Original Research Article

Nutritional practices of the preschool-aged children and associated factors: A cross-sectional study in Rupandehi district of Nepal

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Abstract

Undernutrition is a common problem among Nepali preschool-aged children. Every parent's feeding practice should be focused on preventing unhealthy eating behaviors of preschool-aged children as it is very difficult to change it in their later life. This study was carried out to assess the key nutritional practices and associated factors among the 3-5-year-old preschool-aged children from their primary caregivers/mothers by employing a quantitative research method. Data were collected through scheduled interviews and observations from mothers/primary caregivers of 394 preschool-aged children who were selected through a multi-stage random sampling procedure in Rupandehi District of Nepal. Binary logistic regression was done to determine the predictors of nutritional practices of preschool-aged children. A *p*-value less than 0.05 is considered statistical significance. Economic statuses including caste/ethnicity were the main socio-economic and demographic variables to determine the nutritional practices of the preschool-aged children. Findings of the study indicated that majority of preschool-aged children were found in low-level nutritional practices. The preschool-aged children from marginal economic status, including disadvantage-cohorts of the Terai and Dalit, were the victims of the poor nutritional practices. Hence, community-based nutrition education intervention and mothers/caregivers' awareness programs on feeding practices may be an incredible effort to improve the nutritional status of preschool-aged children if the program is intervened by targeting the background characteristics of the community group.

Keywords: associated factors, nutritional practice, preschool children

Introduction

Nutritious foods are the sources of energy and essential for human health that provide the essential nutrients the body needs for power, growth, development, disease resistance, infection and tissue repair (Scaglioni et al., 2018; Achagh et al., 2020). A healthy diet is regarded as one of the most important aspects to reduce the risk of non-communicable diseases (NCDs) and mortality rates throughout the world (Wang et al., 2016). Different non-dietary determinants influence the nutritional status of children. Such factors include water, hygiene, and sanitation, as well as feeding behaviors (Bhandari & Chowdhury, 2016). Preschool-aged children's daily food must incorporate all necessary nutrients such as energetic foods, proteins, carbohydrates, fats and oils, vitamins, minerals, and water, available in a variety of food groups that are

necessary for physical and mental growth (Hanley-Cook et al., 2022; Kavli et al., 2019; Lamichhane et al., 2016). Regarding the feeding policies, even western nations still place a significant burden on preschool-aged children, especially those from underprivileged groups (Nobile et al., 2014), while South Asian nations account for 70% of the world's hungry children (Akhtar, 2016). Nepal Demographic and Health Survey (NDHS-2016) exhibited that majority of the children in Nepal are not consuming nutritious foods such as fruits and vegetables, dairy products, grains, legumes, and nuts, etc., and consequently failing to meet the minimum requirement of nutrition (WHO and UNICEF, 2021). Poor or faulty feeding practices can result in malnutrition, poor cognitive development as well as unsatisfactory school performance (Victora et al., 2008; World Health Organization, 2009). Beyond the government's interest and investment, families have also played a crucial role in the education, food consumption, and nutritional requirements of children (Angeles-Agrippa et al., 2020). Children from the marginalized and socio-economically disadvantaged group are at high risk of developing malnutrition because of poor knowledge of feeding practices which is strongly embedded with the religious and traditional cultural practices such as beliefs, faiths, lack of knowledge on nutritional composition in different food items and improper food handling practices (Weatherspoon et al., 2013) which eventually increase the burden of chronic disease and low productivity in the later part of life (Pereira et al., 2016). Primary caregivers, especially mothers play a crucial role in shaping children's good eating habits during early childhood through various strategies and establishing predictable mealtimes (Jansen et al., 2018). However, several studies conducted on this issue have not shown satisfactory evidence regarding the aforementioned practices (Guracho & Amenities, 2017; Baek & Chitekwe, 2019). Direct modification of unhealthy eating habits of children in later life is very difficult if it is not shaped in earlier times. Therefore, the feeding practices of parents need to be the target of intervention (Upreti et al., 2021; Finnane et al., 2017) for establishing a sustained healthy eating habits for children. Studies from developed countries are concentrated on dietary practices and obesity of growing children (Finnane et al., 2017; Jansen et al., 2018; Pereira et al., 2016). The studies that have been carried out to date in developing countries, including Nepal are limiting breastfeeding and supplementary food practices, especially focusing on infants up to 2 years of age. However, these studies have not reflected knowledge of nutritional value and practices of food handling with children aged 3-5 years old by their primary caregivers. So, there remain several gaps in knowledge and practices regarding the proper feeding practices of preschool-aged children. Therefore, this study aimed to evaluate the relationship between socio-economic and demographic factors, and nutrition practices of preschool children aged 3-5 years old in Rupandehi district, the Western Terai of Nepal.

Methods and Materials

Study Design

A cross-sectional quantitative study design was employed among mothers/primary caregivers of preschool-aged children of 3-5 years old to evaluate the existing situation of parental nutritional practices based on the research problem.

Study Area

This study was conducted in three local government units (Sub-metropolitan city, municipality, and rural municipality) from 14th February to 12th April 2021 in Rupandehi

district with a population of 1,118,975 according to the last census of 2021. It is located in the western Terai region, Lumbini province of Nepal, and the birthplace of Lord Buddha. The population is distributed among different ethnicities, cultures, and socio-economic origins, and a relatively high fertility rate, therefore are more children in this district compared to other places (Wikipedia, 2022). These three local government units were selected because they represent large urban and rural municipalities, yielding a more representative sample.

Study Population and Sampling

The population of this study was 14358 mothers/primary caregivers of preschool children aged between 3-5 years old from three local government units. The required sample size was calculated using Cochran's formula; $n_0 = Z^2 pq/e^2$ with the desired precision of 5% i.e. the margin of error, 95% confidence intervals.

For: P=0.5, hence q= 1-p =1-0.5=0. e = 0.05, z=1.96. The sample size for a large population was calculated as $n_0 = 384.16$; therefore, for a finite population, the following formula was used.

$$n = \frac{n_0}{1 + \frac{n_0 - 1}{N}} = \frac{384.16}{1 + \frac{384.16 - 1}{14358}} = 374.17$$

= 375, considering the 5% non-response rate, the sample size was 394.

The sample was selected through multistage random sampling based on the population proportionate sampling (PPS) technique. In the first phase, three local units - one sub-metropolitan city, one municipality, and another rural municipality- were selected from a simple random sampling and a lottery method. The population proportionate sampling technique was applied over the sample size, in each selected unit where 136 out of 1447 were from the sub-metropolitan city, 169 out of 1836 from the urban municipality, and 89 out of 645 from the rural municipality of a total 394 were confirmed, in the second phase. Five schools/ECD centers were selected in each local unit and maintained in a systematic order to be used first until the required sample fullness.

Data Collection Tools

Two sets of close-ended interview schedules for mothers/primary caregivers of preschool-aged children were the main tools of this study (Creswell, 2012). A structured, close-ended questionnaire was developed to access socioeconomic, demographic, and general information (Sharma et al., 2022). Another self-constructed questionnaire was developed to access the nutritional practices of mothers/primary caregivers. It was prepared in the format of a Likert scale type of five-point rating consisting of 24 items (Creswell, 2012). However, it was modified in three-point ratings- 'disagree', 'do not know', and 'agree' after pre-testing.

Pre-test of Tools

The tools were pre-tested among 10 percent of respondents who were not further included in the study (William, 2004), and shared with the Ph.D. supervisor and two subject experts to get feedback on reliability and validity. For this purpose, two government-funded ECD centers were selected. Pre-tests of the tools were conducted to collect information on comprehensibility,

time spent on each question, and consistency between related variables and acceptability (Creswell, 2013). After the pre-test, all ambiguous, misleading and misinterpreted questions were modified and revised to reflect the results of the pre-test and address technical difficulties during the period of data collection (Leavy, 2018). To improve the reliability and increase the accuracy of scientific and objective equipment, in particular, the Cronbach alpha test was computed with the Likert scale tool of nutritional practices. The Cronbach tool's alpha reliability status to access the nutritional practices of mothers/primary caregivers was 0.737, which was acceptable (William, 2004).

Operationalization of Variables

The dependent variable, nutritional practices towards preschool-aged children from their mothers/primary caregivers encompasses parental practices, preferences, skills, and attitudes, regarding daily feeding practices along with knowledge of food buying, cooking procedures, nutrition preservation, and sanitation (Beyene et al., 2015). The independent variables were age, sex, the number of preschool-aged children, types of family, religion, caste/ethnicity, parental education and occupations, and economic quintiles. The data on children's nutrition practices were taken through direct interviews with their primary caregivers/mothers and also categorized into low, medium, and high levels based on the literature to be reviewed (Warsito et al., 2012). The rating of Likert scale items was coded from 1= 'disagree', 2= do not know' and 3= 'agree' for the positive statement of the items and vice versa to the negative statement of items to quantify data in continuous series by summing the scores of all items. However, they were merged into low (less than 90%) and high (more than or equal to 90%) because of the frequency adjustment during the data analysis (Warsito et al., 2012). Moreover, the extended type of family was also merged into a joint family category for frequency adjustment. The economic ranking questionnaire was adopted from NDHS-2016 in which information comprised household characteristics such as ownership of land and various durable goods, sources of water, types of latrine facilities, and materials used for houses and floors, and calculated from an excel worksheet (Ministry of Health, 2017). The housing index was established by assessing the condition of the house, that is, the roof, the floor, the cooking fuel, the type of latrine, including the water supply system, furniture, electronic devices, car, motorcycle, bicycle, land which was measured giving '1' score if they have any of the items and '0' if not (Ministry of Health, 2017). The scores were then summed to make a possible maximum score in the continuing series (Leavy, 2018). The score of the wealth (– 0.54 to +3.48) was divided by 25% into every four categories: the poorest, poor, rich, and the richest where <1.8 was the poorest level of economic status. Likewise, from wealth quartile score >1.8 to <2.4 was categorized as poor, from >2.5 to <2.9 rich, and >2.9+ were richest (Sharma et al., 2022).

Statistical Analysis

The data were entered into the IBM SPSS 26.0 version for statistical analysis. As per the need of the objectives, research questions, and the nature of the variables, data were coded and classified. Data analysis was done by studying and coding the responses from the interview schedule (William, 2004). Descriptive and inferential statistics were used (Creswell, 2013) where the *p*-value had been considered significant if less than 0.05. Socio-economic and demographic characteristics were presented as numbers (N) and percentages (%). The association between dependent and independent variables was determined from the chi-square

test. Further, binary logistic regression analysis indicating the adjusted odds ratio was conducted to find out the net effects of independent variables over the dependent ones (William, 2004).

Ethical Consideration

The study was approved by the ethical review board of the Nepal Health Research Council (NHRC: No. 2078- 56/2021). Further research permission had been taken from the Office of the Dean, FOE, Tribhuvan University, Kirtipur, Kathmandu, Nepal. Written and verbal informed consent was obtained from the primary caregivers/mothers involved in the study (Sobal, 1992).

<div align="center">

Results

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Background Characteristics

The results illustrated that 50.5% (n=199) were male children and 49.5% (n=195) were female. Similarly, 9.9 % (n=39) of children were three years old, 44.7 % (n=176) were four years, and 45.4 % (n=179) were five respectively. The majority of parents (72.1%) were having two or less than two children while 27.9 % (n=110) had more than two. By caste/ethnicity, 13.2% (n=52) Dalit, 28.2 % (n=114) Janjati, 23.4 % (n=92) non-Dalit Terai castes group, and 35.3 % (n=139) were among the advantages castes. Similarly, by religion, majority of the respondents, 94.4 % (n=372) were Hindu, 2.3 % (n=9) Buddhist, and 3.3 % (n=13) other (Christian and Islam). More than half of the population (52.8%) belonged to a joint family followed by 47.2 % (n=186) of the nuclear family (Table 1).

Table 1

Background Characteristics of Preschool-aged Children (n=394)

Background characteristics	N	%
Gender		
Male	199	50.5
Female	195	49.5
Age		
Three years	39	9.9
Four years	176	44.7
Five years	179	45.4
Number of children		
Less than or equal to two	284	72.1
More than two	110	27.9
Castes/ethnicities		
Dalit	52	13.2
Janajati	111	28.2
Non-Dalit Terai castes	92	23.4
Advantages castes	139	35.3
Religions		
Hindu	372	94.4
Buddhist	9	2.3
Others (Christian and Islam)	13	3.3
Types of families		
Nuclear	186	47.2
Joint	208	52.8
Fathers' occupations		
Jobs (government/private/self-employed)	83	21.1
Businesses	97	24.6
Foreign countries	93	23.6
Others (labor and household work)	121	30.7

Mothers' occupations		
Jobs (government/private/self-employed)	54	13.7
Businesses	60	15.2
Agriculture	96	24.4
Others (labor and household work)	184	46.7
Fathers' educations		
Illiterate (cannot read and write)	56	14.2
Basic level (can read and write/up to grade eight education)	196	49.7
Secondary and above (above basic level education)	142	36.0
Mothers' educations		
Illiterate (cannot read and write)	91	23.1
Basic level (can read and write/up to grade eight education)	178	45.2
Secondary and above (above basic level education)	125	31.7
Economic ranking		
Poorest	96	24.4
Poor	98	24.9
Rich	101	25.6
Richest	99	25.1
Nutrition practices		
High	155	39.3
Low	239	60.7

Similarly, the result shows that 21.1 % (n=83) of children's father had a job of some kind (government/private/self-employed), 24.6 % (n=97) were engaged in businesses, 23.6 % (n=93) were foreign employees, 30.7 % (n=121) had other (labours and household work) professions. In the case of mothers' occupations, 13.7 % (n=54) children's mothers had jobs, 15.2 % (n=60) were engaged in business, 24.4 % (n=96) engaged in agriculture and 46.7 % (n=184) of mothers had other (labours and household work) profession.

The fathers of 14.2 % (n=56) children were illiterate, 49.7 % (n=196) had basic level education and 36.0 % (n=142) had a secondary level and above education. Likewise, the mothers of 23.1 % (n=91) children were illiterate, 45.2 % (n=178) had basic level education and 31.7 % (n=125) had a secondary and above level of education. The economic status of 24.4 % (n=96) households children was in the poorest category, with 24.9 % (n=98) poor. 25.6 % (n=101) rich and 25.1 % (n=99) richest. Likewise, the majority (60.7%) of the study children were found in a low level of nutrition practices, whereas 39.3 % (n=239) were high.

Relationship between Socio-economic and Demographic Variables and Nutritional Practices

Based on the category of nutritional practices, out of 394 preschool-aged children, 54.0 % of males and 46.0 % of females were in the lower level of nutritional practices, whereas 45.2 % of males and 54.8 % of females were in the normal level of nutritional practices. However, there was no significant relationship between nutritional practices and gender in children (χ^2=0.08, p=>0.1). Similarly, age of children did not have a significant association with nutritional practices (χ^2=0.87, p=>0.1). However, the number of children in the family had a significant association with nutritional practices (χ^2=9.31, p=<0.01) (Table 2).

Based on the relationship between caste/ethnicity and nutritional practices of the respondents, 18.0% of Dalit children were in a low category, whereas very less number of them (5.8 %) was found in normal nutritional practices. Likewise, majority of children in the study area were with low nutritional practices among the non-Dalit Terai castes (33.9%). However, the nutritional practices of

the majority of children (57.4%) from the advantaged castes and Janajati (29.7%) were found at normal levels. There was a significant association (χ^2=75.19, p=<0.01) with the score of nutritional practices and caste/ethnicity of the respondents. Types of family either joint or nuclear did not find an association (χ^2=0.13, p=>0.1) with nutritional practices.

Similarly, a significant association was found between fathers' occupations (χ^2=17.35, p=<0.01) and mothers' occupations (χ^2=28.25, p=<0.01) as well as fathers' educations (χ^2=30.30, p=<0.01) and mothers' educations (χ^2=54.22, p=<0.01) with nutritional practices of preschool-aged children. It was found that the higher the parental education better the nutritional practices. Similarly, the economic status of the family had a significant association with nutritional practices (χ^2=56.78, p=<0.01) as the majority (36.0%) of children found in the low level of nutritional practices from the poorest economic background and a little less (26.8%) from the poor family background. However, the majority of the children (36.8%) from the richest and a little less (34.8%) from rich families were in normal positions of nutritional practices.

Table 2

Relationship between Socio-economic and Demographic Variables and Nutritional Practices (n=394)

Responses	Nutritional practices		χ^2
	Low	Normal	
	N (%)	N (%)	
Gender			.09
Male	129(54.0)	70 (45.2)	
Female	110(46.0)	85(54.8)	
Age			0.87
Three years	25(10.5)	14(9.0)	
Four years	105(43.9)	71(45.8)	
Five years	109(45.6)	70(45.2)	
Number of children			9.31**
Less or equal to two	159(66.5)	125(80.6)	
More than two	80(33.5)	30(19.4)	
Caste/ethnicity			75.20**
Dalit	43(18.0)	9(5.8)	
Janajati	65(27.2)	46(29.7)	
Non-Dalit Terai castes	81(33.9)	11(7.1)	
Advantages castes	50(20.9)	89(57.4)	
Types of families			.138
Nuclear	120(50.2)	66(42.6)	
Joint	119(49.8)	89(57.4)	
Fathers' occupations			17.34**
Jobs	44(18.4)	39(25.2)	
Businesses	52(21.8)	45(29.0)	
Foreign countries	51(21.3)	42(27.1)	
Others	92(38.5)	39(18.7)	
Mothers' occupations			28.25**
Jobs	26(10.9)	28(18.1)	
Businesses	34(14.2)	26(16.8)	
Agriculture	80(35.5)	16(10.3)	
Others	99(41.4)	85(54.8)	

Fathers' educations			30.30**
Illiterate	43(18.0)	13(8.4)	
Basic level	135(56.5)	61(39.4)	
Secondary and above	61(25.5)	81(52.3)	
Mothers' educations			
Illiterate	74(31.0)	17(11.0)	54.22**
Basic level	121(50.6)	57(36.8)	
Secondary and above	44(18.4)	81(52.3)	
Economic ranking			56.78**
Poorest	86(36.0)	10(6.5)	
Poor	64(26.8)	34(21.9)	
Rich	47(19.7)	54(34.8)	
Richest	42(17.6)	57(36.8)	

Note. Significant at *p<0.05 and **p<0.01.

Associated Factors of Nutritional Practices

From multiple regression analysis, the adjusted odds ratio (aOR) was computed for nutritional practices through binary logistic regression. The result of regression analysis showed that the children from advantageous castes and high-level economic status were in the normal level of nutritional practices, whereas children from the disadvantaged castes and marginal economic backgrounds were found in low levels of nutritional practices. It was found that the children from Dalit (aOR=.19; *p*<0.01) and non-Dalit Terai castes (aOR=.18; *p*<0.01) families were less likely to have nutritional practices as compared to advantaged castes. Similarly, according to economic conditions, preschool-aged children in the poorest quintile (aOR=.23; *p*<0.01), were less likely to practice nutrition compared to the advantaged castes.

Table 3

Associated Factors of Nutritional Practices

Category	aOR	95% CI	
		Lower	Upper
Number of children			
More than two (Ref.)	.874	.465	1.642
Less or equal to two			
Fathers' educations			
Secondary and above (Ref.)	.728	.301	1.760
Illiterate	.869	.479	1.579
Basic level			
Mothers' educations			
Secondary and above (Ref.)	.539	.230	1.266
Illiterate	.537	.287	1.005
Basic level			
Mothers' occupations			
Other (Ref.)			
Job	.820	.409	1.642
Business	.538	.266	1.090
Agriculture	.687	.313	1.510

	aOR		
Fathers' occupations			
Other (Ref.)			
Job	.847	.403	1.779
Business	1.011	.485	2.111
Foreign job	.743	.356	1.547
Castes/ethnicities			
Advantages castes(Ref.)**			
Dalit**	.191	.079	.463
Janajati	.581	.322	1.048
Non-Dalit-Terai castes**	.181	.073	.447
Economic status			
Richest (Ref.)**			
Poorest**	.233	.095	.574
Poor	.600	.308	1.168
Rich	1.013	.540	1.899

Constant= 4.763, -2 Log likelihood = 415.177, Cox & Snell R Square =0.249, Nagelkerke R Square=0.338
Hosmer and Lemeshow Test: Chi-square=8.611, Sig.=.376

Note. Significant at *p<0.05 and **p<0.01; aOR = Adjusted Odds Ratio;CI:confidence interval

Discussion

Out of a total of 394 study populations, more than half (60.7%) of them were found in the low level of nutritional practices, whereas less than half (39.3%) of them were in high category. The number of children, castes/ethnicities, parental occupations and educations, and economic status were the main predictors of nutritional practices in unadjusted analysis. However, in multivariate analysis, marginal economic status and disadvantaged castes are found to be the powerful predictors of low-level nutritional practices.

The numbers of children has a significant effect on the nutritional practices of primary caregivers. Having more than two children is highly associated to malnutrition as compared to less than two. A similar finding has been observed in a systematic review as the number of children was negatively associated with healthy nutritional practices (Gutiérrez-Camacho et al., 2019). This signifies that the more children at home, the fewer nutritional practices they face.

According to the finding of this study, caste/ethnicity has a significant effect on the nutritional practices of preschool children. Among them, the children of Dalit, non-Dalit Terai castes, and Janajati were found to have a low level of nutritional practices than advantaged castes which is similar to a study conducted in Nepal that children from Terai/Madhesi, 'Other' and Janajati had not met the minimum dietary diversity of food groups (Baek & Chitekwe., 2019). Another similar finding has been observed in under-five aged children in eastern Terai of Nepal that the children of Dalit parents were more susceptible to low levels of nutrition (Kafle et al., 2017). Likewise, a high prevalence of low nutrition was found in under-five years Dalit children in Morang district, Nepal (Gachhadar et al., 2021).

Similarly, parental education has a significant effect across nutritional practices. The illiterate parents' preschool-aged children were found in less nutritional practices as compared to the others (Gutiérrez-Camacho et al., 2019; Lioret et al., 2015). Similarly, another similar result has been observed in 3-5 year children in Belgaum city of India as it was found

significantly different between the mother's education and the dietary habits of the children (Sankeshwari et al., 2013). This suggests that increasing mothers' education and empowering them in decision-making can improve the nutritional practices of their preschool-aged children (Beyene et al., 2015).

Parental occupation has also significant effect across nutritional practices. The preschool-aged children whose father has 'Other' occupations and whose mothers had agriculture occupations seemed to have a low level of nutritional practices. In this regard, a study reported that parents' employment boosts the food habit of children, however, mothers' full-time employment creates a less healthful food environment at home (Bauer et al., 2012).

Finally, economic status has a significant effect on the nutritional practices of the primary caregivers. The children of poorest and poor economic background were found in a low level of nutritional practices as compared to others. A similar finding has been observed in a systematic review that household income was significantly associated with the dietary practices of children below 24 months of age (Gutiérrez-Camacho et al., 2019). Further, a study in Nepal found that children from the poorest economic ranking were deprived of intake the legumes and nuts, dairy products, flesh foods, and other fruits and vegetables, and did not meet the minimum diversity of food practices (Baek & Chitekwe, 2019). Similarly, a study conducted on Filipino school-aged children found that children from the poorest family background were at the most risk of low-variability diets (Angeles-Agrippa et al., 2020). It can be argued that families who are from marginal economic backgrounds cannot afford verities of nutritious food for their children.

Strengths and Limitations of the Study

A major strength of this study was the study population with the required sample size, diverse ethnic, cultural, and socio-economic backgrounds, and a relatively high fertility rate. In addition, this study addressed the knowledge gap in the practices of preschool-aged children's nutrition with the relationship between demographic and socio-economic variables in Nepal and South Asia. However, there were some limitations of this study that need to be considered. Since the study was cross-sectional, the whole data were obtained only on the day of the survey. The study was conducted on children who studied in a government-based ECD centre; therefore, it may not be generalized to all preschool-aged children. This study did not address the effort of the day meal practices of ECD centers and may have an impact on the results of this study. Further, some of the determinants of nutritional practices such as accessibility of food items, cultural influences, and food choice of the individual child were not studied.

Conclusion

Most of the preschool-aged children in the study area were found in low level of nutritional practices. This study found that the number of children, parental education, occupation, caste/ethnicity, and economic status were significantly associated with the nutritional practices of preschool children. Additionally, nutritional practices are likely to be heavily influenced by economic status and caste/ethnicity. Community-based nutrition education intervention and mothers'/caregivers' awareness programs on nutritional practices, especially for the disadvantaged group (Dalit and non-Dalit Terai caste/ethnicity) as well as those with the poorest economic status may be an incredible contribution to improving the nutritional status of preschool-aged children. Additional research with a strong design and large sample size is

recommended to establish a causal relationship between nutritional status and socio-economic and demographic factors.

Acknowledgments

Conflict of Interest

None.

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