Child Feeding Practices, Maternal Health and the Nutritional Status of Children Among Polygynous Families of the Matigsalug-Manobo in Southern Philippines

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Abstract

The study determined the child feeding practices and maternal health in relation to the nutritional status of children among polygynous families of Matigsalug Manobos in Sinuda, Kitaotao, Bukidnon. The respondents of the study were children aged two to eighteen years old and mothers aged fifteen to sixty years old. To assess the nutritional status of the respondents, the Body Mass Index (BMI) was used as a tool. Contrary to predictions, the study proved no significant association between maternal health and children's nutritional status. However, the type of food and frequency of feeding was positively associated with children's nutritional status with the type of food having the strongest significance.

Keywords: Maternal Health, Child Feeding, Nutritional Status, Polygnous, Matigsalug Manobos

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Introduction

A large number of children in polygynous families, the possibility of insufficiency of food, lack of access to health services, sanitary conditions and education could affect the maternal health and child feeding practices and would eventually affect child health as well.

The study conducted by Rahman and Chowdhury (2007) substantiated the strong association of maternal nutritional status as an proximate determinant of a child's nutritional status. Further studies by Bailey and Ferro-Luzzi (1995) concluded that parents sacrificed their own feeding times during serious food shortage compromising their ability to function because of malnutrition. Ruel and Menon (2002) suggested that better feeding practices were strongly and significantly associated with child nutrition while Senarath et al. (2012) pointed out that inappropriate complementary feeding practices is due to the lack of maternal education, media, and lack of contacts with health workers.

However, De la Croix and Mariani (2012) pointed out that economic motives encouraged the most powerful and wealthy men to have as many wives as possible to enjoy reproductive success. This is true to some indigenous peoples in the Philippines where the practice of polygyny (the marriage of a man to two or more women at a given time) is believed to amplify their dignity, honor, and prestige in their community.

Study Problem and Hypotheses

The studies mentioned above contributed to the understanding of the association between maternal health, food types, number of feeding and children's nutritional status. The purpose of the current study was to examine the three variables as predictors of children's nutritional status.

Specifically, it was hypothesized that there would be a significant positive association between maternal health, type of food, frequency of feeding and children's health. Previous research such as Ruel and Menon's (2002), suggests that, perhaps, better feeding practices were strongly and significantly associated with child nutrition. Moreover, the research conducted by Agarwal and Udipi (1989) suggests that feeding practices during childhood are of critical importance to the growth and development of children, especially during the preschool years while Rahman and Chowdhury (2007) substantiated the strong association of

maternal nutritional status as a proximate determinant of a child's nutritional status. It is for this reason that the authors also hypothesized that the type of food, frequency of feeding, as well as maternal health would make a significant contribution to child malnutrition.

This study is limited to the determination of child feeding practices and maternal health in relation to children's nutritional status in polygynous families among the Matigsalug Manobo in Sinuda, Kitaotao, Bukidnon. In this study, maternal health refers to the nutritional status of mothers which was determined by computing their Body Mass Index (BMI). Child feeding practices were expressed through the amount and type of food being fed the children as well as the frequency of their feeding. Only children aged 2-18 are included as respondents in the study. Determining the correlation between the socio-economic status and child feeding practices is also a limitation of the study.

Materials and Methods

Procedure

The study was presented at the Barangay Hall of Sinuda, Kitaotao, Bukidnon and at the Federation of Matigsalug-Manobo Tribal Council Office, to get the prior consent from both offices. The *Panuvad* (prayer ritual) was held first before the meeting was done. Participants were recruited from the polygynous families of the Matigsalug Manobo selected through non-random methods and purposive sampling. Consent for participation in the study was obtained from mothers of every polygynous household and tribal elders were chosen to confirm and affirm the information gained from the respondents. Upon the conduct of the study, the demographic profile of the respondents was noted through the use of the survey questionnaires while anthropometric measurements such as weight and height were recorded and served as the basis for computing the BMI of the respondents.

Participants

The data were collected from children aged 2-18, that included toddlers (2-3), pre-school children (4-6), children of school age (6-13) and teenagers (14-18). On the average, participants were 10.73 years old. Approximately half of the samples was female (47%) and half was male (53%). Seven percent (7%) of the children respondents were toddlers, 15% were preschoolers, 53% are children of school age, and 25% are teenagers.

Data were also collected from mothers aged 15-60 years old. On the average, participants were 42.03 years old. Approximately 58% were are middle adults, 39% were young adults and 3% were adolescents.

For the purposes of the current study, the type of food being fed to the children were divided into three (3) classifications where (1) three basic food groups (carbohydrate-rich, protein-rich and vitamin-rich) foods are present in the child's diet, (2) only two food groups are present in the diet and (3) only one food group is present in the diet.

Measures

The Body Mass Index (BMI) expressed as the weight (kg)/ height (m²) was used to assess the nutritional status of the mothers. For assessing the mother's BMI, the International Classification of Adult Underweight, Overweight and Obesity were used as the scale. The classification of the nutritional status of an individual was based on the principal cut-off points. An individual is said to be underweight if his/her BMI is (<18.50); severely thin (<16.00); moderately thin (16.00-16.99), mildly thin (17.00-18.49); normal range (18.50-24.99); overweight (≥ 25.00); pre-obese (25.00-29.99); obese (≥ 30.00); obese class I (30.00-34.99); obese class II (35.00-39.99) and lastly, obese class III (≥ 40.00).

BMI is used differently for children. It was calculated the same way as for adults, but by the use of the BMI percentile, children, of the same and age were compared. A BMI that is less than the 85th percentile is considered underweight and above the 95th percentile is considered obese for people 20 and under. A BMI between the 85th and 95th percentiles are considered to be overweight for people under 20.

A descriptive analysis was conducted to make sure that all values were in range and to describe central tendencies and variance of the measures. The descriptive statistics such as mean, percentage and frequency counts were used to describe the characteristics of the mothers and children of polygynous families of the Matigsalug Manobo. To determine the relationship that exists between the mother's nutritional status and child feeding practices and children's nutritional status, the Pearson Product Moment Correlation (r) was used. Multiple Enter Regression analysis was employed in determining the best prediction factors that affect the relationship between the variables.

Results and Discussion

Table 1 shows the profile of the mothers of polygynous families among the Matigsalug-Manobo and these include: age, sex, educational attainment, income and number of children per family.

The age of the majority of the mother respondents ranges from 15 years to 60 years with a mean age of 42.03 years. Fifty-eight percent (58%) of the respondents are considered as middle adults, thirty-nine percent (39%) young adults while the remaining three percent (3%) are adolescents.

As to the educational attainment of the respondents, hundred percent (100%) of them have no formal education. The income of the families ranges from more or less three thousand pesos (Php 3,000). Mother respondents are working as farmers and at the same time as housewives. The overall income of the family is divided among the wives of the husband.

Table 1. Demographic profile of mothers of polygynous families

CHARACTERISTICS	FREQUENCY N=38	PERCENTAGE %
Age		
13-18 (Adolescents)	1	3
65-74 (Young Adults)	15	39
40-64 (Middle Adults)	22	58
Total	38	100
Sex		
Male	0	0
Female	38	100
Total	38	100
Educational Attainment		
None	38	100
Elementary Undergraduate	0	0
Elementary Graduate	0	0
High School Undergraduate	0	0
High Shool Graduate	0	0
College Graduate	0	0
College Graduate	0	0
Total	38	100
Income		
16,000 – above	0	0
12,000 – 15,000	0	0
8,000 – 11,000	0	0
4,000 – 7,000	0	0
3,000 – below	38	100
Total	38	100
Number of Children in the Family		
Anlaon	10	7
Antogon	16	10
Ayubat	18	12
Ayubat	7	5
Cabantao	5	3
Calimpit	9	6
Deyaw	13	8
Dumactal	43	28
Empoloc	2	1
Lacaran	2	1
Mandanuay	5	3
Sakalang	7	5
Talon	13	8
Uban	5	3
Total	155	100

About twenty-eight percent (28%) of the total number of children respondents in the study are from Dumactal family having forty-three (43) children. This was then followed by the Ayubat family with eighteen (18) children consisting twelve percent (12%) of the total population, the Antogon family with sixteen (16) children consisting ten percent (10%) of the total population, Deyaw and Talon family both consisting eight percent (8%) of the total population with thirteen (13) children for each of the families, Anlaon family having ten (10) children which consists seven percent (7%) of the total population sample Calimpit family with nine (9) children; six percent (6%), Ayubat and Sakalang family with seven (7) children; five percent (5%) of the total population size, Uban, Cabantao and Mandanuay family with five (5) children; three percent (3%), and the least was the Empoloc and Lacaran family with two (2) children only consisting one percent (1%) of the total population.

Presented in Table 2 is the demographic profile of the children in polygynous families of the Matigsalug-Manobo. It reveals that out of ninety-two (92) children coming from polygynous families of Matigsalug Manobo Tribe; only sixty (60) has the available height and weight for the Body Mass Index Computation. In general, children included in the data gathering were aged 2 years to 18 years with a mean age of 10.73 years. Seven percent (7%) of the respondents are toddlers while fifteen percent (15%) of the respondents are preschoolers, fifty-three percent (53%) are children of school age while twenty-five percent (25%) are teenagers. Among the respondents, fifty-three percent (53%) were males while forty-seven percent (47%) were females.

Table 2. Demographic profile of children

CHARACTERISTICS	FREQUENCY N=60	PERCENTAGE %
Age		
2-3	4	7
4-6	9	15
7-13	32	53
14-18	15	25
Total	60	100
Gender		
Male	32	53
Female	28	47
Total	60	100

Table 3 presents the type of food being fed to the children respondents in the study. As shown in the table, the type of food are divided into 3 classifications where (1) three basic food groups (Go, Grow and Glow) are present in the child's diet, (2) only two food groups are present in the diet and (3) only one food group is present in the diet.

Results revealed that forty seven percent (46.7%) of the children are being fed with food from the two basic food groups. On the other hand, forty three percent (43%) are being fed with food from the three basic food groups and the least percentage (10%) of respondents are being fed with food from one basic food group only.

Most of the children are being fed with food from the two basic food groups only due to the low socio-economic status of their families. Only available vegetation and hunted animals are readily eaten by the children and because of scarcity of food, nutrient intake of the children are also being limited, thus making them underweight and malnourished.

These findings corroborate the study conducted by Matheson (2002) which states that the lower BMIs in the food-insecure children may have been due to short-term, yet periodic food restrictions. Moreover, it was clearly stated by Monterrubio et al. (1999) in a probabilistic survey conducted in Mexico that

indigenous children have higher probabilities of stunting and become underweight than non-indigenous children. The differences are larger in urban areas and in higher socioe-conomic geographic regions and are explained mostly by socioe-conomic factors.

Table 3. Type of food

FOOD GROUP	NUMBER OF RESPONDENTS	PERCENTAGE
3 Basic Food Groups (Go, Grow & Glow)	26	43.3%
2 Basic Food Groups	28	46.7%
1 Food Group Only	6	10%
TOTAL	60	100%

Table 4 presents the frequency of feeding by the respondents. As shown, fifty eight percent (58%) of the respondents are being fed three times a day while a total of forty two percent (42%) are being fed twice a day.

Table 4. Frequency of feeding

FREQUENCY OF FEEDING	NUMBER OF RESPONDENTS	PERCENTAGE
3 times or more a day	0	0
3 times a day	35	58%
Twice a day	25	42%
Once a day	0	0
None at all	0	0
TOTAL	60	100%

Common methods of food preparation in the group include *sugba* (grill), *sabaw* (soup), and *lung-ag* (boiled). Frying is not commonly used a as a method of food preparation in the group since cooking oil is expensive.

Infants are normally being fed breastmilk. Children aged five to seven months are usually fed with squash, rice/corn starch "tiktik", sweet potatoes and "balanghoy". Children aged one (1) year old to five (5) are being fed milk, "tiktik", and vegetables.

Food sources in the area usually come from the natural resources and vegetation. The Matigsalug make their coffee out of ground toasted corn or rice. Sugar, on the other hand, is taken from the extracts of sugar cane. Vegetables used for cooking include "Muti" (saluyot leaves), Chayote leaves, and wild alugbati.

Fruits are eaten usually once a day. Fruits available in the area include banana, "Panuen" or Tagbak, Santol, Guava, and "Sampinit" or wild strawberry.

Sources of protein include "Limocon"/"Tukmo" (Dove), "Baboy Damo" (Wild Pig), "Usa" (Deer), Tarsier, Milo (Civet Cat), "Unggoy" (Monkey), "Manok" (Chicken), "Kalasanon" (Rooster), Monggos, white beans, red bean, Kentucky beans, string beans, okra, wild talong/ "peliya" (wild eggplant), chayote, and mani (peanuts). Spices found in the area include luy-a (ginger), tanglad (lemon grass) and bawang (onion).

Canned goods were also eaten in the area such as "Tinapa" (Sardines) and noodles but this happens only once a month or once a year.

There were thirty-eight (38) mother respondents in the study. Out of the thirty-eight respondents, only twenty-seven (27) were taken with the weight and height data needed for the BMI calculations since other respondents were not around during the data gathering. Table 5 shows the BMI of mother respondents where seven percent (7%) are severely thin, fifteen percent (15%) are mildly thin, while seventy-eight percent (78%) are in the normal range.

The health status of the respondents was assessed by computing their Ideal Body Weight (defined as the weight in kilograms divided by the square of the height in meters). Results showed that twenty-one(21) women respondents have normal BMI ranging from (18.50 – 24.99). Four (4) are mildly thin (17.00-18.49); and two (2) are severely thin (<16.00). In general, out of twenty seven (27) women respondents, six (6) are underweight and twenty-one (21) of normal weight.

Table 5. Body Mass Index of mothers

CLASSIFICATION	PRINCIPAL CUT-OFF POINTS	FREQUENCY	PERCENTAGE
Underweight	<18.50		
Severe thinness	<16.00	2	7
Moderate thinness	16.00-16.99		
Mild thinness	17.00-18.49	4	15
Normal Range	18.50-24.99	21	78
Overweight	≥ 25.00		
Pre-Obese	25.00-29.99		
Obese	≥30.00		
Obese Class I	30.00-34.99		
Obese Class II	35.00-39.99		
Obese Class III	≥ 40.00		
TOTAL		27	100

Table 6 reveals that out of ninety-two (92) children coming from polygynous families of the Matigsalug Manobo, only sixty (60) has the available data for the BMI calculation. Children included in the data gathering were from age 2-18. Results revealed that seventy three percent (73%) of the respondents are underweight, two percent 2% are of normal weight while thirteen percent 13% are overweight and twelve percent 12% are obese.

Majority of the children respondents are malnourished which is due to the very fact that they only have limited food intake which means that they lack the essential vitamins and minerals that their bodies require. However, there were a number of children who belonged to the obese and overweight classifications which further explains that cases like overeating by the children are also evident.

These findings corroborate the study conducted by Monarrez-Espino et al. (2004) which revealed that nutritional underweight and stunting were higher in

rural localities, but overweight was less prevalent in children aged 10-14 years old in Tarahumara.

Foster et al. (2004) also indicated through comparative analyses that high levels of statural growth stunting are common among indigenous populations throughout lowland South America. This problem appears to be largely attributable to poor dietary quality (diets low in key micronutrients) and high disease loads.

Table 6. Body Mass Index of children

BODY MASS INDEX (BMI)	SEX				TO-TAL	PERCEN-TAGE (%)
	MALE	PERCE N-TAGE	FEMALE	PERCEN-TAGE		
Underweight	22	37	22	37	44	73
Normal	1	1	0	0	1	2
Overweight	3	5	5	8	8	13
Obese	6	10	1	2	7	12
TOTAL	53		47		60	100

It has been observed that there were equal percentage distribution for underweight children, while there were more overweight females than males and more obese males than females, but in general, more males were malnourished than female children.

This is in consonance with the study conducted by Gillette-Netting and Perry (2005) which revealed that if gender bias is observed, females were favored. Girls have better physical status than boys in polygynous households, thereby supporting the combined hypothesis and demonstrating gender bias in pre-adolescents. Moreover, Svedberg (2007) also suggested that since female labor participation in the agricultural sector is comparatively high, polygamy, bride-wealth and early marriage of females are predominant customs, and the nutritional and health status of females vis-avis is favorable.

Table 7 reflects the correlation between the children's nutritional status and the variables that may affect thereto.

As shown in Table 7 below, the child feeding practices are expressed in terms of factors (1) Type of Food (TOF) and (2) Frequency of Feeding (FOF). Moreover, it is shown in the table that TOF (r= -.330) is significantly related to children's nutritional status at the 0.01 level. While FOF (r= -.308) is significantly related to children's nutritional status at 0.05 level.

Table 7. *Correlation between child feeding practices and children's nutritional status, age, gender, number of children in the family and maternal health*

FACTORS	COEFFICIENT OF CORRELATION (R)	SIGNIFICANCE SIG. (2-TAILED)	
Type of Food (TOF)	-.330	.010	**
Frequency of Feeding (FOF)	-.308	.017	*
Mother's BMI	-.034	.798	ns
Age	.252	.052	ns
Gender	.040	.759	ns
Number of Children in the Family (NOC)	-.152	.247	ns

ns = not significant at the 0.05 level
* = correlation is significant at the 0.05 level
** = correlation is significant at the 0.01 level

The Mothers' BMI (r = -.034) is not significantly related to the children's nutritional status. Factors, namely, age (r= .252), gender (r= .040), and number of children in the family (NOF) (r= -.152) were also found to be not significant to children's nutritional status.

This finding corroborates the study of Lutterand Rivera (2003) which indicated that dietary quality rather than quantity is the key aspect of complementary food diets that needs to be improved.

The study conducted by Rueland Menon (2002) also revealed that better feeding practices were strongly and significantly associated with child nutrition. This indicates that the quality of food and the frequency of feeding would eventually give a great impact to children's nutritional status. The results also corroborate with the study conducted by Bequet et al. (2005) which stated that adequate feeding practices around the weaning period are crucial to achieving optimal child growth. Findings in the study of Arimond and Ruel (2004) also suggest the same results where there is an association between child dietary diversity and nutritional status that is independent of socio-economic factors,and

that dietary diversity may indeed reflect diet quality. Thus, the null hypothesis that there is no relationship between the child feeding practices and children's nutritional status is rejected.

In Table 8 maternal health is not significantly related to children's nutritional status with an r = -.034 at 0.01 level, which implies that the nutritional status of children aged from 2 to 18 years old is not really dependent on the maternal health of their mothers.

This result contradicts the study of Rahman and Chowdhury (2007) which results indicate that maternal nutritional status is a proximate determinant of a child's nutritional status.

However, the results corroborate to the study conducted by Mathews et al. (1999) which stated that among relatively well nourished women in industrialized countries, maternal nutrition seems to have only a marginal impact on infants which generally means that there is a considerable uncertainty on the effect of maternal nutrition even during pregnancy to the children's nutritional status. If so, children who were independent from their mother's nutrition such as the children respondents aged 2-18 years old may have an independent and varied nutritional status.

Moreover, the study conducted by Tharakan and Suchindran (1999) which used logistic regression analysis to identify the determinants of child malnutrition had found out that biological, social, cultural, economic, and morbidity factors: age, birth-weight, breast-feeding duration, gender of family head, residence, house type, toilet facility, education of mother and father, child caretaker; intake levels of milk and dairy products, staple foods and cereals, and beverages; and incidence of cough and diarrhea were the only strong determinants of malnutrition which excluded mother's nutritional status. Accordingly, the influence of these factors can be used in the development of strategies of intervention for reducing child malnutrition.

Table 8.   *Correlation between child feeding practices and children's nutritional status, age, gender, number of children in the family and maternal health*

FACTORS	COEFFICIENT OF CORRELATION (R)	SIGNIFICANCE SIG. (2-TAILED)	
Type of Food (TOF)	-.330	.010	**
Frequency of Feeding (FOF)	-.308	.017	*
Mother's BMI	-.034	.798	ns
Age	.252	.052	ns
Gender	.040	.759	ns
Number of Children in the Family (NOC)	-.152	.247	ns

ns = not significant at the 0.05 level
* = correlation is significant at the 0.05 level
** = correlation is significant at the 0.01 level

Table 9 shows the multiple regression analysis to determine the factors that best predict the children's nutritional status.

As can be seen from the table, two of the three factors appeared to be the predictors of children's nutritional status. The best predictor is "Type of Food" (TOF) with the beta weight = .283 and is statistically significant ($p<0.01$). This implies that the "Type of Food" predicts the nutritional status of children among the polygynous families of the Matigsalug-Manobo. This finding corroborates with the study of Lutter and Rivera (2003) who also indicated that dietary quality rather that quantity is the key aspect of complementary food diets that needs to be improved. Moreover, the findings of this study supports Ruel and Menon's (2002) study which indicates that better feeding practices were strongly and significantly associated with child nutrition.

Table 9. *Regression analysis showing the factors that affect children's nutritional status*

VARIABLES	UNSTANDARDIZED COEFFICIENT B	STD. ERROR	STD. CO-EFFICIENTS BETA	T-VALUE	SIG.
1 (Constant)	24.110	3.028		7963	000
Mother's Nutritional Status (MNS)	-.053	.563	-.011	-.094	.926
Type of Food (TOF)	-1.384	.621	-.283	-2.230	.030
Frequency of Feeding (FOF)	-1.164	.567	-.260	-2.051	.045

R= .461R²= .212   Adjusted R²= .155

The second predictor is the "Frequency of Feeding" with the beta weight = .260 and is statistically significant (p<0.05). This implies that in addition to the "Type of Food" as one significant factor which contributes to the nutritional status of the respondents, "Frequency of Feeding" is also found as a predictor of children's nutritional status. This result conforms to the studies of Ruel & Menon (2002) which revealed that better feeding practices were strongly and significantly associated with child nutrition.

The strength of the relationship is reflected on the standardized coefficients (Beta) which are confirmed by the t-value and the significance. The larger the standardized coefficient of Beta, the stronger is the effect of the independent variable on the dependent variable, which are the predictors of children's nutritional status.

Through Regression Analysis, the correlation coefficient (r) indicates the total correlation between the combination of all the independent variables (Xi's) and the dependent variable (Y). R^2 is the coefficient of multiple determination which tells that what portions of the total variations in Y is explained by or associated joint with all of the independent variables. The multiple coefficient of determination (R^2) when all two statistically meaningful predictors (type of food and frequency of feeding) are included in the regression equation is .212, indicating that somewhat over 21.2% of the variance in the children's nutritional status is accounted for or influenced by type of food and frequency of feeding. Thus, the null hypothesis which states that "the independent variables do not predict children's nutritional status" is rejected. The equation or model, useful in predicting Y' children's nutritional status would be as follows:

$Y^1 = 24.110 + (-1.384) X1 + (-1.164) X2$
Where: X1 = type of food
      X2 = frequency of feeding

Each of the unstandardized refression coefficients is obtained from B column on Table 9 and the intercept value is (24.110) is the "Constant" in the variable column.

Conclusion

The best predictor for children's nutritional status is type of food and frequency of feeding with the type of food having the strongest significance. Therefore, it is critical to understand that the dietary quality and quantity is substantial to children's health.

On the contrary, the result of the study suggests no significant association between maternal health and children's nutritional status. This implies the nutritional status of indigenous children from polygynous families may not be dependent on the health of the mothers since they are brought up independent due to the large number of siblings and they all have the chance to consume food of their own choice which could have either favorable or detrimental effects to their nutrition.

Recommendations

On the basis of the results of this study, the following are the recommendations:

1. Better feeding practices should be done by the mothers of polygynous families of the Matigsalug-Manobo specifically in terms of the type of food being fed to the children and the frequency of feeding.
2. Regular monitoring of the nutritional status of children may be done as a way of involving the Nutrition office and the Social Welfare and Development office to educate the employees in the health centers.
3. Further research can also be conducted considering other factors which may affect the nutritional status of children such as physical activity, eating practices, etc.

4. A research study may also be conducted comparing the nutritional status of children in polygynous families and the nutritional status of children from non-polygynous families.

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