

# Factors Influencing Dietary Diversity of Pregnant Women Attending Antenatal Care in Western Regional Hospital, Nepal: A Cross-sectional Study

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## ABSTRACT

**Introduction:** Diet during pregnancy is important to fulfill the nutritional demand of physiological changes as well as to create an environment for fetal development. In Nepal, meal diversity scores of mothers and children are low. The evidence regarding situation of dietary diversity among pregnant women was scarce in the Western Region of Nepal. Thus, this study was conducted to generate evidence regarding the status and determinants of dietary diversity among pregnant women.

**Methods:** It was a cross-sectional study. Systematic random sampling was done to select 282 pregnant women of third trimester attending antenatal care in Western Regional Hospital, Nepal. The semi-structured questionnaires, 24-hour recall tool, and Household Food Insecurity Access Scale were used to collect information from participants. Univariate, bivariate and multivariate analysis was done to assess the status, association as well as strength of association between study variables respectively.

**Results:** The mean ( $\pm$ SD) Women's Dietary Diversity Score was 4.96 ( $\pm$ 1.42). Pregnant women having education level  $<$  SLC compared to  $\geq$  SLC were 74.7% less likely to have high dietary diversity to lowest dietary diversity (AOR: 0.253, CI: 0.103 – 0.620,  $p=0.003$ ). Similarly, pregnant women having an unpaid occupation of husbands compared to paid were 74.5% less likely to have high dietary diversity to lowest dietary diversity (AOR: 0.255, CI: 0.074 – 0.876,  $p=0.030$ ).

**Conclusions:** Consumption of medium dietary diversity was predominant among pregnant women. The education of pregnant women and the occupation of her husband were the two significantly associated factors with dietary diversity.

**Keywords:** ANC; Dietary diversity; Household Food Security; Nepal; Pregnant women

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[www.jkahs.org.np](http://www.jkahs.org.np)

DOI:

<https://doi.org/10.3126/jkahs.v2i3.26653>

## Article Info.

### How to cite this article?

Lama N, Lamichhne R, Bhandari R, K.C. S, Sharma D, Bhandari GP, Wagle RR. Factors Influencing Dietary Diversity of Pregnant Women Attending Antenatal Care in Western Regional Hospital, Nepal: A Cross-sectional Study. Journal of Karnali Academy of Health Sciences. 2019;2(3): 189-196.

Received: 4 Sep., Accepted: 2 Nov., Published: 11 Dec. 2019

Conflict of Interest: None, Source of Support: None

## INTRODUCTION

Dietary diversity is the consumption of number of foods from varied food groups over a reference period that ensures nutrient adequacy and diet quality. Enormous evidence from developed countries and limited studies from developing countries show that dietary diversity has strong association with nutrient adequacy.<sup>1</sup> Individual dietary diversity reflects the nutrient adequacy of diet.<sup>2</sup>

Adequate nutrition between the period of woman's pregnancy and a child's second birthday has immense advantages throughout the life cycle and across generations.<sup>3</sup> Healthy growth and development essentially need a balanced diet of nutrients and vitamins which includes a variety of foods from different food groups (vegetables, fruits, grains, and animal source foods).<sup>4</sup> During pregnancy maternal diet is imperative to meet nutritional demand for physiological changes and to create the environment for fetal development.<sup>5</sup> Poor diet is the cause for vitamin A deficiency in 19 million pregnant women and anemia in 500 million women of childbearing age. Burden of micronutrient deficiencies are high in South Asia and sub-Saharan Africa.<sup>6</sup> Traditionally vegetarian diets, low intake of iron-rich food (particularly meat), high intake of inhibitors of iron and other mineral absorption, and low dietary diversity are considered prime contributors to micronutrient deficiencies and anemia in South Asia. In India, less than 7% of women consume fish, chicken, or meat on a daily basis and only about a third (35%) do so on a weekly basis.<sup>7</sup> According to Suaahara Baseline Survey Report (2013) meal diversity scores for both mothers and children in Nepal are low.<sup>8</sup> Evidence revealed, women in resource poor settings are deficits in macronutrients and micronutrients.<sup>9</sup>

Globally, dietary diversity is advocated as main strategy for better nutrient intake and so does by Nepal.<sup>10,11</sup> However, sufficient evidence was lacking on dietary diversity status and factors influencing it in western region of Nepal. Thus, study was conducted to generate evidence that was lacking. Study results

were expected to be of great use for ministry of health and other health organizations to work in the promotion of maternal health in western region of Nepal.

## MATERIALS AND METHODS

Data collection of this cross sectional study was done from January to February 2016 at Western Regional Hospital. It is the major public hospital in the district and region, and serves as major referral centre in Western Region. The participants of the study were 282 pregnant women of third trimester attending Antenatal Care (ANC) clinic in Western Regional Hospital. The first participant was selected randomly through balloting from among the first five pregnant women of third trimester to arrive at the antenatal clinic and thereafter systematic random sampling was done i.e. in interval of one, pregnant woman of third trimester to arrive were interviewed until sample size was achieved. Semi-structured questionnaire was used to collect information regarding demographic, socioeconomic and cultural factors; Household Food Insecurity Access Scale measurement tool was used to collect information regarding household food security status where the participants were asked to recall a period of 30 days and share the experience of food insecurity;<sup>12</sup> and 24 hour recall tool was used to explore dietary diversity information.<sup>2</sup> EpiData version 3.1 and SPSS version 20 were applied for data entry and data analysis respectively. Data were summarized using descriptive statistics such as frequency, mean, SD and percentage. Hypothesis testing was done using Chi square test at 5% level of significance. After conducting collinearity diagnostics of variables associated in bivariate analysis at  $p \leq 0.20$  (Purposeful selection of variable)<sup>13</sup>, variables were considered for multinomial logistic regression to see the independent effect of the independent variables with outcome after adjusting for confounders. Here, statistical association was considered significant if  $p$ -value was  $< 0.05$  where confidence interval (CI) for odds ratio (OR) was set at 95 percent.

Ethical clearance [IRB Ref. no. 139(6-11-E)2/072/073] was taken from Institutional Review Board, Maharajgunj Medical Campus, Institute of Medicine, Tribhuvan University. The objectives and procedure, risks and benefits of the study were vividly explained in simple and understandable terms to all the participants. After that, written consent was taken from participants before interview respecting the autonomy of the participants.

## RESULTS

Study found that 85.8% of the participants (pregnant women) were of age  $\geq 20$  years. The median age of the pregnant women was found to be 23 years ( $\pm 3.99$  SD). Brahmin/Chhetri (48.2%), Janajati (25.5%) and Dalit (23.4%) were the major ANC service users in Western Regional Hospital (Table 1).

**Table 1:** Demographic Information (n=282)

Characteristics	Category	Number	Percentage
Age of the participants (Year)	$\geq 20$	242	85.8
	$< 20$	40	14.2
Median age: 23			
Year			
Std. Deviation: $\pm 3.99$			
Ethnicity		66	23.4
	Dalit		
	Janajati	72	25.5
	Madhesi	5	1.8
	Muslim	1	0.4
	Brahmin/Chhetri	136	48.2
	Others (Thakuri/ Dasnami, etc)	2	0.7

Among total pregnant women participating in the study, only 50.4% had higher secondary education level. Most of them (82.6%) were House wife (unpaid occupation) and 29.1% spouses of the participants were labour migrant. Study revealed that 62.8% of them had monthly household income less than National average i.e. Rs. 30,121 (Table 2).

**Table 2:** Socioeconomic Information (n=282)

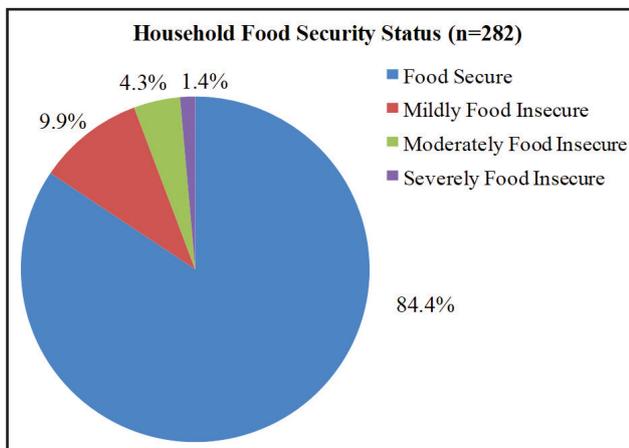
Characteristics	Category	Number	%
Education level of the participants	Illiterate	11	3.9
	Literate	7	2.5
	Primary Level	21	7.4
	Secondary Level	101	35.8
	Higher secondary and above	142	50.4
Employment/ occupation of the participants	Student	9	3.2
	Unpaid occupation (House wife)	233	82.6
	Wage	5	1.8
	Salaried worker	18	6.4
	Business	16	5.7
	Agriculture	1	0.4
	Unemployed	9	3.2
	Student	1	0.4
	Wage	34	12.1
	Salaried worker	79	28.0
Employment status/ occupation of spouse	Business	59	20.9
	Agriculture	18	6.4
	Labour Migrant	82	29.1
	Household Income $\geq$ Rs 30 121	105	37.2
	Household Income $<$ Rs 30 121	177	62.8

Food taboos were prevalent among 34.3% of pregnant women. Honey was found to be avoided by 51.2% and Gahat dal (Horse gram) by 41.2% of pregnant women. The primary reason reported for food avoidance during pregnancy was the belief that it is a hot food and will cause miscarriage (Table 3).

**Table 3:** Cultural Factor (n=282)

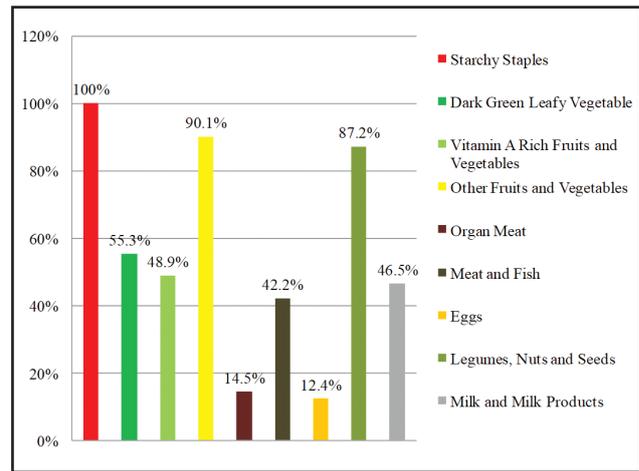
Characteristics	Category	Number	%	
Food avoidance during pregnancy (Food Taboos)	Yes	97	34.4	
	No	185	65.6	
Types of food avoided (n=97)	Honey	50	51.5	
	Papaya	10	10.3	
	Fish	6	6.2	
	Egg	3	3.1	
	Buff	1	1.0	
	Reasons of avoiding foods	Gahat dal (Horse gram)	40	41.2
		Glutinous rice	15	15.5
		Pepper	2	2.1
		Banana	8	8.2
		Hot food	36	37.1
Cause miscarriage		90	92.8	
Cause jaundice to baby		3	3.1	
Effects mother's health	1	1		

About 10% of pregnant women reported the experience of worry of not having enough food sometimes i.e. mildly food insecure, 4.3% reported sacrificing quality of food more frequently i.e. moderately food insecure, and 1.4% reported cutting on meal size or numbers of meal often i.e. severely food insecure (Fig. 1).



**Figure 1:** Household Food Security Status

All pregnant women (100%) consumed starchy staple, 55.3% consumed dark green leafy vegetables and only 12.4% consumed eggs (Figure 2).



**Figure 2:** Food Groups Consumed

Most pressing, only 35.8% of pregnant women had high dietary diversity, 48.9% had medium dietary diversity and 15.2% had lowest dietary diversity (Table 4).

**Table 4:** Dietary diversity status (n=282)

Characteristics	Category	Number	Percentage
Dietary diversity status	High dietary diversity	101	35.8
	Medium dietary diversity	138	48.9
	Lowest dietary diversity	43	15.2

Mean DD=

4.96

SD= ±1.42

The chi square test results revealed that ethnicity, education level, occupation of husband and household income of the pregnant women were significantly associated with dietary diversity. However, age, occupation, food taboos and household food security of pregnant women were not found to be significantly associated with dietary diversity. Though these may be the statistical reality, data still depicted that pregnant women of age group more than or equal to 20 years, having paid occupation and food secured had higher dietary diversity as compared to their counter parts i.e. pregnant women below 20 years of age, having unpaid occupation and food insecure respectively (Table 5).

**Table 5:** Association with Dietary Diversity

Characteristics	Dietary Diversity (DD) n (%)			Total Sample	p-value
	High DD	Medium DD	Lowest DD		
<b>Age</b>					
≥ 20 Years	92 (38.0)	114 (47.1)	36 (14.9)	242	0.146
< 20 Years	9 (22.5)	24 (60.0)	7 (17.5)	40	
<b>Ethnicity</b>					
Dalit/Madhesi/Muslim	16 (22.2)	39 (54.2)	17 (23.6)	72	
Janjati	27 (37.5)	34 (47.2)	11 (15.3)	72	0.026*
Brahmin/Chhetri	58 (42.0)	65 (47.1)	15 (10.9)	138	
<b>Education Level</b>					
No formal education	5 (27.8)	10 (55.6)	3 (16.7)	18	
Below SLC	26 (21.3)	69 (41.5)	13 (9.2)	122	0.001*
Above SLC	70 (49.3)	59 (41.5)	13 (9.2)	142	
<b>Occupation of the participant</b>					
Unpaid*1	83 (34.2)	123 (50.6)	37 (15.2)	243	0.310
Paid*2	18 (46.2)	15 (38.5)	6 (15.4)	39	
<b>Husband's Occupation</b>					
Unpaid*3	5 (17.9)	13 (46.4)	10 (35.7)	28	0.007 *
Paid*4	96 (37.8)	125 (49.2)	33 (13.0)	254	
<b>Household Income</b>					
≥ Average (Rs 30 121)	51 (48.6)	41 (39.0)	13 (12.4)	105	0.003*
< Average	50 (28.2)	97 (54.8)	30 (16.9)	177	
<b>Food Taboos</b>					
Yes	39 (40.2)	45 (46.4)	13 (13.4)	97	0.518
No	62 (33.5)	93 (50.3)	30 (16.2)	185	
<b>Household Food Security</b>					
Food secure	88 (37.0)	112 (47.1)	38 (16.0)	238	0.333
Food insecure	13 (29.5)	26 (59.1)	5 (11.4)	44	

\*Statistically significant association (p<0.05) \*1house wife/student/agriculture \*2wage/salary/business

\*3unemployed/student/agriculture \*4wage/salary/business/labour migrant

Multinomial logistic regression found that participants having education level < SLC compared to ≥ SLC were 74.7% less likely to have high dietary diversity to lowest dietary diversity (AOR: 0.253, CI: 0.103 – 0.620, p=0.003). Similarly, pregnant women with husband having unpaid occupation compared to paid were 74.5% less likely to have high dietary diversity to lowest dietary diversity (AOR: 0.255, CI: 0.074 – 0.876, p=0.030). Contrast to these findings, the

variables such as age, ethnicity and household income of pregnant women had no independent significant association with dietary diversity (Table 6).

The model had Nagelkerke R square value 0.167 i.e. 16.7% change in dietary diversity was explained by education level and occupation of husband. Similarly, likelihood ratio test was found to be significant (p<0.01) which explained, the model fits the data.

**Table 6:** Independent Association with Dietary Diversity

Variables	High Dietary Diversity				Medium Dietary Diversity			
	B	p value	AOR	95% CI	B	p value	AOR	95% CI
Intercept	1.778	0.009			2.165	0.000		
<b>Age</b>								
≥ 20 years	-0.067	0.910	0.935	0.292 – 2.995	-0.299	0.553	0.741	0.276 – 1.993
< 20 years (Ref.)								
<b>Ethnicity</b>								
Dalit*1	-0.078	0.125	0.457	0.168 – 1.243	-0.579	0.201	0.560	0.230 – 1.363
Janjati	-0.075	0.882	0.928	0.344 – 2.506	-0.276	0.567	0.759	0.295 – 1.951
Brahmin*2 (Ref.)								
<b>Education</b>								
No formal	-0.786	0.357	0.456	0.086 – 2.425	-0.139	0.859	0.870	0.189 – 4.010
< SLC	-1.374	0.003*	0.253	0.103 – 0.620	-0.366	0.390	0.693	0.301 – 1.597
≥SLC (Ref.)								
<b>Husband's Occupation</b>								
Unpaid	-1.368	0.030*	0.255	0.074 – 0.876	-1.149	0.02*	0.317	0.120 – 0.835
Paid (Ref.)								
<b>Household income</b>								
≥Average (Rs 30 121)	0.454	0.291	1.575	0.678-3.658	-0.293	0.476	0.746	0.333 – 1.671
<Average (Ref.)								

\*1= Dalit/ Madhesi/ Muslim, \*2 = Brahmin/ Chhetri/ Others, \* Significant association (p<0.05), Ref. = Reference Category, AOR= Adjusted Odds Ratio

## DISCUSSION

The mean ( $\pm$ SD) Women's Dietary Diversity Score [4.96 ( $\pm$ 1.42)] in this study was slightly less than that of the PoSHAN study (5.6  $\pm$ 1.4). However, medium dietary diversity status was profound among the pregnant women in both of these studies.<sup>14</sup> As consumption was reported to be average of four food groups from possible nine food groups per day, it may contribute to the prevalence of under-nutrition and micronutrient deficiencies among pregnant women which is similar to the study done in Bangladesh.<sup>15</sup>

This study reported that age, ethnicity, occupation of pregnant women and household income had no independent association with dietary diversity which was also supported by the study done in Pakistan.<sup>16</sup> However, household income was significantly associated with dietary diversity in bivariate analysis.

Our study reported that about 16% of pregnant women were food insecure which reflected that there may be unequal distribution of available food at household level. The study done in Kenya and Bangladesh supported this study revealing that household food security had no association with dietary diversity of pregnant women.<sup>15,17</sup> This result evoked that household food security does not ensure access to diverse diets. But the study done in Malaysia showed that food security was significantly associated with higher mean diet diversity score.<sup>18</sup>

The study done in Pondicherry India found the higher prevalence of food taboos as well as statistical significant association with dietary diversity where as our study stated only one third of the pregnant women were victim of food taboos and had no statistically significant association with dietary diversity.<sup>19</sup>

The study done in Uganda, Bangladesh, Vietnam and Ethiopia supported to the result of this study that education level and socioeconomic status were significantly associated with dietary diversity.<sup>20</sup> This significant association may be due to the fact that education affects their economic status and food choices. Similarly, occupation of husband influences availability of resources and access to various foods.

However, the study was unable to show variations in dietary practices due to the use of 24 hour recall tool and study design limitation.

The evidence generated by this study regarding dietary diversity and its determinants among pregnant women can be utilized to formulate evidence based plan, strategies and nutrition programs. Health worker can also be encouraged to counsel the pregnant women for dietary diversity to ensure nutritional wellbeing. Similarly, this study may act as baseline information or reference for the upcoming researchers.

## CONCLUSION

Medium dietary diversity was predominant with universal consumption of starchy staples among pregnant women. Education of the pregnant women and occupation of her husband had significant association with dietary diversity. So, the study recommends, the promotion of a dietary diversity through education of pregnant women and by ensuring the paid occupation of spouse. Food insecurity and food taboos were prevalent among pregnant women. These factors must be addressed to prevent malnutrition in pregnant women.

## Acknowledgement

We would like to acknowledge Department of Community Medicine and Public Health, Maharajgunj Medical Campus, Institute of Medicine for their passionate guidance and support; study participants for their voluntary active participation; Western Regional Hospital for providing consent to carry out the study; UNICEF Nepal and Childreach Nepal for providing research grant.

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