Factors associated with nutritional status of women of reproductive age group in rural, Nepal

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ABSTRACT

Background: Maternal nutrition is one of the most important health and welfare problems among women in developing countries. In women of reproductive age, malnutrition can result in adverse pregnancy outcomes. Maternal nutrition is the major public health problem in Nepal. **Objective:** The main purpose of the study was to establish the factors influencing the nutritional status of non-pregnant and non-lactating women of reproductive age in Shree Kedar VDC, Baitadi of Nepal. **Methodology:** A descriptive, cross-sectional study involving 229 non-pregnant and non-lactating women of reproductive age (15-49) was carried out in Baitadi district of Nepal. **Results:** In a total of 229 women, 45.4% of women were of age group 20-29 years. A significant proportion 32.3% was underweight with a mean body mass index of <18.5% and 4.8% were either overweight or obese. Women of all age groups were vulnerable to undernutrition. There was an indication of insufficient food availability at the household level. 22.7% of the study population reported of food inadequacy. Educational status and marital status were statistically significant in the determination of nutritional status. The study showed that the nutrition status of the study population in Shree Kedar VDC was poor. **Conclusion:** Food inadequacy, inadequate information/knowledge, low educational levels, caste, income, and family size were the key contributors to poor nutritional status. Furthermore, nutritional interventions are highly needed to improve the nutrition status of women.

Key words: Food adequacy, non-lactating women of reproductive age, non-pregnant women of reproductive age, nutritional status, risk factor

INTRODUCTION

Maternal nutrition refers to the nutritional needs of women during the antenatal and postnatal period (i.e. when they are pregnant and breastfeeding) and also may refer to the pre-conceptual period (i.e., adolescence).[1] Undernourished pregnant women have higher reproductive risks, including death during or following childbirth.[2] Many women suffer from a combination of chronic energy deficiency, poor weight gain in pregnancy, anemia, and other micronutrient deficiencies, as well as infections such as HIV and malaria.[3]

Malnutrition is one of the most important health problems among women in developing countries.[4,5] It is usually a result of a combination of inadequate dietary intake and infection. Inadequate food intake is a consequence of insufficient food available at the household level, improper feeding practices, or both. Feeding practices include both the quality and quantity of foods taken by the individual.[6] Poor sanitation puts women at increased risk of illness, which affects their nutritional status. Both inadequate food intake and poor environmental conditions reflect underlying social and economic conditions.[7,8] The majority of the population in developing countries is dependent on agriculture to supply their food needs and to provide income with which to supplement their subsistence production. The contributing factors are poor purchasing power, faulty feeding habits, large family size, frequent infections, poor health care, inadequate sanitation, and low agricultural production. Population living in the backward and drought-prone rural areas and urban slums and those belonging to the socially backward groups such as scheduled castes and tribal communities are highly susceptible to undernutrition.[9] Malnutrition has significant health and economic consequences. The most serious of which is increased a risk of death. Other outcomes include an increased risk of illnesses and a reduction in workers' productivity and increased absenteeism in the workplace; these reduce a person's lifetime earning potential and ability to contribute to the national economy. In women of reproductive age, malnutrition can result in adverse pregnancy outcomes. At least 120 million women in less developed countries are underweight.[10] The health status and practices, educational, and socioeconomic status of women as the principal caregiver have a powerful influence on the well-being of their children.[11] The quality of care provided depends on the availability of the resources for care at the household level: Education and knowledge, physical and mental health of the caregiver, time, autonomy, and social support, as well as family economic resources. Most of these resources are compromised in our context; women are systematically denied certain rights, as exemplified by the very low age at marriage and the low rates of attended births. The ability of mothers to provide care to children ultimately rests on the quality of the care that they

themselves receive; inequality experienced by women and girls has an important negative effect on the caring functions.

MATERNAL NUTRITION IN NEPAL

According to the National Demographic Health Survey (NDHS) 2011, in Nepal, 22.7% women are undernourished in Terai as compared to 12.4% and 16.5% in hill and mountain, respectively. Poverty and low household consumption power lead to poor nutrition. The disadvantaged groups are the most affected, i.e., Dalits in Hill and Terai and Janajati in Terai. According to the NDHS 2011, 12% of women in Nepal are <145 cm. Women of Nepal are generally of short stature, and according to NDHS, 12% of women of Nepal are <145 cm. 18.2% of non-pregnant women are undernourished or chronically energy deficient (body mass index [BMI] <18.5 kg/m^2). In adolescence, 25.8% of them have low BMI. Prevalence of anemia among adolescent girl is around 39% over the past 5 years.[12] In women of reproductive age, improper nutrition can result in adverse outcomes. Still, in Nepal, many women and children suffer from serious health problems due to lack of sufficient nutrition. This study set out to investigate the trend and cause of nutrient deficiencies that accelerate maternal mortality, morbidity, poor development, and performance among women of reproductive age group. Although the research focused on maternal health is common, research focused specifically on maternal nutrition is rare. Research, program reports, and other materials specifically related to maternal nutrition principles, practices, and programs are not abundant either.

METHODOLOGY

A descriptive, cross-sectional study was carried out among 229 non-pregnant and non-lactating women of reproductive age (15-49) in Shree Kedar VDC of Baitadi district of Nepal from July to August 2016. The sample size of 229 women was determined based on the prevalence of malnutrition among non-pregnant and non-lactating women in Nepal estimated at 18.2% (NDHS 2011).[12] A structured questionnaire was used to collect data and information on sociodemographic characteristics, the availability and access to health services. It also involved assessing various determinants of health, risk factors, and social indicators (employment, living condition, and education). Data analysis was done using SPSS version 21. Cross tabulations were performed on some selected variables. Statistical significance was determined using Pearson's Chi-square test and linear regression.

Inclusion and Exclusion Criteria

Non-pregnant and non-lactating women of reproductive age group were included in the study. The non-pregnant state among study women was determined by asking when they last had their menstrual period. Those women who had missed their menstrual period for the past 1-month were excluded from the study. Those suspected to be pregnant were excluded because their weight would not reflect their true nutritional status.

Measurement of Nutritional Status

The nutritional status of the women was assessed using BMI as an indicator of energy balance in adults. The measurements were taken with the women wearing light clothes and no shoes to minimize error. Weight was recorded using a 120 kg weighing machine. A measuring tape was used to measure a height of each woman. BMI was calculated as weight/height 2 (kg/m^2). The anthropometric data were entered into the EPI-INFO Program, and the BMI was determined by the categories of nutritional status of adults reported by FA0 (2005) as summarized in Table 1.

Ethical approval was taken from an Ethical Review Board of Inje University and concerned VDC authority. Verbal consent was obtained from each respondent, and the confidentiality of the received information was maintained. The questionnaire was pretested, and modifications were done if needed. The questionnaire was back-translated English to the Nepali language.

RESULTS

Sociodemographic Information

The response rate was 100% (*n* = 229). Most of the women (45.4%) were of 20-29 age group. 34.9% of the study women were illiterate, whereas a majority of the study populations (81.2%) were married. Among the respondents, 63.8% of a family heavily relied on agriculture as their main source of income. More than half portion (55.5%) of households had a joint family. 44.1% of respondents had monthly income range of Rs.10000-20000. The majority of the study population were upper caste group (65.5%) followed by Dalit (34.5%).

Nutritional Status of Women of Reproductive Age Group

The nutritional status of the women was assessed using BMI and height as an indicator of energy balance in adults. The nutritional status was also compared according to the age group.

Nutritional Status of Women of Reproductive Age Group By BMI

It was established that out of the 229 study women, 32.3% were underweight, whereas 62.9% were normal. Results further show that 4.8% of the women interviewed were either overweight or obese as shown in Table 2.

Table 1: Body mass index cut offs

Category	BMI (kg/m^2)
Underweight	<18.5
Normal	18.5-24.9
Overweight	25-29.9
Obese	>30

BMI: Body mass index

Table 2: Nutritional status of study population by BMI (*n*=229)

Category	BMI (kg/m^2)	Frequency (%)
Underweight	<18.5	74 (32.3)
Normal	18.5-24.9	144 (62.9)
Overweight/obese	>25	11 (4.8)
Total		229 (100)

BMI: Body mass index

Nutritional Status of Study Population by Height

3.5% of the women were <140 cm. 11.4% of the women were of the height 140-144.9 cm, and 85.2% of the women were of the height 145 cm or more [Table 3].

Distribution of Nutritional Status of Women (BMI) by Age

Table 4 illustrates that there was no significant relationship between age and nutritional status (*P*-value 0.550). As almost all the age group women were equally prone to poor nutrition.

Food Adequacy

22.7% of the study population reported to have faced food inadequacy in the past 1 month during the time of the study, and 77.3% of the respondents did not face food shortage [Table 5].

Food Adequacy with BMI

The finding from the study shows that there is a significant relationship between food adequacy and the BMI (*P*-value 0.001). Out of the 32.3% of women suffering from BMI, 18.7% of people had faced food inadequacy in the past 1 month while 4% of the people facing food inadequacy had good BMI [Table 6].

Food Adequacy with Types of Family

The finding from the study shows that there is a significant relationship between food adequacy and the type of family (*P*-value 0.001). 20% of the joint family faced food inadequacy as compared to 2.7% of the nuclear family [Table 7].

Food Consumption Among Study Population

Out of the total study population, 88.6% of them eat 3 times per day, 7% of them eat 4 times a day, and 4.4% of them eat 2 times a day. None of them eat one or more than 4 times a day [Table 8].

Health Status of Women
Reported illness and health of study population

42.8% of women reported an episode of illness during the past 1 month preceding the study. Fever was most frequently mentioned, followed by diarrhea and weakness. About 22.3% of women perceived that their health was bad.

Health status of study population and nutritional status

There was a significant positive relationship between the condition of being diseased and respondents having poor nutritional status (*P*-value 0.001). The result showed that 25.7% of respondent who had poor nutritional status reported of illness in the past 1 month compared to 17% of respondents who had good nutritional but poor reported of illness [Table 9].

Factors Influencing Nutritional Status
Education level

The findings from the study indicated that there was a significant relationship between the educational level of the respondents and the general nutritional status (*P*-value 0.006). Respondents who attained a higher level of education beyond secondary level had a higher probability of having good nutritional status than those who never attended school at all. It was observed that 20% of the respondents who had attained education level beyond secondary had good nutritional status compared to 3% in the same category who had poor nutritional status. On the other hand, it can also be noted from Table 11 that more respondents 14% who did not attend school at all had poor nutritional status.

Marital Status

The findings from the study indicate that the majority of the study women 81.2% were married while 6.1% of the women were separated, divorced, or widowed. This study also shows that marital status has a significant effect on the nutritional status of women of reproductive age group (*P*-value 0.008). 26.2% of married women had poor nutritional status as compared to 55% of married women who had good nutritional status.

Household Size

The results of the type of family of a study population of reproductive age of 15-49 years in Shree Kedar VDC are presented in Table 10. Majority of households 55.6% lived in the joint family, and a minority 44.6% lived in the nuclear family.

The study further revealed that there was a significant relationship between the family type and the nutritional status (*P*-value 0.001). Households that had fewer individuals were more likely to have good nutritional status. 23.6% of study population living in joint family was underweight.

Caste

The study showed that there is a significant positive relation between caste and the nutritional status (P-value 0.001). Majority of upper caste group had good nutritional status compared to the Dalit population. 18.3% of the Dalit population had good nutritional status compared to 49.4% of upper caste group which had good nutritional status.

Table 3: Nutritional status of study population by height (*n*=229)

Height (cm)	Frequency (%)
<140	8 (3.5)
140-144.9	26 (11.4)
145 cm or more	195 (85.2)
Total	229 (100)

Table 4: Distribution of nutritional status of study population (BMI) by age (*n*=229)

Characteristics	15-19 years	20-29 years	30-39 years	40-49 years	*P* value
Respondents with poor nutritional status	6 (2.6)	16 (7)	16 (7)	36 (15.7)	0.550
Respondents with good nutritional status	19 (8.3)	42 (18.3)	29 (12.7)	65 (28.4)	
Total	25 (10.9)	58 (25.3)	45 (19.7)	101 (44.1)	100

BMI: Body mass index

Income

The study shows that there is a significant positive relationship between income and the nutritional status (P-value 0.002). 24.8% of women who had poor nutritional status had a family income of less than Rs. 10000 per month compared to 7.4% of women who had family income of more than Rs. 10000 per month.

Previous Nutrition Knowledge

Findings from the study showed that study women who had better knowledge of the best methods to attain good nutrition, that is through consumption of sufficient and various types of foods, significantly had better nutritional status compared to their counterparts. The majority of the women 18.3% out of the 32.2% of women who were undernourished did not know the best method of acquiring good nutrition. The observation of this study demonstrates a very serious gap in knowledge about key nutritional facts in the study population in Shree Kedar VDC. Furthermore, results show that of the 32.3% of women

who were underweight, 23.1% did not know the relationship between dietary intake and nutritional disorders, in contrast with 9.17% of those who were aware of this relationship. 17.9% of the underweight weight did not know the best method for acquiring good nutrition. 20.1% of the undernourished people did not know the definition of malnutrition.

Risk Factors Associated with Malnutrition

In this section, underweight was taken to represent malnutrition of women of reproductive age group in Shree Kedar VDC, Baitadi District of Nepal. Thus, the risk factors associated with underweight of women were considered to be sufficient supply of food, poor sanitation, and access to health services. There was a significant relationship between nutritional status and availability of a sufficient supply of food (*P*-value 0.000). It was observed that the women from households that had enough food throughout the year had better chances of having a better nutritional status. Access to health services was observed to have a significant relationship with nutritional status (*P*-value 0.000). This implies that households that had access to health services were more likely to have a better nutritional status. Access in the context of this study means proximity to affordable and quality health services. There was a significant relationship between sanitation condition and the chance of having poor or good nutritional status (*P*-value 0.000). The people living in poor environmental condition were subject to poor nutritional status [Table 11].

DISCUSSION

Anthropometric assessment is a simple method and serves as the most useful screening test, especially in developing countries of the world, where malnutrition is widely prevalent and the resources are limited. According to reviewed literature, women are typically the primary caretakers in families, and their educational and social status will also determine to a great extent their own health as well as their families.[7] According to our research, the same thing was signified as 47% who were literate or received any sort of schooling had good nutritional status. According to the NDHS report, 12% of women in Nepal are <145 cm and 18.2% of the women were undernourished.[12] According to this research study, 14.8% of the women of reproductive age group were <145 cm which is quite near to the national data. However, 32.3% of the study populations were underweight which does not match with the national data. The disadvantaged groups are the most affected - Dalit-Hill and Terai. Out of 34.45% of the studied population who were underweight, 16.15% of Dalit women had poor nutritional status. A research done in Bangladesh showed that chronic energy deficiency was highly prevalent among women, 56% had BMI <18.5 kg/m^2.[13] This is also significant in this study as almost 32.3% of the women of reproductive age group had BMI <18.5 kg/m^2. The mean body weight was 154.15 cm. This signifies that there is somewhat similar nutritional status of women among South Asia. A research in Nigeria showed the

Table 5: Food adequacy among study population (*n*=229)

Food adequacy	Frequency (%)
Yes	177 (77.3)
No	52 (22.7)
Total	229 (100)

Table 6: Food adequacy with BMI (*n*=229)

Food adequacy	Poor BMI	Good BMI	Total	Chi-square	*P*-value
Yes (%)	31 (13.6)	146 (63.7)	177 (77.3)	78.064	0.001
No (%)	43 (18.7)	9 (4)	52 (22.7)		
Total (%)	74 (32.3)	155 (67.7)	100		

BMI: Body mass index

Table 7: Food adequacy with the family types (*n*=229)

Food adequacy	Nuclear family	Joint family	Total	Chi-square	*P*-value
Yes (%)	96 (42)	81 (35.3)	177 (77.3)		
No (%)	6 (2.7)	46 (20)	52 (22.7)	29.665	0.001
Total (%)	102 (44.7)	127 (44.3)	100		

Table 8: Regular intake of meals per day (*n*=229)

Intake of meal	Total (%)
Twice a day	10 (4.4)
3 times a day	203 (88.6)
4 times a day	16 (7)
Total	100

Table 9: Health status of study population and nutritional status (*n*=229)

Characteristics	Illness	No	Total	Chi-square	*P* value
Respondents with poor nutritional status	59 (25.7)	15 (6.6)	74 (32.3)	60.923	0.001
Respondents with good nutritional status	39 (17)	116 (50.7)	155 (67.7)		
Total	98 (42.7)	131 (57.3)	229 (100)		

Table 10: Association of factor with nutritional status (*n*=229)

Characteristics	Respondents with poor nutritional status	Respondents with good nutritional status	Total	Chi-square	*P* value
Education level					
Illiterate	7 (14)	46 (21)	53 (35)	14.430	0.006
Literate	32 (4.8)	48 (5.2)	80 (10)		
Primary	11 (4.4)	12 (6.5)	23 (10.9)		
Secondary	10 (6.1)	15 (15)	25 (21.1)		
Above secondary	14 (3)	34 (20)	48 (23)		
Total	74 (32.3)	155 (67.7)	229 (100)		
Marital status					
Married	60 (26.2)	126 (55)	186 (81.2)	9.555	0.008
Unmarried	5 (2.2)	24 (10.5)	29 (12.7)		
Others	9 (3.9)	5 (2.2)	14 (6.1)		
Total	74 (32.3)	155 (67.7)	229 (100)		
Type of family					0.001
Nuclear	20 (8.7)	82 (35.7)	102 (44.4)	13.577	0.001
Joint	54 (23.6)	73 (32)	127 (55.6)		
Total	74 (32.3)	155 (67.7)	229 (100)		
Caste					0.001
Dalit	37 (16.15)	42 (18.3)	79 (34.45)	11.672	0.001
Upper caste	37 (16.15)	113 (49.4)	150 (65.55)		
Total	74 (32.3)	155 (67.7)	100		

Table 11: Risk factors associated with malnutrition

Parameter	Linear regression (β)	SE	Significant
Food adequacy throughout the year	2.819	0.752	0.000
Knowledge about nutrition	0.478	0.626	0.445
Income	−1.832	0.581	0.002
Access to health services	−3.499	0.654	0.000
Membership of social organization	−0.238	0.295	0.419
Poor sanitation	−3.181	0.668	0.000

prevalence of undernutrition among women was significantly higher in rural than urban communities.[14-16] The study was also set on the rural setting which was significant with our study. A reviewed literature shows that maternal education and knowledge are critical for improved maternal and child nutrition, efforts to improve household economic status, increase the rural farmers benefits from agriculture, and empower mothers to earn income and take decisions, complemented with nutritional and public health services, are more likely to improve both child and maternal nutrition in the rural areas than in urban, especially in regions with the highest burden of malnutrition.[17,18] The majority of the study population was farmers and the major source of income was agriculture which comprised of about 63.8% of the total studied families.

Those who had access to health facilities had good nutritional status as compared to those who did not have good nutritional status. Access to health center had a significant association with nutritional status. Those women involved in the social organization had good nutritional status, thus resulting in good nutritional status. The observation of this study demonstrates a very serious gap in knowledge about key nutritional facts in the study population in Shree Kedar VDC which the stakeholders of this VDC have failed to see the desired need in the lives of women of reproductive age. It can be noted from Table 10 that more respondents 14% who did not attend school at all had poor nutritional status. This difference may be attributed to the fact that women of low educational level are less empowered to access economic resources which are reflected in their poor general nutritional status. It can also be concluded that women education is a critical resource for maternal and child health, nutrition, and survival. Educated mothers tend to be better able to use health-care facilities, interact freely with health-care providers, comply with treatment recommendations, and keep their living environment clean. 22.7% of the family reported that they had food inadequacy and 18.7% of those women were reported having poor nutritional status. If a household has an adequate supply of food throughout the year, it implies that it has enough income to cater for its food requirements or has the necessary capacity in the form of land and other inputs to produce enough food for itself. Access to health services was observed to have a significant relationship with nutritional status. This implies that households that had access to health services were more likely to have a better nutritional status. Access in the context of this study means proximity to affordable and quality health services. It also observed that, in addition to the hygienic condition of the household, nutritional status could also be affected by the ease of access to and quality of health care, which is a big problem in the hilly areas of the far western region. The majority of study population 63.7% did not know of the existence of the link between dietary intake and nutritional disorders. This observation demonstrates a very serious gap in knowledge about key nutritional facts by the study population. This shows the link between knowledge of nutrition and nutritional status. This demonstrates that knowledge through nutrition education could improve nutritional status through improved dietary practices. Thus, well-targeted nutrition education programs designed to improve specific caregiving practices, better dietary plans, hygiene,

and use of health services could in the short-term help mothers make better use of their scarce resources and protect their own and possibly their children's health and nutrition.

CONCLUSION

The sociodemographic factors studied education, availability of a sufficient supply of food, and access to health services was significantly positively associated with malnutrition. Low educational levels among the women greatly undermined the welfare of them since it is the key cause of poor nutritional status. Almost equal percentage of the women of all age group was prone to poor nutritional status. Large family sizes were found to be a major contributor to poor nutritional status among study women. The best way to tackle nutritional and food crisis in these areas would be to educate the people and provide food aid. It is recommended that nutritional education and family planning should also be extended. The government should integrate and strengthen maternal nutrition in key health programs through community-based approaches.

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