

Factors Associated with Minimum Dietary Diversity Among Women of Reproductive Age of Gokarneshwor Municipality, Nepal

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ABSTRACT

Introduction: Micronutrient deficiencies remain a significant public health concern among women of reproductive age. Dietary diversity is widely used as a proxy indicator for micronutrient adequacy and overall diet quality. Limited access to diverse foods and socioeconomic disparities often lead to monotonous diets dominated by staples, increasing the risk of hidden hunger. **Aims:** To assess minimum dietary diversity and its associated factors among women of reproductive age. **Methods:** A community-based cross-sectional study was conducted among 178 women aged 15–49 years in Gokarneshwor Municipality. Data were collected using a semi-structured questionnaire and the Minimum Dietary Diversity for Women guideline based on a 24-hour dietary recall. Descriptive statistics were used to summarize the data, and the chi-square test assessed associations between socio-demographic variables and dietary diversity. A p-value <0.05 was considered statistically significant. **Results:** The mean age of participants was 35.65±8.34 years. Most women belonged to *Adivasi/Janajati* ethnicity 118 (66.31%), were homemakers 96 (53.94%), and lived in nuclear families 108 (60.67%). Overall, 78.09% of women achieved adequate minimum dietary diversity (MDD-W ≥5), with a mean dietary diversity score of 6.29±1.9. Staples 177 (99.40%) and legumes 170 (95.50%) were the most commonly consumed food groups, whereas nuts and seeds 56 (31.46%) and animal-source foods were less frequently consumed. Household income showed a significant association with adequate dietary diversity (p=0.007). **Conclusion:** Despite most women attaining adequate dietary diversity, dietary patterns were primarily staple-based with insufficient intake of micronutrient-dense foods. Household income significantly influenced dietary diversity.

Keywords: Dietary diversity; Micronutrient deficiency; Women of reproductive age

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INTRODUCTION

Micronutrient deficiencies continue to be a major global public health concern, especially among women of reproductive age (WRA) in low- and middle-income countries, despite the fact that these nutrients are necessary for hormone regulation, enzyme production, and normal growth and development.¹ Iron, iodine, and vitamin A deficiencies disproportionately affect this group due to increased physiological demands during pregnancy and lactation and limited access to diverse, nutrient-rich foods^{2,3} leading to impaired immunity, poor pregnancy outcomes, and

reduced productivity.^{4,5} Dietary diversity, a qualitative indicator reflecting consumption of varied food groups, serves as a proxy for micronutrient adequacy and overall diet quality.⁶ Monotonous, staple-based diets and policies emphasizing caloric sufficiency over nutritional quality perpetuate multiple micronutrient deficiencies.^{7,8} There were significant association between dietary diversity and socioeconomic status, family size, educational level, occupation⁷ and household monthly income.⁹ There is still a lack of recent data from Nepal. Hence, this study aimed to assess the factors associated with minimum dietary diversity among WRA of Gokarneshwor Municipality.

METHODS

A community based cross- sectional study was conducted among women at ward no. 8 and 9 of Gokarneshwor Municipality in Kathmandu district, Nepal from June 2024 to November 2024. Ethical clearance was obtained from Nepal Medical College-Institutional Review Committee (reference no. 71-080/081). Verbal consent was taken from all participants prior to the interview. Women of reproductive age between 15 years and 49 years were included in the study. Pregnant, lactating, and seriously ill women were excluded. The sample size was calculated to be 148 using the formula, $n = Z^2pq / d^2$ where P was taken as 55.6%.¹⁰ However, a total of 178 samples were collected to increase statistical power particularly for subgroup analysis and secondary outcome. A list of households with women of reproductive age was collected from the female community health volunteers of ward no. 8 and 9. Then, women who fulfilled the inclusion criteria were selected using simple random technique till the required sample size was obtained. The semi-structured questionnaire was used to interview the participants after obtaining the verbal consent. Dietary diversity among women were ascertained by using Minimum Dietary Diversity for Women of reproductive age (MDD-W) guideline provided by Food and Agriculture Organization (FAO).¹¹ Data were entered in Microsoft Excel datasheet and analyzed with SPSS Version 16.0. Descriptive statistics such as means, standard deviation, frequencies and percentages were obtained. Association between categorical variables were found by using Chi-square test. Variables with P value less than 0.05 were taken as statistically significant at 95% of the confidence interval.

RESULTS

Of total 178 participants, 81(45.50) women were in 35 to 44 age group followed by 50 (28.10%) women in 25 to 34 age group with the mean $\pm$ SD of 35.65 $\pm$ 8.34 years. Most of the women 118 (66.31%) belonged to *Adivasi/Janajati* ethnic group followed by *Brahmin/Chhetri* 49 (27.52%). Similar proportions of women had attained basic education 55 (30.91%) and secondary education 58 (32.58%). However, 38 (21.35%) of women had no education. Regarding occupation status, 96 (53.94%) of participants were homemakers followed by 69 (38.76%) job holders and 13 (7.30%) were students. More than half of respondents' 97 (54.50%) family income was equals to or above Rs 45000 with median family income being Rs 45000 with IQR: 35000-60000. Most of the women 108 (60.67%) were living in nuclear family with 107 (60.11%) of them with the family size equals to or more than 5 (Table I).

The prevalence of women who had adequate minimum dietary diversity or who were consuming 5 or more than 5 food groups were 139 (78.09%) whereas 39 (21.91%) of them had inadequate dietary diversity. Dietary diversity had a mean score of 6.29 $\pm$ 1.9, with 3 and 11 being the lower and higher values, respectively (Figure 1).

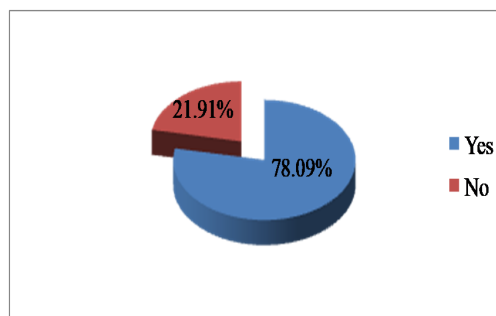


Figure 1: Prevalence of adequate minimum diet diversity (MDD-W) in reproductive aged women (n=178)

Variables	n	(%)
Age group in years		
15 to 24	21	11.80
25 to 34	50	28.10
35 to 44	81	45.50
≥45	26	14.60
Mean±SD	35.65±8.34	
Ethnicity		
Brahmin/Chhetri	49	27.52
Adivasi/Janajati	118	66.31
Dalit	11	6.17
Educational status		
No education	38	21.35
Basic education	55	30.91
Secondary education	58	32.58
More than secondary education	27	15.16
Occupation status		
Homemaker	96	53.94
Student	13	7.30
Job holder	69	38.76
Family income(NRs)		
<45000	81	45.50
≥45000	97	54.50
Median (IQR)	45000 (35000-60000)	
Family type		
Nuclear	108	60.67
Joint/Extended	70	39.33
Family size		
<5	71	39.89
≥5	107	60.11

Table I: Socio-demographic characteristics of the women (n=178)

Table II displayed the proportions of each food group that participants consumed during the course of the past 24 hours. Sta-

ple or cereal foods made up the majority of the participant's diets 177 (99.40%), followed by beans peas and lentils 170 (95.50%), other vegetables 136 (76.40%) and dark green leafy vegetables 125 (70.22%). More than half of the respondents 103 (57.86%) ingested other fruits and dairy products also by 102 (57.30%) women. Whereas 83 (46.63%) women consumed other fruits and vegetables high in vitamin A, 84 (47.19%) of them consumed eggs and 83 (46.62%) consumed meat, poultry and fish. Consumption of nuts and seeds was lower 56 (31.46%) among women.

Food group consumption in previous 24h	n	(%)
Grains, white roots and tubers, and plantains		
Yes	177	99.40
No	1	0.60
Beans, peas and lentils		
Yes	170	95.50
No	8	4.50
Nuts and seeds		
Yes	56	31.46
No	122	68.54
Dairy products		
Yes	102	57.30
No	76	42.70
Meat, poultry and fish		
Yes	83	46.62
No	95	53.38
Eggs		
Yes	84	47.19
No	94	52.81
Dark green leafy vegetables		
Yes	125	70.22
No	53	29.78
Other vitamin A-rich fruits and vegetable		
Yes	83	46.63
No	95	53.37
Other vegetables		
Yes	136	76.40
No	42	23.60
Other fruits		
Yes	103	57.86
No	75	42.14

Table II: Consumption of food groups by respondents (n=178)

Table III revealed that adequate minimum dietary diversity was found in 64 (79.01%) women between 35 to 44 years age group followed by 37 (74.0%) women between 25 to 34 years age group. Majority of women 91 (77.12%) belonging to *Adivasi/Janajati*

had the adequate dietary diversity. Women who had attained basic 46 (83.63%) as well as secondary education 45 (77.58) had the adequate dietary diversity. Homemakers 76 (79.16%) who were living with nuclear family 85 (78.70%) and those who had family income of equals to or more than Rs 45000 83 (85.56%) had adequate dietary diversity. Women whose family size was more or equals to five 85 (79.44%) had adequate dietary diversity. There was a significant association between the family income and the adequate dietary diversity ($p=0.007$). However, there was no significant association between age, ethnicity, education status, occupation status and type of family.

Variables	Minimum dietary diversity				P value
	Adequate		Inadequate		
	n	(%)	n	(%)	
Age group in years					
15 to 24	15	71.43	6	28.57	0.439
25 to 34	37	74.0	13	26.0	
35 to 44	64	79.01	17	20.99	
≥45	23	88.46	3	11.54	
Ethnicity					
<i>Brahmin/Chhetri</i>	40	81.63	9	18.37	0.737
<i>Adivasi/Janajati</i>	91	77.12	27	22.88	
<i>Dalit</i>	8	72.72	3	27.28	
Education status					
No education	24	63.15	14	36.85	0.051
Basic education	46	83.63	9	16.37	
Secondary education	45	77.58	13	22.42	
More than secondary education	24	88.88	3	11.12	
Occupation status of women					
Homemaker	76	79.16	20	20.84	0.932
Student	10	76.92	3	23.08	
Job holders	53	76.81	16	23.19	
Family income					
<45000	56	69.13	25	30.87	0.007*
≥45000	83	85.56	14	14.44	
Type of family					
Nuclear	85	78.70	23	21.30	0.806
Joint/Extended	54	77.14	16	22.86	
Family size					
<5	54	76.05	17	23.95	0.361
≥5	85	79.44	22	20.56	

***Significant P-value <0.05, Chi-square test**

Table III: Association of minimum dietary diversity among women of reproductive age with independent variables (n=178)

DISCUSSION

This study assessed the minimum dietary diversity among women of reproductive age and the factors associated with it. The findings revealed that 78.09% of women achieved adequate minimum dietary diversity (MDD-W ≥ 5 food groups) with a mean dietary diversity score of 6.29 ± 1.9 , indicating that a majority of participants consumed a relatively diversified diet. This proportion is higher than the findings reported from West Africa (31%) and Bangladesh (40.3%), where limited access to diverse foods, cultural dietary patterns across regions and poor socioeconomic conditions constrained women's diets.^{3,12} Similarly, the proportion of adequate dietary diversity in this study is higher than the findings from urban Baglung, Nepal, where only 55% of pregnant women consumed a diversified diet with a mean dietary diversity score of 4.76.¹³ However, our findings are comparable to the Ethiopian study by Merga et al., where 81.9% of women met minimum dietary diversity, suggesting that community-level food availability and purchasing capacity may improve dietary practices.²

In terms of food group consumption, the majority of participants consumed grains, white roots, and tubers (99.4%) and beans, peas, and lentils (95.5%), indicating a strong reliance on staple foods. This pattern is consistent with studies conducted in Nepal and other low- and middle-income countries, where diets are predominantly based on cereals and legumes.¹⁴ However, comparatively lower consumption of nutrient-dense foods such as nuts and seeds (31.46%), meat, poultry and fish (46.62%), eggs (47.19%) and vitamin A rich fruits and vegetables (46.63%) was observed. Similar patterns have been observed in resource-poor settings, where reliance on starchy staples contributes to hidden hunger and micronutrient deficiencies.^{7,14,15} Comparable findings were reported in Bangladesh, where intake of animal-source foods and nutrient-dense food groups was relatively low.³ Low consumption of animal-source foods and nuts may predispose women to iron, zinc, and vitamin deficiencies, which are already prevalent globally and in Nepal.^{4,16,17} Socioeconomic factors played a critical role in dietary diversity.

Family income showed a significant association with adequate MDD ($p=0.007$), indicating that women from household income $\geq$ NRs 45,000 had better access to diverse foods and were more likely to achieve adequate dietary diversity compared to those with lower income. This aligns with studies from Ethiopia, Lesotho, and India, which identified income, purchasing power, and women's decision-making autonomy as key determinants of dietary quality.^{2,9,18} Although education status showed a near significant association ($p=0.051$), women with higher educational attainment demonstrated better dietary diversity. Education may enhance knowledge regarding nutrition and healthy food choices, enabling women to make informed dietary decisions. Previous studies have also highlighted education as an important determinant of dietary diversity among women of reproductive age.^{13,19} Compared with national data, the prevalence of adequate MDD in this study exceeds the NDHS 2022 estimates for pregnant and non-pregnant women in Nepal (55–59%), suggesting possible local

improvements in food access or awareness.¹⁰ Nevertheless, persistent dependence on staple foods and suboptimal intake of micronutrient-rich foods indicate continued vulnerability to deficiencies. Previous Nepali studies have documented inadequate dietary intake, anemia, and micronutrient insufficiencies among WRA, particularly in poorer and marginalized groups.^{14,20,21}

LIMITATION

This study's cross-sectional design limits causal inference, and the 24-hour recall method may not represent habitual intake and is subject to recall bias.

CONCLUSION

Most women achieved adequate minimum dietary diversity; however, consumption of certain micronutrient-rich food groups such as nuts, seeds, and animal-source foods remains relatively low. Given that dietary diversity is an important proxy indicator of micronutrient adequacy, efforts should focus on improving access to and consumption of nutrient-dense foods, particularly among lower-income households. Nutrition education programs, women's empowerment initiatives, and strategies to improve household economic conditions could contribute to better dietary practices and improve overall health outcomes.

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