

## THE RELATIONSHIP BETWEEN THE UPPER ARM CIRCUMFERENCE (UAC) OF THE THIRD TRIMESTER PREGNANT WOMAN AND BIRTH WEIGHT IN SIFRA MATERNITY CLINIC, SUB-DISTRICT OF EAST LANGOWAN, MINAHASA REGENCY

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### ABSTRACT

The assessment of nutritional status is the first step to monitor one's health. Pregnant women with less nutritional status are likely to have high risk of problem categories, such as miscarriage, intrauterine fetal demise, stillbirth, fetal or infant defect, and low birth weight (LBW). Pregnant women with chronic energy deficiency (CED) and anemia are likely to have greater risk of illness, especially during third trimester of pregnancy. This study aims to determine and analyze the relationship between the upper arm circumference (UAC) of the third trimester pregnant women and the weight of babies born in Sifra Maternity Clinic, Sub-district of East Langowan, Minahasa Regency.

This analytical study uses cross sectional approach. The samples were taken from all third trimester pregnant women in Sifra Maternity Clinic of Sub-district of East Langowan, the Regency of Minahasa from March to April 2017, comprising 69 people. The data collection format was presented in the form of distribution tables. The data was analyzed using chi-square test.

Based on the results of the study, 58 (84,06%) of the respondents presented  $AUC \geq 23.5$  cm and 11 (15,94%) had  $AUC < 23.5$  cm. Fifty-six babies (81.16%) weighed  $\geq 2500$  grams at birth while 13 (18.84%) weighed  $< 2500$  grams at birth. Based on the results of chi-square test, the p-value was  $0,000 < \alpha$  or equal to 0.05. Thus, there is a relationship between the upper arm circumference of the third trimester pregnant women and birth weight. Health workers can provide continuous counseling on nutrition fulfillment from pregnancy to postpartum for the sake of maternal and infant health; pregnant women should undertake routine check-up during pregnancy so that their nutritional status can be identified in order to get supplementary feeding, counseling, medication, or others during pregnancy period.

**Keywords:** AUC of the third trimester Pregnant Women, Birth Weight

### INTRODUCTION

High maternal mortality rate (MMR) and infant mortality rate (IMR) indicates low level of health within the community. Assessment of nutritional status is the first step for monitoring one's health. Pregnant women with less nutritional status are

likely to have high risk of miscarriage, intrauterine fetal demise, stillbirth, fetal and infant defect, and low birth weight (Nugroho, 2014)

Based on the data from World Health Organization (WHO), in 2012 the MMR and IMR reached 450/100.000 and 35/1000 livebirths, respectively. The causes of

maternal deaths are bleeding, eclampsia, complications of abortion, obstructed labor, and sepsis while the causes of perinatal and neonatal deaths are asphyxia, birth trauma, infections, congenital abnormalities, and others (Prawirohardjo, 2014).

UAC threshold of  $<23.5$  cm or the red ban indicates less-nourished and UAC  $\geq 23.5$  cm indicates well-nourished, while UAC  $<23.5$  is included in malnutrition group (Ministry of Health RI, 2015). Pregnant women with chronic energy deficiency (CED) and anemia are likely to have greater risk of illness, especially during the third trimester of pregnancy than in the other pregnancy periods; consequently, they have a greater risk to give birth to babies with LBW, stillbirth, and bleeding (Waryana, 2010).

Based on a study conducted by Kamariah and Musyarofa (2016) at BPS Artiningsih of Surabaya towards 33 pregnant women, the more normal the UAC of pregnant women, the more normal the weight of babies born. Susilani (2015) conducted a study in Widuri Maternity Hospital towards 72 respondents concluded that there was a significant relationship between the women's UAC and birth weight.

A preliminary survey was conducted by the researchers on May 2, 2017 at Sifra Maternity Clinic, Sub-district of East Langowan, Regency of Minahasa to review the data on pregnancy and birth register books in 2016. The results showed that, of 258 pregnant women checked themselves in, 22 (8.52%) presented CED with UAC  $< 23.5$  cm. In addition, 306 mothers gave birth at the Sifra Maternity Clinic and 38 (12.41%) babies were born with weight less than 2500 gram from mothers less than 20 years of age and primigravida.

According to Meilani, et al (2009) in Happinasari and Suryandari (2015), risky pregnant women can be identified from their nutrition status by measuring the UAC through four antenatal care visits during pregnancy. The World Health Organization (WHO) in 1994 developed the concept of Four Pillars of Safe Motherhood as an effort to save mother and baby. Those are family planning, antenatal care, clean and safe delivery, and essential obstetric services (Syafrudin and Hamidah, 2009).

It is imperative to perform an analysis on UAC of the mothers as one of the factors to determine low birth weight. Therefore, a study on the relationship between upper arm circumference of third trimester pregnant women and birth weight in the study site needs to be conducted.

## **METHODS**

This analytical study used a cross sectional approach. The researchers measured the circumference of the women's upper arm and weighed the baby's weight at one time. The samples were taken from all third trimester pregnant women at Sifra Maternity Clinic, Sub-district of East Langowan, Regency of Minahasa from March to April 2017, covering as many as 69 people. The data was collected through format sheets and presented in the form of distribution tables. Chi-square test was employed for data analysis.

## **RESULTS AND DISCUSSION**

### **Result**

#### **1. Univariate Analysis**

##### **Characteristics of Respondents**

##### **A. Age**

Fifty-five respondents (79.71%) were 20-35 years old while 5 (7.25%) were more than 35 years of age.

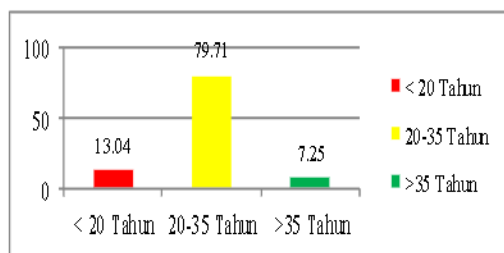


Figure 1. Distribution of Respondents by Age at the Sifra Maternity Clinic of East Langowan Sub-district, Minahasa Regency, Year 2017.

**B. Education**

For education, 41 respondents (59.42%) completed senior high school and only 9 (13.04%) had bachelor degree.

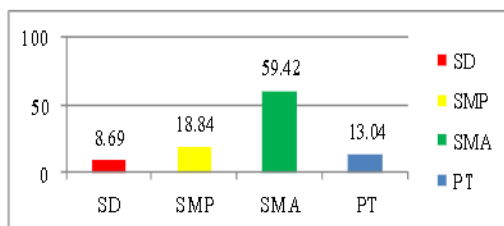
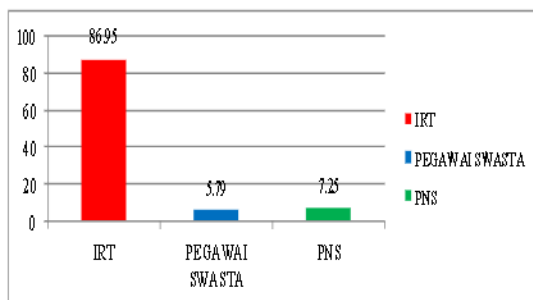


Figure 2. Distribution of Respondents by Education at Sifra Maternity Clinic of East Langowan Sub-district, Minahasa Regency, in 2017.

**C. Occupation**

Based on figure 3, 60 (86,96%) respondents were housewives and only 9 (13,04%) respondents worked as private employees or civil servants.



Occupation at Sifra Maternity Clinic of East Langowan Sub-district, Minahasa District in 2017.

**D. Parity**

In this study, 36 respondents (52.17%) were multigravida and 33 (47.82%) were primigravida.

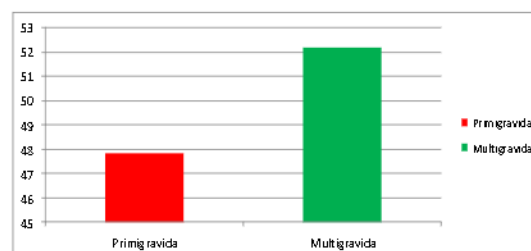


Figure 4. Distribution of Respondents by Parity at Sifra Maternity Clinic of East Langowan Sub-district, Minahasa Regency Year 2017.

**E. Upper Arm Circumference (UAC)**

After measurement, 58 respondents (84%) presented UAC of more than 23.5 cm and 11 (15,94%) presented UAC of less than 23.5 cm.

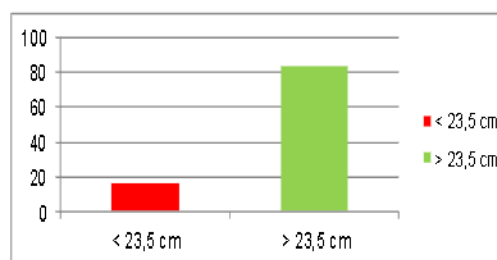


Figure 5. Distribution of Respondents based on UAC at Sifra Maternity Clinic East Langowan Sub-District, Minahasa Regency Year 2017.

**F. Birth Weight (BW)**

Fifty-six babies (81.16%) were born with weight of more than 2500 grams and 13 (18.84%) were born with weight of less than 2500 grams.

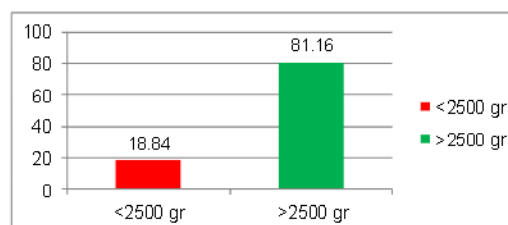


Figure 6. Distribution of Respondents based on BW at Sifra Maternity Clinic of East Langowan Sub-district, Minahasa Regency Year 2017.

## 2. Bivariate Analysis

Bivariate analysis was done to determine the relationship between the dependent variable (the upper arm

circumference) and the independent variable (birth weight). Chi-Square test with 95% confidence level ( $\alpha = 0.05$ ) was used.

Table 1. The relationship between the UAC of the third trimester women and the birth weight at Sifra Maternity Clinic of East Langowan Sub-district, Minahasa Regency Year 2017.

No		Berat Bayi Lahir				Total	P value	
		< 2500 gram		≥2500 gram				
		N	%	N	%	N	%	
1	LILA < 23,5 cm	8	11,59	3	4,35	11	15,94	0,000
2	LILA ≥ 23,5 cm	5	7,25	53	76,81	58	84,06	
	Total	13	18,84	56	81,16	69	100	

Based on table 1, of 11 (15.94%) pregnant women with UAC < 23.5 cm, 8 (11.59%) gave birth to infants with BW < 2500 grams and 3 (4.35%) gave birth to infants with BW ≥ 2500 gram. Of 58 pregnant women (84,06%) with UAC ≥ 23.5 cm, 5 (7.25%) gave birth to infants with BW <2500 gram and 53 (76.81) gave birth to infants with BW ≥2500 gram. The results of Chi-square test obtained a p-value of 0,000 while  $\alpha$  was equal to 0.05, meaning that the p-value was fewer than  $\alpha$ . Thus, there was a relationship between the upper arm circumference of pregnant women and birth weight.

## DISCUSSION

The data was collected during all third trimester pregnant women at Sifra Maternity Clinic, East Langowan Sub-district, Minahasa Regency from March to April 2017 towards 69 women. The study found that most pregnant women aged 20-35 years and this age is the best time for pregnancy and birth. Age determines the health of women as women are said to be at risk if they get pregnant at the age under 20 and over 35 years old (Walyani, 2010).

The physical condition of pregnant women aged > 35 years determines the process of fertilization. The quality of women's eggs at this age has decreased compared to women's eggs during reproductive age (25-30). In addition, pregnant women aged <20 years are also at risk because the reproductive system is inoptimum (Kuswanti, 2014). Pregnant women carrying their first child and more than the third child should have checked their pregnancy as often as possible to avoid maternal deaths.

The antenatal care aims to monitor the condition and development of the fetus from early pregnancy to the birth. According to Bartini (2012), nutritional status of pregnant women also greatly affects pregnancy and pregnancy outcome. In women with good nutritional status, the outcomes of pregnancy will also be good with one of the criteria, i.e., birth weight more than 2500 grams (Bartini, 2012).

The result of analysis with chi-square test using 95% confidence level ( $\alpha = 0.05$ ) obtained a p-value of 0.000; thus the p-value was fewer than  $\alpha$ . For this, there was a relationship between the upper arm

circumference during the third trimester pregnant and the birth weight of babies born at Sifra Maternity Clinic, East Langowan Sub-district, Minahasa Regency.

The results of this study are similar to the study of Mataihu, et al (2015) done at Tilango Health Center of Gorontalo Regency that there is correlation between the nutritional status of pregnant mother and birth weight in a review from the women's upper arm circumference. In line with the Mutalazimah's study (2005) in DR. Moewardi Surakarta hospital, there is a relationship between UAC and HB levels to birth weight shown through a test of product moment with a p value of 0.029 and 0.001. In accordance with Siagian's study (2010) at Sigumpar Health Center of Toba Samosir Regency of North Sumatra province, there is a significant correlation between the upper arm circumference and the birth weight indicated by Pearson's correlation test with an r of 0.653 and a p of 0.01 (Siagian, 2010).

Based on the results of statistical analysis of the two variables, the upper arm circumference of pregnant women greatly affects the completion of fetal development in the womb, but not all pregnant women with UAC <23.5 cm always give birth to low birth weight (LBW) infants, because many factors affect it. UAC can be used for screening needed in identifying pregnant women whose nutritional status is poor and in obtaining supplemental feeding or requiring counseling, medication, or other things during their pregnancy period.

## CONCLUSION

1. Of 69 women, 58 (84,06%) presented UAC  $\geq$  23.5 cm and 11 (15,94%) presented UAC <23.5 cm.
2. Most respondents (56 women/81.16%) gave birth to infants with birth weight

of  $\geq$  2500 gram and 13 (18.84%) gave birth to infants with birth weight of < 2500 gram.

3. The result of Chi-square test with 95% confidence level ( $\alpha = 0,05$ ) obtained a p-value of 0,000, meaning fewer than  $\alpha$  or there was a relationship between the upper arm circumferences of the third trimester pregnant women and birth weight.

## SUGGESTIONS

1. Health workers are expected to provide continuous counseling about the fulfillment of nutrition from pregnancy to childbirth for the sake of maternal and infant health.
2. Pregnant women should meet the nutritional needs for them and their fetus and can apply their knowledge and experience obtained.
3. Further study is expected to develop this study related to maternal and infant health.

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