (Ververs *et al.*, 2013). Upper arm circumference is strongly related to a person's body mass index (Miele *et al.*, 2021). Upper arm circumference aims to measure muscle and fat in the arms (Jeyakumar, Ghugre and Gadhave, 2013). The MUAC cut-off point varies in each country, in Indonesia the MUAC cut-off is >23.5 cm. So when someone has a MUAC <23.5 cm, it means that the person has a chronic energy deficiency. The increase in a person's upper arm circumference is influenced by body mass index, anemia status, pregnancy spacing, parity and the mother's education level (Kurniawati, 2022). Maternal characteristics, including body mass index (BMI) and socioeconomic status, have impacted maternal MUAC. Low MUAC is linked to working moms, mothers with low levels of education, and mothers who are underweight, all of which may affect maternal health. In Indonesia, the danger of chronic energy deficiency (CED) is indicated by a MUAC limit of less than 23.5 cm. Low birth weight is associated with pregnant women with low MUAC (Yosefinata, Zuhairini and Luftimas, 2022).

MUAC measurements for both groups showed no significant difference ($p=0.08$, $p>0.05$). Nonetheless, the treatment group had an average increase in upper arm circumference that was greater than that of the control group (treatment:



0.096 cm, control: 0.012 cm). This most likely occurs as a result of kundalini yoga's ability to decrease pregnancy-related nausea and increase the mother's appetite (Khusmitha *et al.*, 2023).

Consuming a variety of foods and consuming sufficient protein will improve a person's nutritional status. The food consumed will be stored regularly and continuously as glycogen, protein, and fat (Harna *et al.*, 2024). Consuming foods high in protein can improve absorption to the best possible level to preserve and grow muscle mass. Based on previous research, it is stated that nutritional monitoring includes knowing nutritional status, recommending daily menus, monitoring food consumption, nutritional counseling and health education related to maternal nutrition during pregnancy can increase a person's arm circumference (Abadi and Putri, 2020).

4.2 Body Weight

Any change in any of the body's tissues will result in a change in body weight. The most reliable measure of nutritional status, growth, and development is body weight (Mardiyana, 2022). Gaining weight when pregnant is typical for the fetus's growth and development. Weight gain during pregnancy is divided into two parts, namely the results of conception and the increase in maternal tissue. The products of conception in question are the fetus, placenta and amniotic fluid. The placenta adds 5%, the amniotic fluid adds 6%, and the fetus increases body weight by 25% on average. The increase in maternal tissue is two-thirds of the total increase in body weight. The increase includes uterine weight, mammary tissue weight, maternal blood volume, extracellular fluid, fat and tissue reserves (Suitor, 1991; Abrams and Selvin, 1995).

Weight gain during pregnancy varies greatly. Recommendations for weight gain are adjusted to the mother's body mass index (BMI) before pregnancy. In Indonesia, mothers with a BMI <18.5 are 12.5-18kg, a BMI 18.5-24.9 is 11.5-16kg, a BMI 25-29.9 is 7-11.5kg and a BMI ≤ 30 is 5-9kg (Kemenkes RI, 2021).

Maternal and neonatal problems are linked to weight gain that is below recommended limits. Lack of weight increase will result in SGA, preterm, LBW, and neonatal death. While excessive weight growth is linked to preterm birth, a higher chance of cesarean birth, macrosomia, or large for gestational age (LGA),

childhood obesity, hypertensive pregnancy syndrome, gestational diabetes, and postpartum weight retention (which can lead to maternal obesity).

Body weight did not significantly change between the control and research groups' pre- and post-research results ($p=0.254$; $p=0.289$). Food security, strong social support, and more prenatal care all affect how much weight pregnant women gain ($p=0.008$, $p=0.007$, $p<0.001$) (Dolatian *et al.*, 2020). Previous research also stated that yoga did not affect body weight in children or adults (Lauche *et al.*, 2016).

CONCLUSION AND SUGGESTION

Kundalini yoga was shown to be ineffective in increasing MUAC and weight gain in the 1st trimester with emesis gravidarum. Future research can observe mothers recalling nutrition every day.

DECLARATION

Conflict of Interest

This research contains no conflicts of interest. This ensures transparency and integrity in the research process.

Authors' Contribution

All of the authors contribute in every stage of the research, from the initial concept to the drafting of the article.

Ethical Approval

Ethical approval number: 110/fkes/EP/2023.

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Data Availability

Data is retrieved as needed.

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