Original Research Article

PREVALENCE AND DETERMINANTS OF MALNUTRITION IN UNDER FIVE CHILDREN IN EGUME, KOGI STATE, NIGERIA.

Comment [I1]: In SELECTED HEALTH FACILITIES IN EGUME

ABSTRACT

Aims: This study was conducted to determine the prevalence and determinants of malnutrition in under five children in Egume, Dekina LGA, Kogi State.

Study Design: The study design was a retrospective and a cross-sectional descriptive study that assessed the Prevalence and determinants of malnutrition of under-five children in Egume Dekina LGA, Kogi State.

Comment [I2]: Case series/review

Study Area: The study was conducted at General Hospital and St. Luke clinic in Egume, Dekina LGA, Kogi State.

Methodology: The study focused on Mothers and their under five children who were treated as in- or out-patients at the General Hospital and St. luke clinic Egume within the past five years, Interview was conducted with the aid of a validated, questionnaire, after obtaining informed consent from mothers and ethical clearance from the Health Research Ethics Committee, Kogi State Ministry of Health. Data was obtained through reviews of available health records. Anthropometric measurement was carried out following standard procedures.

Comment [I3]: On how and how if it is retrospective or case series/review, else it should be cross-sectional study.

Results: The study showed that 19.3%, 23.4%, 45.4% and 3.7% of the sampled children were mildly undernourished, moderately undernourished, severely undernourished and healthy respectively.

Conclusion: The present study further revealed that a child's age and gender, mother's education and nutrition and other health variables such as clean water and toilet are significant determinants of child malnutrition.

Comment [I4]: What value?

Keywords: Malnutrition, under nutrition, Children, Women, under five, Prevalence.

1. INTRODUCTION

Malnutrition is a condition that results from eating a diet in which one or more nutrients are either not enough or are too much such that the diet causes health problems (1). Not enough nutrient is called under nutrition while too much is called over nutrition. Adequate nutrition is essential in early childhood to ensure healthy growth, proper organ formation and function, a strong immune system, neurological and cognitive development. Economic growth and human development require well-nourished populations who can learn new skills, think critically and contribute to their communities. Child malnutrition impacts cognitive function and contributes to poverty through impeding individuals' ability to lead productive lives. In addition, it is estimated that more than one-third of under-five deaths are attributable to Under nutrition (2, 3).

Children are prone to diseases, infection and malnutrition because their immune system is not fully developed. This phase of life is critical, hence the need for sufficient nutrients that will aid in their growth and development. (4)

According to the Nigeria Demographic and Health Survey (5), the percentage of stunting in Nigerian children under-five years declined from 41% in 2008 to 37% in 2013. However, the percentage of children who are wasted increased from 14% in 2008 to 18% in 2013. Under nutrition is more common in developing countries aside under-five children certain groups have higher rates of under nutrition including women who are pregnant or breast feeding and the elderly under nutrition becomes more common due to physical, psychological and socials factors (6).

For a child to be properly fed, to avoid malnutrition he/she must absorb or consume the right quality and quantity of food in the right number of times a day. Children 6-to-25 months of age should receive foods from the four main food groups which would provide the appropriate nutrients such food include fruits, vegetables, eggs, milk, fish, meat and grams, children should receive solid, semi-solid, or soft foods two – to – four times daily (7).

2. MATERIALS AND METHOD

2.1 Study Design

The study design was a retrospective and a cross-sectional descriptive study that assessed the Prevalence and determinant of malnutrition of under-five children in Egume Dekina LGA, Kogi State.

2.2 Study Area

This study was conducted at General Hospital and St. Luke clinic in Egume, Dekina LGA, Kogi State. Egume, the headquarters of Okura district is an important town in Dekina Local Government area kogi state, Nigeria. Its geographical coordinates are 7° 29' 0" North, 7° 12' 0" East and its original name (with diacritics) is Egume. The town is almost in the centre of Igala land. Egume has only one ward.

2.3 Study Population

Records of under five children who were treated as in-patient and out-patient and discharged in the past five years at the general Hospital Egume, Dekina LGA, Kogi State. Also, mothers with fewer than five children who attend the St. Luke hospital clinic in Egume were randomly selected to participate in the study.

2.4 Inclusion and Exclusion criteria

Eligible mothers of under-five children who are willing to participate and give their consent were included in the study. Unwilling mothers with under-five children and under five mother pair that are sick requiring hospitalization were excluded from the study. Under-five children mother pair on visit were also excluded.

2.5 Sample Size Determination

A minimum sample size was determined using the formula cited by Charan and Biswas (8).

$$N = \frac{Z^2 p q}{d^2}$$

Where:

N = Minimum sample size

Z = Standard deviation at 95% confidence interval = 1.96

p = Anticipated proportion/Prevalence Rate of Malnutrition = %

q = Complementary probability = 1 – p

d = Error margin/tolerance = 5% = 0.05

In Kogi state, a prevalence of 10% was reported in Kogi (9) . Therefore, at 10% prevalence of malnutrition, using 5% precision at 95% confident interval, the minimum sample size N for this study was calculated as 50. Therefore, 50 patients were selected for the study.

Sampling

Comment [I5]: among

Comment [I6]: , including

Comment [I7]: Insert in front in addition

Comment [I8]: Just as earlier stated in abstract section

Comment [I9]: Since the study was in two health facilities, it should rather be in selected or convenient health facilities

Comment [I10]: This is usually not acceptable in research for sake of bias and fault in measurement of variables. Same measures should be applied in all processes of the research processes.

Comment [I11]: delete

Comment [I12]: wrong sample size if calculated from above equation

The sampling method used was a systematic sampling; of the equal – probability modality. This sampling interval was elucidated using the formula:

$$K = \frac{N}{n}$$

Where:

K = sampling interval by which every K^{th} element/subject was selected from the sampling frame.

N = population size of patients = 200

n = sample size = 50 patients

K = 200/50 = 4

Therefore, within 3weeks of the research, every 4^{th} patient will be recruited from the entire sampling frame of 200 patients to comprise the 50 patients as sample size, given the logical homogeneous composition of the population.

Comment [I13]: Not valid since sample size calculated was wrong

2.6 Ethical Clearance and Consent Form

Ethical clearance was obtained from the Health Research Ethics Committee, Kogi State Ministry of Health in accordance with the code of ethics on human experimentation drafted by the World Medical Association in 1964.

Informed consent for inclusion into this study was soughed from the mothers with under five children who attend the St. Luke clinic Egume, Dekina LGA, Kogi State to participate in the study using standard protocol.

Comment [I14]: Check word usage

2.7 Data collection.

The tools used for the data collection include; infantometer, height board, questionnaire, weighing scale, etc**.** Questionnaire was administered to respondent**.** The interview was conducted with validated questionnaire after obtaining informed consent from mothers with children under the age of five years. The questionnaire was pre-tested by administering the questions to a small number of representatives before the survey.

Comment [I15]: From where?

Relevant data on the factors related to malnutrition was obtained with the help of the schedule and review of any available relevant health records. For assessing the nutritional status of the subjects, and anthropometric measurements was carried out following standard operating procedures. The data collected include weight, recumbent length (if the child is not able to stand without support), and height for children above 2 years.

2.8 Anthropometry

2.8.1 Age determination

Age was determined using available records or using local calendars.

2.8.2 Weight determination

Weight was measured to the nearest 0.1 kg using UNICEF Seca weighing scale with subjects in minimal clothing. The scale will be occasionally checked for standardization to avoid faulty reading.

Comment [I16]: was

2.8.3 Length/height determination

Height was measured using a length/height board, with the participant standing on a firm/level surface and it was measured to the nearest 0.1 cm. recumbent length was measured using an infantometer. Each measurement will be done twice, and the mean of the two readings were recorded.

Comment [I17]: was

2.9 Data Analysis

Statistical analysis was performed using statistical package for social sciences (SPSS) 20.0. Results obtained were expressed as frequencies and percentages. The data obtained from questionnaire were subjected to descriptive statistics.

3. RESULTS

3.1 Socio-demographic status of mothers attending St. Luke clinic, Egume, in Dekina LGA of Kogi State

The socio-demographic status of mothers attending St. Luke clinic is presented in table 1. The results revealed that the age range between 21-30 (64%) participated more in the study. 80% of the mothers are married. 30% are Igalas. A high percentage of the mothers (62%) had senior secondary school education. Also more of the mothers are traders (56%). 44% of the mothers studied had their monthly income between N5, 000 - N14, 999.

Table 1: Socio-demographic status of mothers attending St. Luke clinic, Egume, in Dekina LGA of Kogi State

Characteristics	Group	Frequency (F)	Percentage (%)
Age	≤ 20		
	21 – 30	12	24.0
	31 – 40	32	64.0
	>40	6	12.0
Marital Status	Single	8	16.0
	Married	40	80.0
	Divorced	1	2.0
	Widow	1	2.0
Ethnicity	Igala	30	60.0
	Hausa	2	4.0
	Yoruba	4	8.0
	Igbo	9	18.0
	Others	5	10.0
Education	Primary	5	10.0
	Junior Secondary	6	12.0
	Senior Secondary	31	62.0
	Tertiary Education	7	14.0
	No Formal Education	1	2.0
Occupation	Civil Servant	4	8.0
	Trader	28	56.0
	Farmer	6	12.0

	Artisan	3	6.0
	Full time house wife	6	12.0
	Others	3	6.0
Monthly Income	< N5,000	8	16.0
	N5,000 - N14,000	22	44.0
	N15,000 - N24,000	14	28.0
	N25,000 - N34,000	2	4.0
	N35,000 - N44,000	-	-
	N45,000 - N54,000	3	6.0
	≥ N55,000	1	2.0

N: Naira

3.2. Household care resources of mothers attending St. Luke clinic, Egume, in Dekina LGA of Kogi State

The household care resources of mothers attending St. Luke clinic as shown in table 2 revealed that 50% of the population use wood as source of heat for cooking. Main source of drinking water for 50% is borehole. More than half (52%) of the mothers use bush as their primary method of refuse disposal. 42% make use of pit latrine. 50% have no means of household food storage.

Table 2: Household care resources of mothers attending St. Luke clinic, Egume, in Dekina LGA of Kogi State

Characteristics	Group	Frequency (F)	Percentage (%)
Main Source of Cooking	Wood	26	52.0
	Kerosene	17	34.0
	Gas	7	14.0
Main Source of Drinking Water	Public Tap	14	28.0
	Public well	2	4.0
	Private well	2	4.0
	River/Stream	6	12.0
	Borehole water	25	50.0
	Rain water	1	2.0
Primary Method of Refuse Disposal	Bush	26	52.0
	Refuse dump	22	44.0
	Others	2	4.0
Main Type of Toilet	Bush	10	20.0
	Pit latrine	21	42.0
	VIP latrine	5	10.0
	Water System	14	28.0

Household Food Storage Method	Refrigerator	8	16.0
	No means of storage	25	50.0
	Others	17	34.0

3.3: Child information and Hygiene Practices of mothers attending St. Luke clinic, Egume, in Dekina LGA of Kogi State

The Child information and Hygiene Practices of mothers attending General Hospital as presented in table 3 showed that they were more male (54%) participants in the study than females (46%). 68% of the mothers wash their hands regularly with soap and water. Also 54% of the mothers wash their fruits before eating it with the skin. Sizeable number of the mothers (42%) pre-chew food before giving to their child.

Table 3: Child information and Hygiene Practices of mothers attending St. Luke clinic, Egume, in Dekina LGA of Kogi State

Characteristics	Group	Frequency (F)	Percentage (%)
Sex of Child	Male	27	54.0
	Female	23	46.0
Age of Child (months)	≤ 1	5	10.0
	1 – 12	35	70.0
	13 – 24	2	4.0
	25 – 36	3	6.0
	37 – 48	2	4.0
	49 – 60	3	6.0
Hygiene Practices in Food Preparation			
Do you wash your hand with soap and water regularily?	Yes	34	68.0
	No	16	32.0
Do you wash fruits before eating with the skin	Always	19	38.0
	Sometimes	27	54.0
	Never	4	8.0
Do you masticate/ pre-chew foods before giving to your child?	Always	8	16.0
	Sometimes	21	42.0
	Never	21	42.0

3.4: Breastfeeding Knowledge and Practices of mothers attending St. luke clinic, Egume, in Dekina LGA of Kogi State.

The Breastfeeding Knowledge and Practices of mothers attending St. Luke as presented in table 4 showed that majority of the mothers (100%) breastfed their children. A good percentage (84%) of the

mothers breastfeed their children for the duration of 19-24 months. 88% introduced colostrums at birth. 60% of the mothers initiated breast milk immediately after delivery.70% of the mothers breastfeed their child exclusively. 66% of mothers used Guinea corn gruel as complimentary food. 56% of the mothers introduced their children to complementary food at the age of 4 - 6 months, while 68% of mothers feed children complementary food with aid of spoon and cup. 70% of mothers prepared and stored their complementary food in warmers.

Table 4: Breastfeeding Knowledge and Practices of mothers attending St. luke clinic, Egume, in Dekina LGA of Kogi State

Characteristics	Group	Frequency (F)	Percentage (%)
Do you breastfeed your child?	Yes	50	100.0
	No		
Duration of breast feeding (months)	< 6	2	4.0
	7 – 12	-	-
	13 – 18	42	84.0
	19 – 24	6	12.0
Breastfeeding Initiation	Immediately after delivery	30	60.0
	Within the first 12 hours	9	18.0
	Within the first 24 day	8	16.0
	Within the first 2 days	2	4.0
	Others	1	2.0
Colostrum	Fed the Child	44	88.0
	Discarded	6	12.0
Breastfeeding frequency (per day)			
	3 – 5 times	1	2.0
	6 - 9 times	2	4.0
	>10 times	1	2.0
	Breastfed on demand	20	40.0
	Others	26	52.0
Exclusive breastfeeding	Yes	35	70.0
	No	15	30.0
Complementary foods introduced	Commercial	17	34.0
	Guinea corn gruel	33	66.0

Time of introduction of complementary foods	1 – 3 months	11	22.0
	4 – 6 months	28	56.0
	Above 6 months	11	22.0
Mode of feeding complementary foods	Spoon and cup	34	68.0
	Feeding bottles	16	32.0
	Others		
Preparation of complementary foods	On demand	15	30.0
	Prepared and stored in warmers	35	70.0

3.5: Nutritional Status of under-five children based on Weight for Age (WFA) between January 2012 to December 2017 at General Hospital Egume, Dekina, Kogi State.

Nutritional status of under-five children based on weight for age (WFA) between January 2012 to December 2017 at General Hospital Egume, Dekina, Kogi State as presented in figure 1 shows that 10.6% of the male children were mildly underweight, 14.2% where moderately underweight, 24.8% where severely underweight, and 9% were healthy. It also shows that 8.7% of females were mildly underweight, 9.2% where moderately underweight, 20.6% where severely underweight, and 2.8% were healthy with the standard Z-scores <-1 to>-2, <-2 to>-3, <-3, 0 t0 +1 respectively.

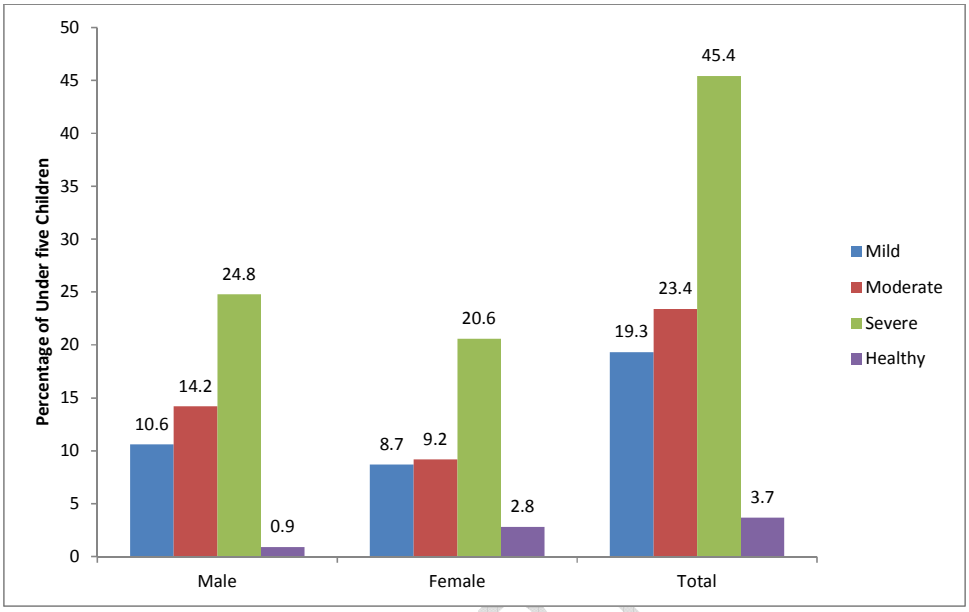

Figure 1: Nutritional Status of under-five children based on Weight for Age (WFA) between January 2012 to December 2017 at General Hospital Egume, Dekina, Kogi State.

Key: Mild = (< -1 to > -2 Z score)
Moderate = (< -2 to > -3 Z score)
Severe = (< -3 Z score)
Healthy = (0 to +1 Z score)

4. DISCUSSION

The prevalence rate of malnutrition is high, and results from the analyses confirmed that child's variables (age and gender), mother's variables (education and nutrition), feeding practices and health variables (clean water and toilet) were the significant determinants of child malnutrition.

In this study, 64.0% of the *mothers* were between the ages of 21 and 30 years, 80% of the mothers were married and 63% of them were from the Igala tribe.

The women see business as self-employment with quick results that could afford them minimum assets for marriage or for sending funds back home to their families. This present study revealed that few mothers (2%) had no formal education, 62% had secondary education. Several studies have shown that a mother's education is associated with good nutritional practices, most especially under-five child nutrition (10, 11, 12). Formal education of mothers directly transfers health knowledge to future mothers (13). Children born to educated women suffer less from under nutrition which usually manifests as underweight, wasting and stunting in children. Maternal education has been associated with nutrition outcomes among children in various settings (14). The literacy and numeracy skills that women acquire in school enhance their ability to recognize illness and seek treatment for their children. Mother's occupation is one of the indicators for access to adequate food supplies, use of health services, availability of improved water sources, and sanitation facilities which are prime determinants of child nutritional status (15). This study showed that few of the mothers are civil servant (8%) and majority of them are traders (56%). Weight –for-age is a composite index of weight-for-height and height-for-age, and does not distinguish between acute malnutrition (wasting) and chronic malnutrition (stunting). A child can be underweight for his age because he is stunted, because he is wasted, or both. Weight-for-age is a good

overall indicator of a population's nutritional health (16). The observed prevalence of under nutrition in this study could be due to the occupation of the care givers as they did not apparently appear constrained to cater for their children. Indeed, maternal occupation and educational characteristics determines child care practices as a correlation exists between height for age and the number of hours mothers worked outside the home (17).

A high prevalence sometimes reflects the low socio-demographic status of the mothers which affects the dietary intake. In this study, the socio-demographic status of the mothers revealed that few of the mothers (8%) were civil servants, although only 12.0% earn a monthly income above N25 000, a greater percentage (44%) earn less than N14999. Such a relatively low income is likely to affect the nutritional status of subjects in such homes considering the cost of living in Egume. Poor breastfeeding and complementary feeding practices are widespread. Globally, it is estimated that only 34.8% of infants are exclusively breastfed for the first 6 months of life, the majority receiving some other food or fluid in the early months (18). Complementary foods are often introduced too early or too late and are often nutritionally inadequate and unsafe (18). This contradicts the results from this study which indicate that majority of the mothers (70%) breast fed exclusively. also all the mothers studied (100%) breastfed their children. while (56%) of them introduced complementary food between 4-6 months. As a global public health recommendation, infants should be exclusively breastfed for the first 6 months of life to achieve optimal growth, development and health. The high percentage of exclusive breastfeeding observed was as a result of increased awareness and campaign. The present study further revealed that child's variables (age and gender), mother's variables (education and nutrition) and health variables (clean water and toilet) were the significant determinants of child malnutrition. Mother's education and body mass index are significant due to the fact that child nutrition will improve with increased mother's education and nutrition. Availability of clean water and toilet also reduces the possibility of infection. The retrospective study of Nutritional status of under-five children studied showed that the case of severe underweight is high with 45.4% of which male is 24.8% and female 20.6%. The significant determinants of underweight include, gender of child, education of mother, body mass index of mother and access to clean water. The gender variable revealed that male children are more likely to be underweight, compared to their female counterparts. The differences observed across studies in regard to the relationship between gender and the child's nutritional status may indicate that gender is not a biological factor in malnutrition, but that there may be other gender-related social or cultural factors that affect a child's growth. The results from this study are consistent with those from the study by Rayhan and Khan (19) on factors causing malnutrition among under-five children in Bangladesh that showed that low birth weight was positively associated with child underweight. This study revealed a significant association between child illness and child underweight, consistent with the findings of a study by Turyashemererwa et al (20), of child underweight. Also the finding that males were more underweight and wasted than females agrees with the study by Ozor *et al.*,(21). But not in agreement with the findings of Banerjee *et al.,* (22), Harishankar *et al.,* (23) and Bhalani *et al.,*(24).

CONCLUSION

Results from the analysis confirm that child's variables (age and gender), mother's variables (education and nutrition), feeding practices and health variables (clean water and toilet) were the significant determinants of child malnutrition. To a large extent, women are responsible for feeding and caring for young children. The quality of feeding and care given to the children would reflect the level of education of the mother when other factors are fixed. This then gives a focus to policymakers in the designing of strategies aimed at combating malnutrition among children below five years.

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