INVESTIGATING PRENATAL PRACTICES FOR ANTHROPOMETRIC MEASUREMENTS AND BODY WEIGHT OF NEONATES IN THE SPECIAL GEOGRAPHIC AREA

Dulia D. Sultan[1]

[1] *Barangay Chairman, Nunguan, Pikit, Cotabato, Philippines*

ABSTRACT

The study on investigating mothers' prenatal practices on anthropometric measurements and body weight of neonates in SGA, BARMM was undertaken by the researcher to have a reliable glimpse of the nutritional status of newborn children using only their anthropometric measurements as indicators.

Study 1 focused on the socio-demographic characteristics, prenatal practices of mothers and its relationship with anthropometric measurements of neonates. The results indicated a positive significant relationship between the frequencies of prenatal consultations of mothers on the anthropometric measurements of neonates. Head, chest, and mid upper arm circumference as well as foot length were also found to have significant relationship with body weight of the neonates.

Study 2 dealt with the qualitative research on navigating the prenatal practices of mothers. Study 3 was all about some open-ended questions on the major issues and concerns affecting neonatal care in the study area (SGA, BARMM).

The prenatal practices were correlated with body weight, head circumference, and mid-upper arm circumference. These were found to have very strong relationship with body weight.

Based on the findings of this study, pregnant mothers undergo prenatal consultations accordingly with health workers. The more frequent the pregnant women had consultations with health workers; the better was for the neonates. When expectant mothers observe regular prenatal consultations, the more their neonates obtain healthier status as per result of anthropometric measurement.

Keyword: - *Prenatal practices, neonates, body weight, and anthropometric.*

1. INTRODUCTION

In the Philippines, traditional maternal care practices are still dominant in contemporary Filipino culture (Palispis, 2012), which may influence the quality of prenatal and neonatal healthcare. However, Bergerat et al. (2021) emphasized proper practices of pregnant women for every child to have a healthy start in life. Likewise, every expectant mother must access quality healthcare during pregnancy and childbirth. Thereby, anthropometric measurements can help identify inadequate growth patterns that warrant further evaluation.

The World Health Organization (2014) reported that more than 800 women die every day from complications in pregnancy and childbirth. The majority of these deaths could be prevented given the right resources and care. Most of these deaths are particularly high in rural areas due to the difficulty of reaching prenatal centers.

Although, prenatal care is performed by health professionals. some pregnant women still go to traditional birth attendants for their prenatal care. As NDHS (2008) reported that about 39% of women who had live births in the five years preceding the survey visited a doctor for their prenatal care, 52% visited either a nurse or a midwife while 4% went to a traditional birth attendant (NSO and Macro International, 2010).

One of the bases of this study is the report of WHO Philippines (2015) that Filipino women incur the highest health risks during pregnancy of those who are less than 18 years old and more than 35 years old, who were unattended by health workers before, during, and after delivering birth. Hence, improving the well-being of mothers,

infants, and children is an important public health goal, especially for third-world countries like the Philippines. Their well-being determines the health of the next generation and can impact future public health challenges for families, communities, and the healthcare system.

Thus, anthropometric measurements are used for the assessment of the influence of a mother's prenatal practices on the health status of newborns (WHO, 2015) and further find out the use of anthropometric measurements, since this system of measurement has not been known by mothers, this evaluation was conducted due to a lack of research locally conducted that includes information dissemination, which appears as a research gap. Hence, a study was directed.

This study attempted to popularize the use of anthropometric measurements in the Special Geographic Area of BARMM as one of the tools for assessing the health condition of newborn babies. When implemented in full scale, this tool will help improve the child's health care system in this municipality. This explains why this study is urgently necessary and important.

2. METHODOLOGY

This study used a mixed method specifically with concurrent qualitative design since both quantitative and qualitative data are collected in a single phase. Because the general aim of this approach is to better understand or obtain more developed understanding of the phenomenon under study, the data were collected from the same participants or similar target populations. As defined by Creswell and Clark (2011), it includes at least one quantitative and one qualitative strand. A strand is a component study that encompasses the basic process of conducting, and analyzing data and interpreting the results.

This study was conducted in the SGA newly created municipalities of BARMM such as Tugunan, Malidegao, Ligawasan, Kapalawan, Kaabacan, Kadayangan, Nabalawag, and Pahamudin. The **Special Geographic Area** (**SGA**) is a loose collection of 63 *barangays* in six *municipalities* of the province of *Cotabato* in the *Philippines*. It is part of the *Bangsamoro Autonomous Region in Muslim Mindanao*, despite the province of Cotabato itself being part of a separate neighboring region, *Soccsksargen*. These barangays were partitioned from Soccsksargen following *a two-part plebiscite held in January and February 2019* that formed Bangsamoro after the residents of said barangays consented to their localities' inclusion in the new autonomous region. The municipalities these barangays are a part of, as well as the barangays themselves, remain part of Cotabato. These barangays could be reorganized into one or more new municipalities or merged with any of the neighboring municipalities in *Maguindanao del Norte* and *Maguindanao del Sur*, which are part of Bangsamoro.

The Bangsamoro regional government started effective governance over these barangays since the official turnover of these localities to the region by the Cotabato provincial government on November 20, 2019. Some of these barangays are *exclaves*, which means they are entirely surrounded by localities that are not part of Bangsamoro

The respondents of this study were 165 mothers with neonates born during the conduct of the study in the SGA BARMM newly created municipalities.

The sampling procedure used in this study was the quota sampling procedure. In this method the researcher selected participants based on specific characteristics, ensuring they represent certain attributes in proportion to their prevalence in the population. As mentioned above, the study shall consider all neonates born within the duration of this study, but only those coming from the 8 newly created municipality of SGA, BARMM were considered as respondents.

A prepared survey questionnaire was employed and filled up by the trained enumerators. This involved filling up of data on the space provided in the survey questionnaire. The data come from anthropometric measurements of the neonates in terms of their body weight, head circumference, chest circumference, mid-upper arm circumference, and foot length.

The data gathered were tallied and analyzed using descriptive and inferential statistics. Descriptive statistics were used to determine the frequency analysis and mean including the respondents' sex and origin by barangay. Inferential statistics, which is mainly correlation analysis, was used to determine the degree or strength of the relationship between two variables.

3. RESULTS AND DISCUSSION

Age, Weight, and Household Income

The respondent mothers were relatively young with a mean age of 27 years old. They have a mean weight of 53.8 kg. with P6,473.00 average household income. Table 4 below shows the distribution of the respondents by age, weight, and income (monthly).

Table 4. Socio-demographic profiles of the respondent mothers

Mean Age	Mean Weight	Mean HH Income / Month
27 year old	53.8 kgs	6,473.00

Anthropometric Measurements

The anthropometric measurements of the neonates are shown (Table 5). The mean head circumference is about 34.26cm, chest circumference is 33.97cm; mid-upper arm circumference is 12.35cm; foot length is 52.20cm; and body weight is 3.54kg.

A baby's birth weight is an important indicator of health. The average weight for full-term babies born between 37 and 41 weeks gestation is about 7 lbs. or 3.2kg. in general, small babies and very large babies are more likely to have problems. Newborn babies may lose as much as 10% of their birth weight. In related studies, the Office of Disease Prevention and Health Promotion (https://health.gov.healthy people about work groups) found that babies weighing 7 pounds 3 ounces at birth might lose as much as 10 ounces in the first few days.

In a study commissioned by the United States Agency for International Development (USAID) (www.scielo.org.za), the standard MUAC-weight ratio was established in children such as the following:

Table 5. Standard MUAC-weight ratio

BMI Category	BMI (kg/sq.m.)	MUAC Cut-Off (cm.)
Underweight	<18.5	22.80 (22.28 – 23.31)
Ideal weight	18.6 – 24.9	21.8 (24.15 – 25.28)
Overweight	25.0 – 29.9	27.10 (26.87 – 27.51)
Obese	30.0 – 39.9	30.57 (30.27 – 30.86)
Morbidly Obese	>40.0	37.32 (36.74 – 37.90)

Head circumference is the distance around the baby's head. The average newborn's head measures 13 and 3/4 inches (35 cm). As established in a study conducted (www.stanfordchildrens.org), a newborn's head size is about half the baby's body length in cm Plus 10 cm.

Table 6. Mean Anthropometric measurements of the 300 neonates

Descriptive Statistics						
	N	Minimum	Maximum	Mean	Std. Deviation	Variance
Head Circumference	300	28.00	63.00	**34.2153cm**	5.88087	34.585
Chest Circumference	300	28.00	78.00	**33.9713cm**	8.36701	70.007
Mid-upper Arm Circumference	300	9.00	106.00	**12.3480cm**	7.87542	62.022
Foot Length	300	41.00	66.00	**52.2027cm**	5.88668	34.653
Body Weight	300	2.20	25.70	**3.5420kg**	2.22777	4.963
Valid N (listwise)	300					

Relationship of Frequency of Consultation and Anthropometric Measurements

Table 7 below shows the relationship between the frequency of mother consultations with health workers and anthropometric measurements of the neonates. The data shows that there is a significant relationship between all variables which implies that the more prenatal consultation pregnant women do, the better the health of the neonates.

The correlation coefficient ranges from 0.210 to 0.346 which is interpreted as a weak linear relationship. In a study conducted by the National Institute of Health (https://www.ncbi.nlm.nih.gov. articles.PMC5401464), it was determined that chest circumference was superior in predicting the risk of infant death within the first month and year of life.

Table 7. Relationship between frequency of prenatal consultation of mother, Anthropometric Weights, and body weight of neonates

		Body Weight	Head Circumference	Chest Circumference	Mid-upper Arm Circumference	Foot Length
Frequency of Consultation	Pearson Correlation	**.346****	**.345****	**.338****	**.210****	**.241****
	Sig. (2-tailed)	.000	.000	.000	.010	.003
	N	300	300	300	300	300

Relationship between Anthropometric Measurements and Body Weight

The correlation matrix presented in Table 8 discloses the data of the anthropometric measurements and body weight of neonates in SGA, BARMM. The statistical analysis reported a highly significant relationship between anthropometric measurements and body weight. However, the degree of relationship indicates a weak to very strong linear relationship (r= 0.321 to 0.869) as illustrated in the book of Corpuz (2021). This finding explains that as the anthropometric measurements such as head, chest, mid-upper arm circumference, and foot length increase in size/length, the body weight of the neonates will also increase.

A study (www.currentpediatrics.com>articles) was done to find the correlation between a newborn's foot length (FL) and other anthropometric variables such as birth weight (BW), gestational age (GA), head circumference (HC), chest circumference (CC), and length to determine the utility of using the newborn's FL as screening tool to identify newborn babies with low birth weight (LBW) and preterm babies (premature).

In this study, it was observed that a significant positive correlation between FL and other anthropometric variables of the study population was strong confirming the findings of this particular study.

Table 8. Relationship between Anthropometric Measurement and body weight of neonates

		Body Weight
Head Circumference	Pearson Correlation	**0.392****
	Sig. (2-tailed)	0.000
	N	300
Chest Circumference	Pearson Correlation	**0.392****
	Sig. (2-tailed)	0.000
	N	300
Mid-upper Arm Circumference	Pearson Correlation	**0.869****
	Sig. (2-tailed)	0.000
	N	300
Foot Length	Pearson Correlation	**0.321****
	Sig. (2-tailed)	0.000
	N	300

** Correlation is significant at the 0.05 level (2-tailed)

Head circumference and body weight

The result showed that the correlation coefficient between head circumference and body weight is 0.392 which is highly significant. However, the linear relationship is interpreted as weak. The head circumference of a neonate is one of the valid indicators for assessing the nutritional status of newborn babies.

Chest Circumference and Body Weight

The result showed that the correlation coefficient is 0.392 which is positively significant (prob=0.000). However, this correlation coefficient is interpreted weak relationship between the chest circumference and body weight of the neonates. This manifests that the chest circumference can also be a valid indicator for assessing the nutritional status of the neonates.

Mid-Upper Arm Circumference and Body Weight

The result showed that the correlation coefficient is 0.869 which is highly significant. The relationship between mid-upper arm circumference and body weight of the neonates is very strong as indicated. It implied that the mid-upper arm circumference of neonates in SGA BARMM can be effectively used as a predictor for body weight to determine whether or not the neonate is malnourished, undernourished, or well-nourished.

Foot Length and Body Weight

The result shows that the correlation coefficient of 0.321 is highly significant but the degree is a weak linear relationship between foot length and body weight of the neonates. This implied that foot length can also be a reliable indicator for assessing the nutritional status of the neonates in the SGA, BARMM.

Influence of Mothers' Prenatal Consultation on Body Weight of Neonates

Prenatal consultation of mothers with the medical staff/personnel is found to have a highly significant influence on the anthropometric measurement of neonates as shown in Table 8. This implies that prenatal consultation is the best predictor of anthropometric characteristics of neonates that need to be done to promote sound and healthy newborn babies upon delivery.

Table 8. Influence on the anthropometric measurements of neonates

Mother	Neonates				
	Body Weight	Head Circumference	Chest Circumference	Mid-upper Arm Circumference	Foot Length
Prenatal Consultation	**4.486****	**4.469****	**4.365****	**2.618***	**3.018****
R^2	0.120	0.119	0.114	0.044	0.058
F	**20.120****	**19.976****	**19.054****	**6.853****	**9.107****
Prob	0.000	0.000	0.000	0.010	0.003

** Highly Significant

Influence of Anthropometric Measurements on Body Weight of Neonates

The result of the analysis reported that chest circumference had no significant influence on the body weight of neonates. Other anthropometric measurements such as head circumference, mid-upper arm circumference, and foot length have a highly significant influence on the body weight of neonates. This implies that the three anthropometric measurements are the best predictors of body weight in neonates.

The coefficient of determination R^2 is very strong which is highly significant (F=578.02; prob = 0.000) indicating that about 94.1% of the variations of the body weight are due to head circumference, mid-upper arm circumference, and foot length of neonates.

Table 9. Influence of the Anthropometric Measurements on Body Weight of Neonates

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-4.977	.665		-7.484	.000
	Head Circumference	.077	.024	.171	**3.184****	.002
	Chest Circumference	.027	.018	.087	1.512	.133
	Mid-upper Arm Circumference	.237	.005	.907	**44.762****	.000
	Foot Length	.038	.012	.078	**3.214****	.002

R^2 = 0.941
F = 578.020**
Prob = 0.000

Major Issues and Problems

The issues and challenges identified by the respondents with the help of health workers are listed in Table 11 below. They are ranked based on the frequency of the answers. The corresponding recommendations were listed opposite each issue and problem.

Among the most prevalent problems were sepsis control and neonatal tetanus, hence, this is ranked number 1. The respondents (health workers) recommended comprehensive health education during prenatal check-ups of pregnant mothers.

This was followed in descending order by metabolic disorder, incomplete immunization, lack of TD vaccine supplies, diaper rash, and the lowest was that some parents still had so much distrust about immunization. In this case, the health workers recommended that the religious sector should be involved in actively advocating for immunization, especially among Bangsamoro mothers.

Challenges in the Implementation of Neonatal Care in Pikit, Cotabato

The number one challenge in the implementation of neonatal care in the LGU of Pikit has been an institutional problem. The municipal birthing center is located in Barangay Fort Pikit which is now under the Special Geographic Area (SGA), BARMM since February 2021.

Up until now, the birthing center cannot operate because of the issue of who will issue or approve its application for renewal of permit to operate. Is it DOH 12 or the Ministry of Health, BARMM? This was not resolved to-date. As a consequence, the parturients from Pikit have to travel to the Provincial Hospital in Amas, Kidapawan City where they deliver birth.

The next challenge is the prevalence of neonatal health problems such as sepsis, neonatal tetanus, metabolic disorder, incomplete immunization, and diaper rash. Although this is not alarming but, still, a cause for concern. Anything that affects neonates shall have to be addressed by the LGU considering their target in the municipal development plan under the health sector is to significantly reduce neonatal health problems by year 2025.

Lack of tetanus diphtheria vaccines were also noted. This came out in our focused group discussion with some municipal health workers of Pikit.

Lastly, the researcher asked the health workers if they have encountered parents who do not allow their children to be vaccinated. One of the interviewees responded that, so far, she met only two family heads who are still very reluctant to have their children vaccinated.

Table 9 Challenges in the implementation of neonatal care in Pikit

Themes	Frequency	Core Ideas
Issuance/approval of permit for the municipal birthing center	General	Institutional problem
Prevalence of neonatal health problems (Sepsis, neonatal tetanus, metabolic disorder, incomplete immunization, diaper rash)	Typical	Health education on the part of the parents
Lack of TD vaccine supplies	Variant	Insufficient funds
Parents' refusal to avail of immunization	Variant	Attitudinal/Cultural

Legend: General = 50% or more
Typical = 26% – 49%
Variant = 25% and below

Addressing the Challenges Encountered in Implementing the Neonatal Care Program

As regards the institutional problem, the interviewees suggested that the local chief executive should make strong representation with the Chief Minister of the BARMM to address the issue of conflicting idea on who should grant renewal permit for the Municipal Birthing Facility in Pikit, Cotabato. "The municipal birthing facility is a waste of money if it cannot operate according to how it was intended to be", quipped one of the interviewees.

On the occurrence of some neonatal health problems like sepsis, neonatal tetanus, incomplete immunization, diaper rash, the interviewees suggested that a comprehensive training for mothers should be conducted from time to time so that they are fully aware of the importance of the neonates hygiene as an effective deterrent against most of these neonatal health problems.

Lack of TD vaccines may be addressed if the different barangays shall contribute funds to augment the municipal funds intended for this purpose.

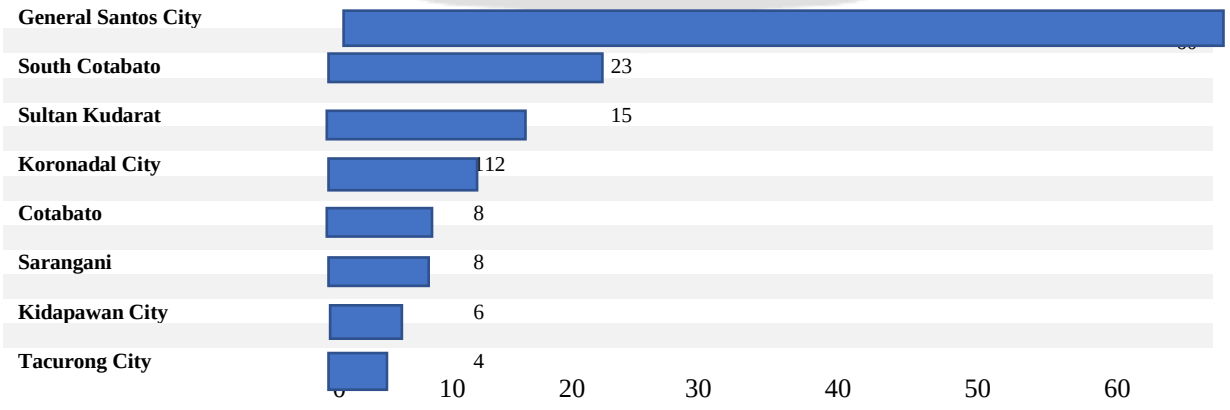
As to parents' refusal to avail of vaccines, these are only very few. The researcher suggested focused targeting in poor communities so that they can be taught the proper way of handling neonatal health and nutritional requirements.

Incidence of Malnutrition at the Regional and Provincial Level

Figure 2 below shows the number of deaths caused by malnutrition in Region XII in 2023, by location.

Among the four provinces and four cities in Region XII, the City of General Santos posted the highest number of deaths caused by malnutrition. Out of a total of 136 deaths due to malnutrition in 2023, sixty (60) or 44.12% is from General Santos City. The City of Tacurong had the lowest number of deaths at 4.

Figure 2 The Bar graph showing the number of deaths caused by malnutrition in Region XII in 2023, by location.



Data provided by the Department of Health in Region XII based on the Operation Plus Timbang (OPT) of the Food and Nutrition Research Institute (FNRI) showed that the province of Sultan Kudarat had the highest number of underweight at 6.07% followed by Sarangani at 5.15%.

Among the 50 LGUs in the Region, the top 3 with the highest prevalence of underweight are the municipalities of Kabacan (10.50%), Banisilan (10.18%) and Libungan (10%).

For stunting, the top 3 LGUs with the highest prevalence rates are the municipalities of Tiboli (26.90%), Magpet (23.27%), and Kiamba (22.54%).

The top 3 LGUs with the highest prevalence rates of wasting are Libungan (10.63%), Maasim (9.20%), and Banisilan (8.35%).

Among the reasons cited for high incidence of malnutrition, the top 2 are: extreme poverty and lack of basic health education of the parents.

For the record, the National Nutrition Survey cited the Bangsamoro Region as having the highest prevalence of stunting in the country at 45.2%.

4. CONCLUSIONS

Based on the findings of this study, the following conclusions were drawn:

The pregnant mothers' frequency of consultations with health workers is strongly related to the anthropometric measurements of the neonates. The more frequently the pregnant women consulted with health workers, the better was it for the neonates.

The head circumference of the neonates has a strong correlation with their body weights. This can be used as a valid indicator of the nutritional status of the neonates.

The chest circumference of the neonates had a weak correlation with their body weights. As far as neonates in SGA, BARMM is concerned, this alone cannot be a reliable indicator for the nutritional status of the neonates.

The mid-upper arm circumference of the neonates had a very strong correlation with their body weights. Just like head circumference, this is a very reliable indicator for assessing the nutritional status of neonates.

The foot length of the neonates has a weak correlation with their body weights. This, alone, cannot be a valid indicator for assessing the nutritional status of the neonates.

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