Malnutrition among Children under 5 Does Not Correlate with Higher Socio Economic Status of Parents in Rural Communities

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Abstract

Introduction: Understanding the socioeconomic characteristics of families with undernourished children is very critical to providing solution to the menace especially in rural communities where there is complexity in the relationship between economic activities, education and parental care and the undernutrition. **Objectives:** The study is aimed at understanding the nutritional status of children under the age of 5 years in relation to the socio economic status of the family so as to determine causes of vulnerability. **Methods:** Hospital based cross sectional study was carried among 505 children under the age of 5 years, taking measurement of their Mid Upper Arm Circumference (MUAC) using standard techniques and also taking records of their families' socioeconomic data using structured questionnaire. **Results:** Record of nutritional status of the children sampled shows that undernourished children were 345 (68.3%) and the nourished were 160 (31.7%). The number of times each child felt sick within the last one year shows that out of the total 505 children, 140 (27.72%) fell sick once, 155 (30.69%) fall sick twice in the previous year, 65 (12.87%) felt sick three times, 55 (10.89%) felt sick four times due to either malaria, undernutrition or other factors. Children born to farmers, constituting 51.5% of the sampled children have as high as 69.2% prevalence of undernutrition, compared to those born to beggars (0%). The highest prevalence is recorded in children born to petty traders (80%), followed by government workers and commercial motorcyclist with 75% each. Prevalence of 100% was recorded in the sampled children whose father attains tertiary level of education, followed by those who attain only secondary level of education (68%). **Conclu-**

sion: There is high prevalence of undernutrition among children in rural communities which is often underestimated for the fact that rural dwellers of Kano are mostly farmers and that they are adequate to provide for their children. Frequency of illnesses among the children of rural dwellers is associated with the nutritional status of the children. Malnutrition is not always dependent on the occupation and educational status of the parents or whether child parents are alive or not. Children of farmers and learned persons are also very susceptible to malnutrition in the rural communities of Kano. Nutritional education and programs should as well target all families with varied socioeconomic status, including farmers, petty traders and those with high educational status without making assumptions that they are less susceptible to malnutrition.

1. Introduction

The term malnutrition generally refers to both under nutrition and over nutrition [1]. Malnutrition is frequently part of a vicious cycle that includes poverty and disease. These three factors are interlinked in such a way that each contributes to the presence and permanence of the others. Socioeconomic and political changes that improve health and nutrition can break the cycle; as can be specific nutrition and health interventions [2]. Inadequate diet and disease, in turn, are closely linked to the general standard of living, the environmental conditions, and whether a population is able to meet its basic needs such as food, housing and health care [1]. The World Food Programme (WFP) defines malnutrition as "a state in which the physical function of an individual is impaired to the point where he or she can no longer maintain adequate bodily performance process such as growth, pregnancy, lactation, physical work and resisting and recovering from disease" [3]. Malnutrition is estimated to contribute to more than one third of all child deaths, although it is rarely listed as the direct cause [3] (WFP, 2000).

The impact of malnutrition usually falls mainly on children under five years of age [3]. Contributing to more than half of deaths in children worldwide, child malnutrition was associated with 54% of deaths in children in developing countries in 2001 [4] [5]. Food security is said to exist if at all times, people have a physical and economic access to sufficient, safe and nutritious food that meet their dietary and food preferences, for an active and healthy life [3]. Certain groups are particularly vulnerable to food insecurity, including women (especially low income pregnant and lactating women), victims of conflict, the ill, mi-

grant workers, low income urban dwellers, the elderly, and children under five [6]. The establishment of properly functioning economic and political structures would help to lead countries to food security, as well as help to improve the overall wellbeing of the people [7].

The 2015 National Nutrition and Health Survey (NNHS) results seem consistent with the GNR 2015 positive findings, as the overall NNHS 2015 global acute malnutrition (GAM) and severe acute malnutrition (SAM) prevalence for under-five children is reported at 7.2 and 1.8 percent respectively, whereas the same indicators were reported at 8.7 and 2.2 [8]. In addition, none of the states surveyed this year reported GAM and SAM above critical WHO cut off points and there has also been a slight reduction in the underweight indicator (19.4 percent compared to 21 percent in 2014).

Nationally, the likelihood of a child being under weight is 3.5 times higher for children in the poorest households (bottom 20% of households) than children in the richest households (top 20% of households) [9]. Malnutrition disproportionately affects poor households since the poorest families spend the greatest proportion of their income on buying staple foods, making them highly vulnerable to price fluctuations [9]. The burden of malnutrition has been directly linked to poverty, quality of food intake, excessive disease and poor health status [10]. Nearly one of every four human beings alive today exists only on the margins of survival, too poor to obtain the food they need to work, or adequate shelter, or minimal health care, let alone education for their children [11].

Poverty is unmistakably the driving factor in the lack of resources to purchase or otherwise procure food, but the root causes of poverty are multifaceted. Poverty, combined with other socioeconomic and political problems, create the bulk of food insecurity around the globe [6]. Improving the educational status of parents, especially of mothers, on nutrition, sanitation and common disease prevention strategies should logically reduce the malnutrition related mortality and morbidity [12]. This problem is very crucial in Sub Saharan Africa, where access to formal education for the girl child in certain communities is still a major burning challenge [12]. This study is aimed at understanding the socio-demographic characteristics of families in relation to their nutritional status of their children under the age of 5 years so as to determine vulnerability to malnutrition per parents' status.

2. Materials and Methods

2.1. Study Area

Kano State is located in the North Central part of the country between longitude 8.500˚E and latitude 11.500˚N; it occupies a total surface area of 20,131 km^2 (77,773 m^2) and has a total population of approximately 11 million. Kano State is a commercial and agricultural region known for the production of groundnuts and cotton. It is also the second largest industrial center in Nigeria, with textile, tanning, footwear, cosmetics, plastic, and other industries. The state consists pri-

marily of Sudan savannah type vegetation, with an annual mean rainfall of 800 - 900 mm, a temperature that ranges between 25˚C - 40˚C (mean approximately 26˚C), and a relative humidity of 47.43%. The climate of the study area is a tropical dry-and-wet season type typical of West African savannah. The wet season lasts from May to October, while the dry season extends from November to April [13]. In collaboration with primary healthcare personnel and traditional rulers in each local government area (Bichi and Tsanyawa), one ward each was selected randomly. The wards are Badume (8.291˚E, 12.201˚N) in Bichi and Gurun (7.975˚E, 12.343˚N) in Tsanyawa LGA.

2.2. Study Design

This is a hospital based cross sectional study to determine relationship between nutritional status and the sociodemographic characteristics such as child school status, parents' educational status, occupation, etc in Bichi and Tsanyawa Kano State between February and December, 2016. Children under the age of 5 years that have given their consent and met the inclusion criteria were selected randomly. MUAC measurement and socio-demographic variables such as age, gender, mother alive, father alive, educational status of parent/guardian, social class, child's educational status and occupation of parent/guardian were noted and recorded into an investigator administered questionnaire.

2.3. Inclusion Criteria

1) All consenting children of age of 0 to 59 months who present to their records for the sake of the research.

2) All consenting healthy and unhealthy children matched for age, and other socio-demographical records also included.

2.4. Exclusion Criteria

1) Parents who declined consent.
2) Parents who are not willing to take part in the research.
3) Children under no parental or guardian care.

2.5. Sampling Method

Systematic random sampling method was used to recruit participants until the desired sample size was obtained. A total of 505 children were selected for the research

2.6. Sample Size Calculation

For the calculation of sample size, the following formulae would be used:

$$\text{Sample size}(n) = \frac{Z_{1-\alpha/2}^2 P(1-P)}{d^2}$$

where $Z_{1-\alpha/2}$ = standard normal variate (At 5% *i.e.* $P < 0.05 = 1.96$),

P = Expected proportion based on previous studies,

d = Absolute error or precision allowable by the researcher (5%) [14]. In order to make up for attrition, an anticipated 90% (0.9) response is used [15]. Based on this, the "n" was divided by 0.9 (n/0.9).

2.7. Ethical Considerations

Ethical approval for the study protocol was obtained from the Research and Ethics Committee of Kano State's Ministry of Health. When seeking consent from the volunteers in each facility, the objectives and procedures of the study were explained clearly to them in the local language, Hausa. Participants were also informed that they could withdraw from the study at any time without consequences. Thus, written and signed or thumb-printed informed consents were obtained from all adult participants and guardians/parents on behalf of their children before starting the survey; the ethics committees approved these procedures as well. All malaria-positive individuals were treated with the standard medication according to national malaria drug policy

2.8. Measurement of Mid Upper Arm Circumference

Mid Upper Arm Circumference (MUAC) was measured using plastic tape using standard technique [16]. Values obtained as below 11.5 cm^3 were considered undernourished [17].

3. Statistical Analysis

Data recorded on the questionnaire was transferred to a proforma (in excel format) developed on and then analyzed using the statistical package for social science SPSS V 20.0 (2010) Inc., IBM, New York, USA). Frequency and percentage analysis were done for the categorical variables. Data was presented in frequency charts, descriptive and analytical tables. Bar and pie charts was used to illustrate the results obtained from the participants. Association between studied variables was compared using Chi-Square (χ^2) and Fisher's exact tests while P-value < 0.05 was considered significant at 95.0 % confidence level. Logistic regression analysis was used to generate odds ratio to assess contribution of the various independent variables such as low educational level, parent alive (both mother and father), employment status of parent, educational status of child was taken.

4. Limitation

This is hospital based study and children of the enlightened family are more likely to attend clinics when sick. There can be a lot more susceptible children in the communities who have not been attending clinics and therefore that category may not be represented in this study.

5. Results

Socio-demographic characteristics of the study participants were collected from

five hundred and five (505) participants who took part in the study. The age range is widely distributed amongst the children. Their age ranges from eight months to 59 months, the mean age 30.39 months. There were 260 (51.5%) males and 245 (48.5%) females sampled (**Figure 1**). Children who had their father alive are the most predominant constituting up to 410 (81.2%) followed by children who lost their father with 95 (18.8%) (**Figure 2**). Also children who responded mother alive were also predominant with 450 (89.1%) where as children sampled without mother alive constitute 55 (10.9%) respectively (**Figure 3**). The occupational prestige of the parents counts those who responded none of the options were 110 (21.8%), whereas farmers making up 260 (51.5%) about the half of the samples taken, those responded Petty traders connotes 50 (9.9%), Beggars makes only 15 (3%) of the respondent, commercial motorist makes 15 (3%), commercial cyclist were 20 (4%), company workers makes 20 (4%). moreover, those responded laborers takes the remaining 15 (3%) of the sample (**Figure 4**). The highest educational level of the parent (father) were taken from none to tertiary level where parents who never attended any formal or semi-formal school

% of children sampled by gender
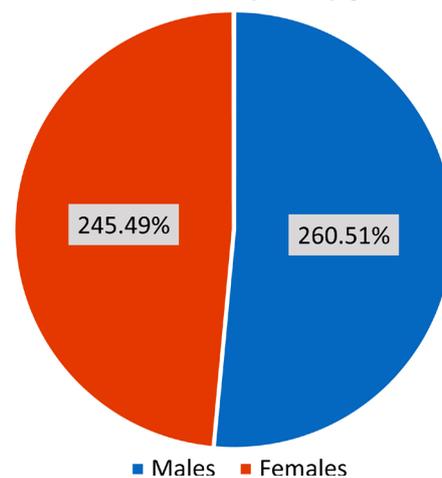
Figure 1. Percentage of children sampled by gender.

Fathers Alive
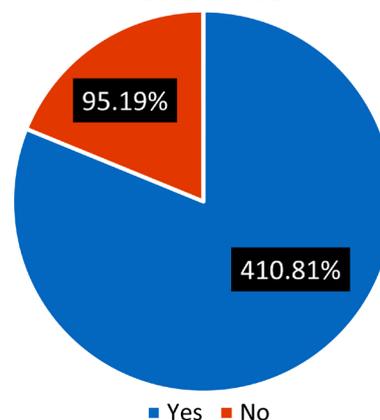
Figure 2. Percentage of children with father alive.
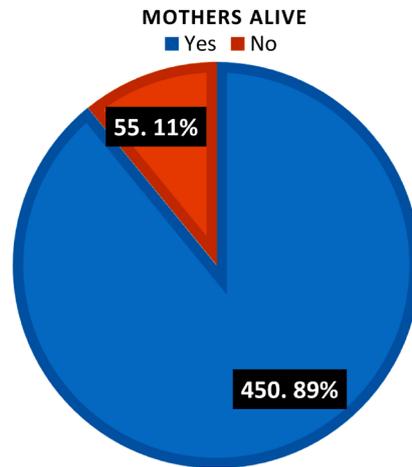
Figure 3. Percentage of children sampled with mother alive.
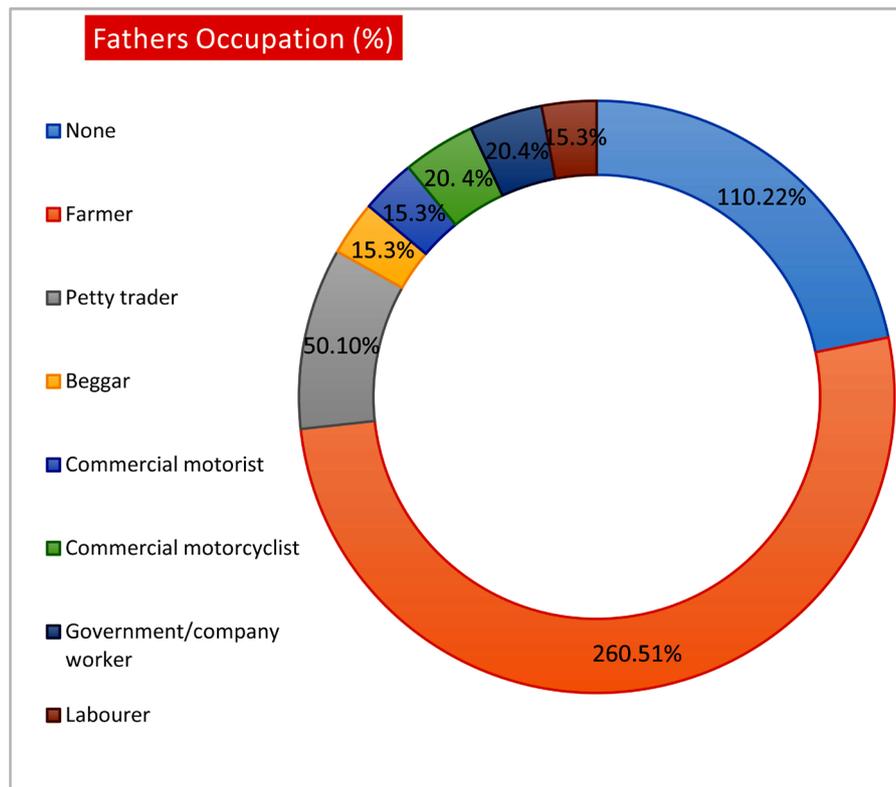
Figure 4. Occupation of children fathers sampled.

(none) makes 40 (7.9%), literacy classes 85 (16.8%), primary 235 (46.5%) constituting the highest counts in the respondent, secondary 125 (24.8%), while tertiary education completes 20 (4%) making the lowest counts in the data recorded (Figure 5).

The educational status of the children was taken as schooling and non-schooling where children schooling makes 135 (26.7%) where the non-schooling makes 370 (73.3%) (Figure 6). Nutritional status of the children sampled were also recorded (MUAC) where the undernourished makes 345 (68.3%) and the nou-

rished were 160 (31.7%) (Figure 7).
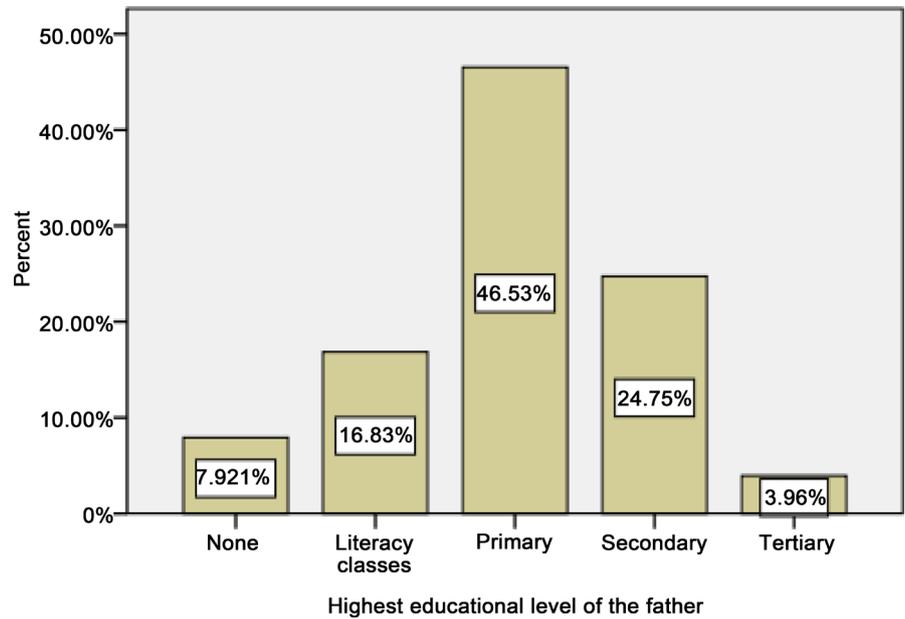
Figure 5. Highest educational level of children fathers.
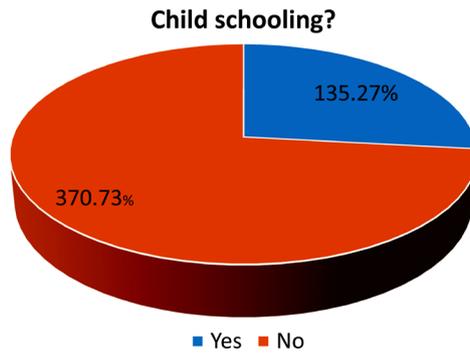
Figure 6. Percentage of children schooling and not schooling.
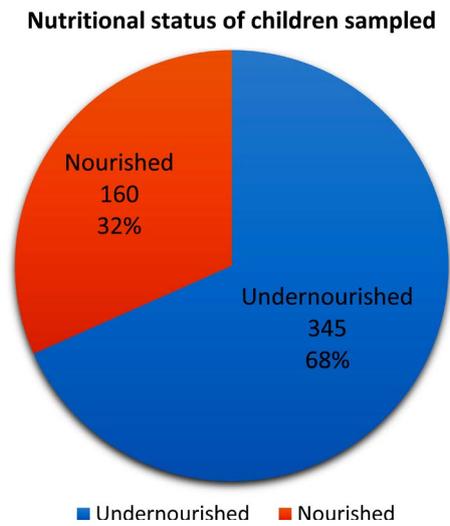
Figure 7. Nutritional status of children sampled.
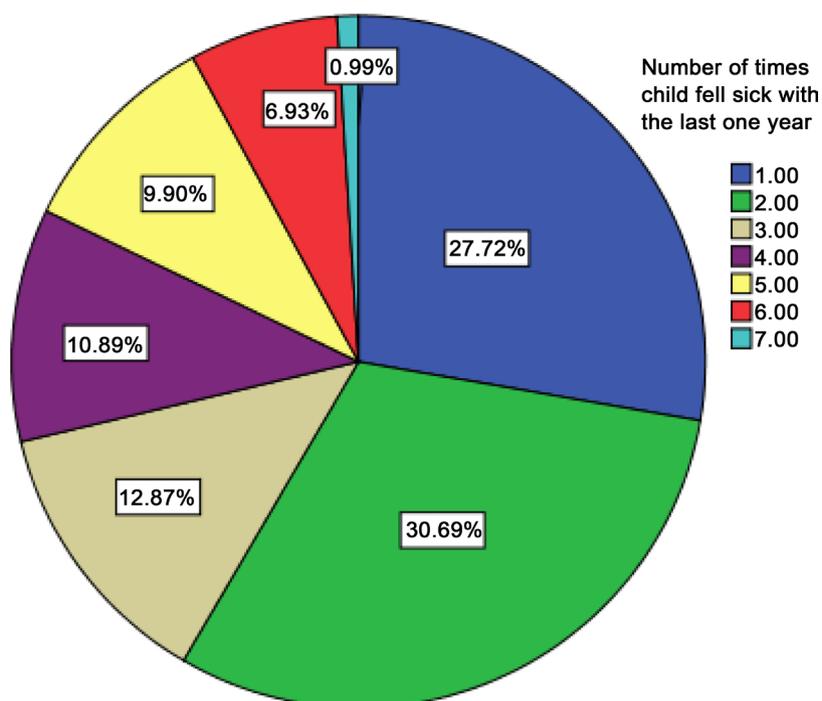
Figure 8. Number of times child within the last one year fell sick.

The number of times each child felt sick within the last one year shows that out of the total 505 children, 140 (27.72%) fall sick once, 155 (30.69%) fall sick twice in the previous year, 65 (12.87%) fall sick three times, 55 (10.89%) fall sick four times due to either malaria, malnutrition or others factors (Figure 8).

The below table shows some of the socio-demographic results in count and percentage of the data.

Table 1 shows the cross tabulation of occupation in relation to nutritional status, eight (8) group of occupation were involve in the study none, farmer, petty trader, Beggar, commercial motorist, commercial motorcyclist and Government/company worker. The first group represents 110 none. About 75 (68.2%) out of 110 are undernourished and 35 (31.8%) are nourished. The second group represents 260 with 180 (69.2%) are undernourished and 80 (30.8%) are nourished. The third group represent 50 petty traders with 40 (80%) are undernourished and 10 (20%) are nourished. The fourth represents 15 Beggar which indicate all are nourished. The fifth represent 15 commercial motorists with 10 (66.7%) are undernourished and 5 (33.3%) are nourished. The sixth represent 20 commercial motorcyclists with 15 (75%) are regarded undernourished and 5 (25%) are nourished. The seventh represent 20 Government/company with 15 (75%) are undernourished and 5 (25%) are nourished. The last group represent 25 laborers with 10 (66.7%) are undernourished and 5 (33.3%) are nourished. Furthermore, with respect to occupation, most occupation 345 (68.3%) out of 505 are undernourished and only 160 (31.7%) are nourished.

Table 2 shows the Pearson chi-square test which is used to test the relationship association between nutritional status and occupation as predictor variable.

Table 1. Occupation * nutritional status cross tabulation.

		Nutritional Status		Total
		Undernourished	Nourished	
None	Count	75$_a$	35$_a$	110
	% within Occupation	68.2%	31.8%	100.0%
Farmer	Count	180$_a$	80$_a$	260
	% within Occupation	69.2%	30.8%	100.0%
Petty Trader	Count	40$_a$	10$_a$	50
	% within Occupation	80.0%	20.0%	100.0%
Beggar	Count	0$_a$	15$_b$	15
	% within Occupation	0.0%	100.0%	100.0%
Commercial Motorist	Count	10$_a$	5$_a$	15
	% within Occupation	66.7%	33.3%	100.0%
Commercial Motorcyclist	Count	15$_a$	5$_a$	20
	% within Occupation	75.0%	25.0%	100.0%
Government/Company Worker	Count	15$_a$	5$_a$	20
	% within Occupation	75.0%	25.0%	100.0%
Labourer	Count	10$_a$	5$_a$	15
	% within Occupation	66.7%	33.3%	100.0%
Total	Count	345	160	505
	% within Occupation	68.3%	31.7%	100.0%

Each subscript letter denotes a subset of Nutritional Status categories whose column proportions do not differ significantly from each other at the 0.05 level.

Table 2. Chi-square tests.

	Value	df	Asymp. Sig. (2-Sided)
Pearson Chi-Square	36.461[a]	7	0.000
N of Valid Cases	505		

a. 3 cells (18.8%) have expected count less than 5. The minimum expected count is 4.75.

Chi-square ($\chi^2 = 36.461$, $P < 0.005$) shows to be significant among the occupation.

Table 3 shows the cross tabulation of educational level in relation to nutritional status, five (5) group of educational level were involve in the study none, literacy class, primary secondary and tertiary. The first group represents 40 none educated with both 20 (50%) are undernourish and nourished. The second group represents 85 literacy classes with 60 (60.6%) are undernourish and 25 (29.4%) are nourished. The third group represents 235 primaries with 150 (63.8%) are undernourished and 85 (36.2%) are nourished. The fourth represent 125 secondary with 95 (76%) are undernourished and 30 (24%) are nourished. The fifth represent 20 tertiaries with all 20 (100%) are undernourished. Furthermore, with

Table 3. Highest educational level of the father * nutritional status cross tabulation.

| | | Nutritional Status | | Total |
		Undernourished	Nourished	
None	Count	20a	20b	40
	% within Highest Educational Level of the Father	50.0%	50.0%	100.0%
Literacy Classes	Count	60a	25a	85
	% within Highest Educational Level of the Father	70.6%	29.4%	100.0%
Primary	Count	150a	85b	235
	% within Highest Educational Level of the Father	63.8%	36.2%	100.0%
Secondary	Count	95a	30b	125
	% within Highest Educational Level of the Father	76.0%	24.0%	100.0%
Tertiary	Count	20a	0b	20
	% within Highest Educational Level of the Father	100.0%	0.0%	100.0%
Total	Count	345	160	505
	% within Highest Educational Level of the Father	68.3%	31.7%	100.0%

Each subscript letter denotes a subset of Nutritional Status categories whose column proportions do not differ significantly from each other at the 0.05 level.

Table 4. Chi-square tests.

	Value	Df	Asymp. Sig. (2-Sided)
Pearson Chi-Square	21.273[a]	4	0.000
N of Valid Cases	505		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.34.

respect to higher educational level, most education 345 (68.3%) out of 505 are undernourished and only 160 (31.7%) are nourished.

Table 4 shows the Pearson chi-square test which is used to test the relationship association between nutritional status and occupation as predictor variable. Chi-square ($\chi^2 = 21.273$, $P = 0.000$, $P < 0.005$) show to be significant among the educational levels.

6. Discussion

From the result of this study, the proportion of male children attending clinics for treatment of aliments and accessing nutritional services only slightly differs from females (51.5% vs 48.5%) (Figure 1). Similar sample characteristics of 53.6% and 46.4% for males and females respectively [18]. The percentage of children who have their fathers alive are 81% (Figure 2) and those with mothers alive

are 89% (Figure 3). This shows that more children with mothers are slightly higher than those with fathers alive. The results however show that majority of fathers are farmers constituting about 51.5% in the area studied, followed by those with fathers having no occupation, constituting 21.8% (Figure 4). Other finding also reported that majority of Kano residents are farmers and merchants [19].

The study also shows that majority of fathers have primary education as the highest educational level, accounting for 46.53% followed by those with secondary school, 24.75%. This shows that majority of the fathers could not get the opportunity to further their education after completion of primary education, but venture into economic activities such as farming. Only 3.9% are opportune to proceed to tertiary institution. The school attendance of the sampled children is very low as only 26.7% are attending schools. This may not be unconnected with the fact that in rural communities, children are often not enrolled into school before attaining the age of 5 years.

The prevalence of malnutrition in the studied area is as high as 68%, despite the fact that majority of the children have fathers alive (81%) and mothers alive (89%) and that 51.5% of their fathers are farmers. This prevalence obtained in this study is far from what was reported by National Nutrition and Health Survey, 2015 [8]. Severe acute malnutrition (SAM) prevalence for under-five children is reported at 7.2 and 1.8 percent respectively, whereas the same indicators were reported at 8.7 and 2.2 percent in National Nutrition and Health Survey (NNHS) 2015 [8]. In addition, none of the states surveyed that year reported GAM and SAM above critical WHO cut off points, and there has also been a slight reduction in the underweight indicator (19.4 percent compared to 21 percent in 2014). Stunting, however, is still the largest burden, thus indicating a long-term nutritional problem in the country. The indicator is quite stable (33 percent), confirming an overall prevalence positively below Sub-Saharan regional level (37 percent) [8].

However, the frequency of children assessed falling sick is that 30.69% fell sick at least twice a year. This may not be unconnected with the high prevalence of malnutrition found among the children. Even though it has long been recognized that malnutrition is associated with mortality among children [20] [21], a formal assessment of the impact of malnutrition as a risk factor was only recently carried out. In the early 1990s, results of the first epidemiological study on malnutrition showed that malnutrition potentiated the effects of infectious diseases on child mortality at population level [22].

A multitude of factors lead to malnutrition. These include not having enough money to buy sufficient nutritious food and not having a reliable supply of food throughout the year; gender inequality; poor infant and young child feeding practices; and limited access to healthcare, safe drinking water and adequate sanitation [9]. Lack of purchasing power reduces a household's ability to buy the food it needs, which combined with the other causes mentioned above increases

the likelihood of malnutrition [9]. Malnutrition can create and perpetuate poverty, which triggers a cycle that hampers economic and social development, and contributes to unsustainable resource use and environmental degradation [23].

In view of the above, the fathers' occupation, which is a function of and purchasing power, was studied in relation to the nutritional status of their children. Children born to petty traders are worse affected as the prevalence among them is as high as 80%, followed by commercial motorcyclists and government workers. This may be attributed by the fact that majority rarely stay with their families as they often on business tours outside the state, mostly in the southern part of the country. Findings also suggest that children born to farmers are significantly affected by undernutrition as 69.2% of the children with fathers' occupation as farming are undernourished. Ironically, children whose fathers are beggars have 0% prevalence of undernutrition. This finding suggests that farmers are less likely to feed their children than the beggars. It is common practice in northern rural communities that farm produce are not adequately made availability to families, but rather taken to markets for sale. Additionally, the farmers predominantly produce less nutritionally valuable food for children such as maize, millet and corns. Protein rich food are inadequately produced and livestock rarely slaughtered and eaten. Socioeconomic inequalities in childhood malnutrition are more pronounced in urban centers than in rural areas [24].

In 47% of surveyed households in Daura LGA, agriculture production was found to account for less than 25% of the total household food consumption. The remainder of poor household's diet comes largely from buying food in local markets and food received for work. The poor own few livestock and survive through a combination of smallholder agriculture, casual labour and petty trade [9].

Parents' education status is one of the most important determinants of malnutrition [25]. Educated parents are more likely to employ better child-care practices as compared to uneducated parents. According to a study done in Bangladesh, children of mothers with secondary or higher education were at a lower risk of childhood stunting (risk ratio (RR): 0.86), underweight (RR: 0.83) and wasting (RR: 0.82) as compared to children of uneducated mothers [26]. However, findings of this study negate the findings of the above researchers as it shows high prevalence of malnutrition among children with parents who attended tertiary institution (100%), followed by secondary (76%) than those with parents attended literacy (70.6%), primary (63.8%) and not attended any (50%). It's however worthy of note that this is a hospital based study and that educated families are more readily attending clinics than the less educated ones.

7. Conclusion

There is high prevalence of malnutrition among children in rural communities which is often underestimated for the fact that rural dwellers of Kano are mostly farmers and that they are adequate to provide for their children. Frequency of

illnesses among the children of rural dwellers is associated with the nutritional status of the children. Malnutrition is not always dependent on the occupation and educational status of the parents or whether child parents are alive or not. Children of farmers and learned persons are also very susceptible to malnutrition in the rural communities of Kano.

Recommendations

Based on this study, it is recommended that nutritional education in both rural and urban communities should be directed at not only the poor parents, but of particular importance to the educated, wealthy and farmers whose children appeared to be worse affected by undernutrition. Programs in rural communities should rather than focusing on the provision of Ready to Use Therapeutic Foods, concentrate on enlightening caregivers on the use of the locally available farm produce to enhance the nutritional status of their children.

It is also recommended that another study be conducted with sample children drawn from within the communities to cover those malnourished children whose parents have no faith in modern health care.

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