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The Relationship Between Upper Arm Circumference of Pregnant Women and the Incidence of Low Birth Weight in All Primary Health Care Madiun City in 2022

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Original Research Article

INTRODUCTION

The pregnancy period in women is at very high risk for malnutrition for both the mother and the fetus if periodic control is not carried out at least once a month during pregnancy (Adha et al., 2019). The nutritional status of the mother can be seen through anthropometric indications of the Upper Arm Circumference (LILA) of pregnant women. The risk of upper arm circumference (LILA) of pregnant women who are less than normal will affect the weight of the baby born can be low or very low (Kpewou et al., 2020).

The overall prevalence of low birth weight, 15% to 20% of the 20 million births in a year of birth in the world experience Low Birth Weight (BBLR) which is almost represented by various countries with low to middle class income as much as 96% including Indonesia (Astuti, 2021). In Indonesia, the incidence rate varies greatly between 9% to 30% in various regions. Data from the Madiun City Health Office, of 9,273 babies born, 348 babies were assessed as Low Birth Weight (BBLR), of which 123 babies were malnourished (BPS Kota Madiun, 2018).

Abstract

The circumference of the upper arm of pregnant women is one indicator of maternal nutritional adequacy during pregnancy. The size of the upper arm of pregnant women who are less than equal to 23.5 cm is at risk for giving birth to babies with Low Birth Weight (BBLR). If the size of the arm circumference of pregnant women is in accordance with what is recommended, the fetus will tend to be born with a normal birth weight. BBLR is the condition of babies born with a body weight of less than or equal to 2,500 g. BBLR cases in Madiun City increased from 2019 as much as 3.1%, year 2020 BBLR cases as much as 3.5%, year 20 21 as much as 3.8%. This study aims to determine whether there is a relationship between the circumference of the upper arm of pregnant women and the incidence of low birth weight in the working areas of Manguharjo Health Center, Ngegong Health Center, and Demangan Health Center throughout Madiun City.

Keywords: upper arm circumference, pregnant women, low birth weight

There are 2 factors that cause low birthweight, namely from the mother and fetus (Abubakari et al., 2019). Factors from the mother include maternal age, parity status, and nutritional status. Factors of the fetus include premature or inadequate birth, placental abnormalities, restrictions or disorders in the womb, or full-term birth but the mother does not routinely do complete Ante Natal Care (ANC) so it is too late to detect early the presence of Chronic Energy Deficiency (SEZ) experienced by pregnant women. This causes nutrients from the mother to the baby to be less so that it affects the growth and development of the fetus in the womb which finally at birth, the baby's weight will be low (Nicholls et al., 2021)(Abubakari et al., 2019).

The incidence of low birth weight can be prevented through early detection of the premarital, pre-pregnancy, and post-pregnancy periods. This can be done by fulfilling a diet that contains a balanced intake of macronutrients and micronutrients, Supplementary Feeding (PMT) once a day for 90 days if during SEZ risk measurement, routinely following counseling both during pre-pregnancy and during pregnancy to anticipate the risk of SEZ in women of childbearing age, and measuring body circumference independently. Measurements of waist circumference, abdominal circumference, and upper arm circumference can be done independently at home using a measuring tape(Riyanto et al., 2020).

The pregnancy period is very crucial because it is related to fetal growth and development so it must be monitored properly so that the baby can be born with sufficient birth weight. Monitoring can be done by conducting Ante Natal Care (ANC) examinations carried out at least 4 (four) times during pregnancy, namely 1 examination in the first trimester, 1 examination in the second trimester, and 2 examinations in the third trimester recorded in the MCH book, including the size of the upper arm circumference of pregnant women.

Based on this background, it is necessary to conduct research on the relationship between upper arm circumference (LILA) of pregnant women with low-birth weight babies in all health centers in Madiun City.

MATERIALS AND METHODS

The study is quantitative research using analytical observational research methods with a cross-sectional research design. This study used an observational analytical design with a cross sectional approach. The independent variable in this study was the circumference of the upper arm of pregnant women, the dependent variable of the incidence of low birth weight babies. The population in this study was all mothers who gave birth throughout 2022. The sample in this study was 46 respondents using purposive sampling techniques. Analysis of bivariate data using chi square and odd ratio (OR). The result of this study is that there is a relationship between the circumference of the upper arm of pregnant women and the incidence of low birth weight in all Puskesmas in Madiun City.

RESULTS

Table 1. Characteristics of Respondents Based on Maternal Age During Pregnancy at Manguharjo Health Center, Demangan Health Center, and Ngegong Health Center in Madiun City in 2022

Mother's Age (Years)	f	%
17-20	2	4,3
21-34	33	71,7
35-44	11	23,9

Table 1 shows that most respondents aged between 21-34 years, namely 71.7% (33 respondents), as many as 23.9% (11 respondents) aged between 35-44 years, as many as 4.3% (2 respondents) aged between 17-20 years. Based on table 1, respondents were found to have an age at risk of BBLR 4.3% (2 respondents). Based on table 2, it was found that the majority of respondents had an age that was

not at risk of giving birth to BBLR as much as 71.7% (33 respondents). Based on table 3, respondents have an age at risk for BBLR as much as 23.9% (11 respondents).

Table 2. Frequency Distribution Based on the Size of the Upper Arm Circumference of Pregnant Women at Manguharjo Health Center, Demangan Health Center, and Ngegong Health Center in Madiun City 2022

Size LILA (cm)	f	%
Low	30	65,2
Normal	16	34,8
Total	46	100

Table 2 explains that the majority of pregnant women in the three puskesmas had a low upper arm circumference size of 65.2% (30 respondents), while pregnant women with a normal upper arm circumference size of 34.8% (16 respondents).

Table 3. Frequency Distribution Based on Newborn Weight at Manguharjo Health Center, Demangan Health Center, and Ngegong Health Center in Madiun City

Newborn Birth Weight	f	%
BBLR	33	71,7
Tidak BBLR	13	28,3
Total	46	100

Table 3 explains that of the 46 respondents, the majority of babies with low birth weight were 71.7% (33 babies), while the weight of babies born without low birth weight was 28.3% (13 babies).

Table 4. Cross Tabulation Between the Upper Arm Circumference of Pregnant Women with Newborn Weight

MUAC	Baby Birth Weight				p-value	OR
	BBLR	%	Tidak BBLR	%		
Low	25	83,3	5	16,7	0,036	
Normal	8	50	8	50		5
Total	33	71,7	13	28,3		

From Table 4, cross-tabulations were obtained that from 46 respondents, mothers with low upper arm circumference (23.5 cm) with low birth weight as much as 83.3% (25 babies), normal baby weight as much as 16.7% (5 babies). While mothers with normal upper arm circumference with low birth weight as much as 50% (8 babies), normal baby weight as much as 50% (8 babies). Statistical calculation results using chi-square P-values of $0.036 < 0.05$ were obtained. Odd-Ratio (OR) = $5 > 1$.

DISCUSSION

In line with the theory, the circumference of the upper arm of pregnant women affects the occurrence of birth weight. According to the *World Health Organization*, the incidence of Low Birth Weight is determined by many risk factors including the nutritional status of pregnant women which can increase the risk of high fetal and neonatal mortality and morbidity, early developmental

limitations, infections, developmental delays, deaths in infancy and childhood, and chronic diseases later in life. The results of this study are in line with Ayu Rahma Putri who stated that the circumference of the upper arm of pregnant women has a relationship with the incidence of BBLR. In his research, he obtained results in the form of respondents who had low LILA, as many as 76 people (91.8%) or were at risk of SEZ. Low birth weight babies (BBLR) as many as 74 babies (87.1%). This strengthens the existing theory that the circumference of the upper arm of pregnant women can affect the occurrence of low birth weight (Ayu Rahma Putri, 2021)

Previous research that supported this study was conducted by Trisnawati Tambunan entitled "The Relationship between the Size of the Mother's Upper Arm Circumference During Pregnancy and the Body Weight of Newborns at the Niar Medan Pratama Clinic in 2019" with the results of the study found that pregnant women with abnormal upper arm circumference were 23 respondents (67.6%) while pregnant women with normal upper arm circumference were 11 (32.4%). The results of the chi-square test obtained p values of $0.032 < 0.05$ so that it was concluded that there was a significant relationship with the direction of positive correlation and the strength of the weak correlation between maternal weight gain during pregnancy and newborn weight.

CONCLUSION

Based on the results of research on the relationship between the upper arm circumference of pregnant women with the incidence of low birth weight in all Puskesmas Kota Madiun, it can be concluded that there is a significant relationship between the circumference of the upper arm of pregnant women and the incidence of low body weight as evidenced by the results of the chi-square p value test of $0.036 < 0.05$ and the $OR = 5 > 1$ test.

CONFLICT OF INTEREST

The implementation of this research is pursued as much as possible in accordance with the aims and objectives of the research. However, there are still limitations and weaknesses that cannot be avoided, including data collection in this study is only based on secondary data, allowing data discrepancies in the collection process because there is no repeat examination of respondents. Also, the limited number of respondents who fit the inclusion criteria is considered insufficient to represent the entire population.

REFERENCES

- Abriani, A. A., & Ningtyias, F. W. (2019). The Relationship between Food Consumption, Nutritional Status, and Physical Activity with Premenstrual Syndrome. *Gizi Dan Kesehatan*.
- Abubakari, A., Taabia, F. Z., & Ali, Z. (2019). Maternal determinants of low birth weight and neonatal asphyxia in the Upper West region of Ghana. *Midwifery*, 73, 1–7. <https://doi.org/10.1016/J.MIDW.2019.02.012>
- Adha, C. N., Prastia, T. N., & Rachmania, W. (2019). GAMBARAN STATUS GIZI BERDASARKAN LINGKAR LENGAN ATAS DAN INDEKS MASSA TUBUH PADA MAHASISWI FIKES UIKA BOGOR TAHUN 2019. *PROMOTOR*, 2(5). <https://doi.org/10.32832/pro.v2i5.2523>
- Astuti, E. R. (2021). Factors Associated with The Incidence of Low Birth Weight. *Journal of Health Science and Prevention*, 5(2). <https://doi.org/10.29080/jhsp.v5i2.517>
- Edem Kpewou, D., Poirot, E., Berger, J., Vicheth Som, S., Laillou, A., Negash Belayneh, S., & Wieringa, F. T. (2020). *Maternal mid-upper arm circumference during pregnancy and linear growth among Cambodian infants during the first months of life Cambodia, infant, maternal MUAC, stunting*. <https://doi.org/10.1111/mcn.12951>
- Kedokteran, J., Malikussaleh, K., Putri, A. R., & Muqsith, A. (2018). HUBUNGAN LINGKAR LENGAN ATAS IBU HAMIL DENGAN BERAT BADAN LAHIR BAYI DI RUMAH SAKIT UMUM CUT MEUTIA KABUPATEN ACEH UTARA DAN RUMAH SAKIT Tk IV IM.07.01 LHOKSEUMAWE TAHUN 2015.

AVERROUS: Jurnal Kedokteran Dan Kesehatan Malikussaleh, 2(1), 1–7.
<https://doi.org/10.29103/AVERROUS.V2I1.399>

Nicholls, J. A., David, A. L., Iskaros, J., Siassakos, D., & Lanceley, A. (2021). Consent in pregnancy - an observational study of ante-natal care in the context of Montgomery: all about risk? *BMC Pregnancy and Childbirth*, 21(1). <https://doi.org/10.1186/s12884-021-03574-2>

Riyanto, Islamiyati, & Herlina. (2020). Pemberdayaan Kader Posyandu melalui Peningkatan Pengetahuan Deteksi Dini Ibu Hamil Resiko Tinggi dan Keterampilan Pengukuran Tekanan Darah dan Lingkar Lengan Atas di Keurahan Tejosari Kecamatan Metro Timur. *BANTENESE JURNAL PENGABDIAN MASYARAKAT*, 2(2). <https://doi.org/10.30656/ps2pm.v2i2.2810>

K C, A., Basel, P. L., & Singh, S. (2020). Low birth weight and its associated risk factors: Health facility-based case-control study. *PloS one*, 15(6), e0234907. <https://doi.org/10.1371/journal.pone.0234907>

Adha, C. N., Prastia, T. N., & Rachmania, W. (2019). GAMBARAN STATUS GIZI BERDASARKAN LINGKAR LENGAN ATAS DAN INDEKS MASSA TUBUH PADA MAHASISWI FIKES UIKA BOGOR TAHUN 2019. *PROMOTOR*. <https://doi.org/10.32832/pro.v2i5.2523>

Muqsith, Malikussaleh. (2018). Hubungan Lingkar Lengan Atas Ibu Hamil dengan Berat Badan Lahir Bayi di Rumah Sakit Umum Cut Meutia Kabupaten Aceh Utara dan Rumah Sakit Tk IV IM.07.01 Lhokseumawe. *Kedokteran*, 2(4).

Wang S, et al. (2020). Changing Trends of birth weight with maternal age: a cross-sectional study in Xi'an city of Northwestern China.