Women's Decision Making Autonomy in Household and Its Effect on Dietary Diversity: Evidence from Nationally Representative Panel Data of Bangladesh

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Abstract

Despite a large body of literature suggests that women's participation in household decision making has a significant contribution in nutritional status but the extent of this nexus is likely to vary and is not clear in many societies. An attempt has been taken to analyze the status of women decision making autonomy and its effect on dietary diversity. We have used three rounds of nationally representative panel data of Bangladesh Integrated Household Survey (BIHS) collected in 2011/12, 2015 and 2018/19. The total sample size used in this study is 11,901. Poisson regression model has been used to examine whether women's decision making autonomy has any effect on dietary diversity. Our outcome variable is dietary diversity and the explanatory variable includes decision making variables. There has been a significant increase in HDDS and WDDS from the first survey round to the third. The study has found strong evidence for a positive relationship between dietary diversity and women's decision making autonomy which indicates that increasing women's participation in household decision making can improve dietary intake as well as nutrition.

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Key words: Women's decision making autonomy, dietary diversity, panel data, Bangladesh

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Introduction

Globally, the high levels of malnutrition possess a threat to achieve Sustainable Development Goals (SDG) as nutrition has a multidirectional relationship with many developmental goals (Deepali S, 2020). Malnutrition affects almost two billion people worldwide, with 821 million people undernourished (Yadava et al., 2018). The problem is so widespread in South Asia where 33.3% of children under 5 are stunted and 15.3 % are wasted compared to the global average of 22.2% and 7.5%, respectively (UNICEF/WHO/WB Group, 2018). Among the South Asian countries, Bangladesh as a developing and an overpopulated country has experienced steady advances in domestic food production and hunger in recent decades but many indicators of malnutrition still a matter of concern. About 28% of women of reproductive age are underweight (NIPORT, 2015) and 54% consume less diverse diets (Ahmed et al., 2017). Around 39% of women suffer from anemia, whereas 42% have iodine deficiency. In Bangladesh, like other South Asian countries, there is gender disparity in education and health which exacerbates food security and nutrition (Smith et al., 2003). Women are the key actors of household food and nutrition security. Evidence supports that dietary diversity is one of the major indicator of nutritional outcomes especially in women and children (Arimond et al., 2010; Arimond and Ruel, 2004; Rah et al., 2010). Although in developing countries women account for 43% of the workforce (FAO, 2011) but in Bangladesh role of women in agriculture isn't appreciated (Sraboni et al., 2014) due to cultural norms and barriers which undervalue female worker (Rahman, 2000). In Bangladesh's patriarchal society, women are disempowered in terms of control of income, use of resources and community leadership (Sraboni et al., 2014). Decision-making power refers to bargaining power of women at the household level, where decisions are usually taken either by the household head alone or in partnership with other

women or household members (Sariyev, 2018). Different methods have been used for estimating the empowerment or decision making of women. Malhotra and colleagues (2002) found that women's participation in household decision-making, access and control over resources and freedom of movement were the key components of women empowerment. According to Batliwala (1994) women empowerment is the control of resources and ideology. Doss 1996 used female access to ownership of the asset as a measure of decision autonomy. Alkire et al., (2013) used the Women's Empowerment in Agriculture Index (WEAI) in five domains: resource, leadership, income, development, and time allocation.

Evidence showed that the majority of the women Africa, Asia and Latin America have no input in their everyday household decisions such as the purchasing household commodities, visiting friends or relatives and making health care decision (Mosca et al., 2011; Saaka, 2020). In a study conducted in Congo, majority of the participants informed that their father made the final decision in most of the household matters which indicates intra household gender inequality (Sleigh et al., 2014). But woman's autonomy at the household level and ability to purchase food is directly related to nutrition (Bhagowalia et al., 2012). Different studies documented that women's direct participation in household decision-making and control of resources has a significant impact on agricultural productivity, improved nutrition and greater education level, which help to reduce poverty and malnutrition (World Bank, 2007). Women having lower decision making power not only suffer from undernutrition (Baqui et al., 1994; Hindin M.J., 2000) but also limit their ability for making decisions in the best interest of children's health (Baatiema et al., 20137). Sethuraman et al., 2006, observed that domestic abuse and sexual coercion put mothers and their children at a higher risk of malnutrition. Sariyev et al., 2020 found that in Ethiopia women's decision-making autonomy had a significant positive

consequence on dietary diversity. Likewise, Nguyen et al., 2013 found a positive relationship between maternal education and dietary diversity. Murakami et al., 2010 found that higher education was linked with greater food intake among Japanese women. Bhagowalia and colleagues found a significant positive relationship between women empowerment and child nutrition in Bangladesh.

The short literature review have showed that women's decision-making autonomy is a crucial part of women empowerment, as it relates to nutrition of both women and children and a good number of studies have been done in the developing countries including Bangladesh in this aspect. However, the existing literature indicates that most of the studies analyzed the association between women's empowerment and undernutrition, in which empowerment was defined as economic and socio-cultural factors such as property ownership, employment, attitudes toward domestic violence and sexual coercion etc. In comparison, few studies focused on women's decision-making power and women dietary diversity especially in Bangladesh context.

Our present study adds to the existing literature in multiple aspects. Most of the existing studies have employed cross-sectional data and one of the main problems of cross sectional studies is selection bias which can lead to overestimation or underestimation of exact association (Jones, 2017). Also many studies used smaller sample size for assessing the relationship which makes it difficult to draw firm conclusions. As of the author's concern, no studies have been done so far to assess women decision making autonomy and dietary diversity using panel data set in Bangladesh. Therefore, this is the first attempt to analyze the status of women in household decision making and its effect on household dietary diversity by using a large, unique, and nationally representative panel dataset in Bangladesh.

Methodology and Data

This segment starts by briefly explaining the database, after that it explains how the main outcome variables (HDDS and WDDS) is calculated and defines other explanatory variables including decision variables. Finally, it discusses econometric models to determine whether women's decision making autonomy has any effect on dietary diversity or not.

Data

The study is based on three rounds panel data of Bangladesh Integrated Household Survey (BIHS) collected by the International Food Policy Research Institute (IFPRI). The data collection was conducted in 2011/12, 2015 and 2018/19. BIHS is a household survey statistically representative at the national and seven administrative divisional levels of rural Bangladesh namely Barisal, Chottogram, Dhaka, Khulna, Rajshahi, Rangpur, and Sylhet. BIHS followed a two-stage stratified sampling technique: firstly, by selecting 325 primary sampling units (PSUs) and secondly, by selecting households from the PSUs. The survey collected detailed data on plot-level agricultural production, dietary intake and anthropometric measurements of household members. The survey questionnaire incorporated various modules for male and female household members addressing a variety of research questions and covering the whole agricultural production year (Islam et al., 2018). Information regarding household food consumption patterns, women decision making power in the household, individual socioeconomic characteristics and women asset holding has been taken for analysis.

BIHS collected a sample of total 6500 rural households across different agro-ecological zones (AEZ) of Bangladesh. Among 6500 households, 4423, 4619 and 4886 households are national representatives in 2011/12, 2015 and 2018/19, respectively (representative of rural Bangladesh) and the remaining households fall under a different stratum referred to as the "Feed the Future

Zone (FTF)". Households falling under the FTF zone have not been taken in this study. A slight change in sample size is observed over the years which mainly due to split-up households. Therefore, we have used a smaller sample size than the original BIHS data. Only primary female respondent is considered in this study. Around 500 observations were removed from the data set because the key female respondent was either absent or did not reply to all of the decision-making variables. We have dropped around 500 observations from the data set because the primary female respondent was either absent or did not reply to all of the decision-making variables. Some of the observations have been dropped due to possible data entry errors in the socio-economic data and food consumption data. In this study, female members who are married only taken as there are questions related to marriage and domestic abuse. So the final estimation consists of 11,901 samples using 3 round data (Table 1). Although in panel data, sample attrition is normal, but it was comparatively low in BIHS data which is 1.26% per year (Islam et al., 2018).

Table 1: Sample description

Item	Round-1 (2011-12)	Round-2 (2015)	Round-3 (2018-19)	Panel
Households	4042	3935	3924	11901

Empirical research methods

In our study, we want to formalize the relationship between nutrition more specifically dietary diversity and women's decision making status. The Poisson model is employed in this study since our dependent variable is the dietary diversity score, which is a count variable (Kouser and Qaim 2011; Hirvonen and Hoddinott 2017).

The basic formula of Poisson panel regression is given by $Prob(DD_{it} = dd_{it}\ x_{it}) = e^{-\lambda it}\ \lambda_{it}^{ddit} / dd_{it}!$, where dd_{it} are the dietary diversity indicators that vary across individual households i and over time t. The Poisson distribution is predicted to have conditional mean λ_{it}, which hinges on a vector of exogenous variables (X_{it}) (Islam et al., 2018). The most common specification of λ_{it} can be described as (Cameron and Trivedi 1998):

$$\ln \lambda_{it} = \beta X_{it} + \gamma V_i + C_i + \mu_t$$

Where X_{it} and V_i are vectors of time-variant and time-invariant exogenous variables, with β and γ as the respective vectors of parameters to be estimated. C_i and μ_t represent unobserved individual and time-specific effects, respectively. For assessing the relationship between dietary diversity score and decision making autonomy we have included different decision making indicators as part of the vector X_{it}. (e.g. Islam et al., 2018; Koppmair et al., 2016; Sibhatu et al., 2015).

Household Dietary Diversity and Women's dietary diversity

The primary outcome variable of our study is dietary diversity which is a popular method worldwide. Dietary diversity is the key component of a balanced diet since higher dietary diversity indicates higher nutrients intake (Arimond and Ruel, 2004; Frison et al., 2006; Kennedy et al., 2007; Steyn et al., 2006). Dietary Diversity Score (DDS) is usually calculated at the household level and individual level. Household dietary diversity score (HDDS) which is widely accepted, is a proxy measure for assessing household access to diversity of foods and socio-economic status (FAO, 2011; Kennedy et al., 2007; Steyn et al., 2006).

The household dietary diversity score (HDDS) is defined as the number of food groups consumed by the household over a certain recall period which is 24 hours or 7 days (Islam et al., 2018; Keding et al., 2012; Sibhatu et al., 2015). Although for calculating HDDS there is no

international standard of number of food groups but FAO proposed to use 12 food groups (FAO, 2011). These are Cereals; White tubers and roots; Legumes, nuts and seeds; Vegetables; Meat; Eggs; Fish and other seafood; Fruits; Milk and milk products; Oils and fats; Sweets; and Spices, condiments and beverages (Table 2). In this study we have calculated HHDS by simply counting the number of food groups consumed by the household out of 12 food groups. We have used a recall period of 24 hours for calculation HDDS. If any member of the household consumes a food item from a specific group in the last 24 hours, that food group receives one point toward the HDDS. HDDS ranges from 0 to 12. Although HDDS is considered a superior method for assessing nutritional outcomes it does not necessarily indicate individual's exact dietary intakes (Kennedy et al., 2013). According to Villa et al. (2011), dietary diversity allocation within household is asymmetric. Ruel et al., 2014 suggested calculating individual dietary diversity for assessing the diet quality of the individual. Hence, we have also calculated women's dietary diversity score (WDDS) by counting the number of food groups consumed by the women out of 9 food groups during the 24 h recall period (Arimond et al. 2010; FAO 2013; Islam et al., 2018).

Table 2. Food Groups Included in Dietary Diversity Scores for Women and Households

Food groups for Women Dietary Diversity Score	Food groups for Household Diet Diversity Score
1. Starchy staples 2. Dark green leafy vegetables 3. Other vitamin A rich fruits and vegetables 4. Other fruits and vegetables 5. Organ meat	1. Cereals 2. White tubers and roots 3. Vegetables 4. Fruits 5. Meat 6. Eggs

6. Meat and fish 7. Eggs 8. Legumes, nuts and seeds 9. Milk and milk products	7. Fish and other seafood 8. Legumes, nuts and seeds 9. Milk and milk products 10. Oils and fats 11. Sweets 12. Spices, condiments and beverages

Source: (Kennedy G., Ballard T., 2010)

Women's Decision Making Autonomy Variables

BIHS survey included questions on intrahousehold decision making concerning several different domains like who is normally takes the decision when specific decisions are made, whether the decisions are taken jointly or solely etc. It included questions about four areas of women's decision making autonomy (Table 3). These are decisions regarding major household purchases including food items, clothing; own health care, education, visits to family or friends, decisions regarding family planning, etc. Each question had four answers: (1) respondent alone; (2) respondent's husband alone; (3) joint decision including respondent and her husband; (4) others. We have included the decision on food item expenditure as one of our important variables because it is directly related to dietary diversity. The major household decision is defined as sole if the female solely decides how to spend money whereas joint decision means if female decides with husband. This study also used women's control over money for food items of household and medicine for herself as explanatory variables. To find out whether women's mobility and domestic (i.e. physical) violence has any association with dietary diversity these variables are also used.

Table 3: Measurement and definition of decision making variables

Variable	Measurement and definition
Expenditure of the food item-sole	=1 if female solely decide how to spend money on food item
Expenditure of the food item -joint	=1 if there is a joint decision with husband regarding how to spend money on food item
Expenditure on major HH purchase -sole	=1 if female solely decide how to spend money on major purchases (i.e. housing)
Expenditure on major HH-joint	=1 if there is a joint decision with husband regarding how to spend money on major household purchases
Healthcare decision	=1 if women have a say regarding how to spend money on healthcare either alone or with her husband
Education decision	=1 if women have a say regarding how to spend money on education of the child either alone or with her husband
Control money to food	=1 if women can control the money needed to buy food from market
Control money to medicine	=1 if women can control the money needed to buy medicine for herself
Mobility to visit relatives	=1 if women have mobility to visit friends or relatives (to go outside alone or with other household members)
Mobility to visit market	=1 if female has the mobility to visit market (to go outside alone or with other household members)
Domestic abuse	=1 if women suffer domestic abuse (i.e. physical abuse)

and Discussion

Descriptive Statistics

Table 4 represents summary statistics of household characteristics. There has been a significant increase in HDDS from the first survey round to the third round which is quite remarkable. A significant rise is also experienced in WDDS especially in the third round (5.01). Although both HDDS and WDDS has increased over the years but HDDS is comparatively higher than women's WDDS particularly in the first two rounds which suggests intra-household disparities. The average earning status of women shows that the number of earning women has been increased from the first to the third round. The average age of the participants is 39 years. There has not found any significant difference in women education over the years. As a patriarchal society household head is mostly male in Bangladesh.

Table 4: Description of variables used in the econometric analysis

Variable	Measurement and definition	Round-1	Round-2	Round-3	Total
HHDS	Number of food groups consumed by the household in the last 24 h	7.048 (2.499)	8.063 (2.346)	8.269 (2.491)	7.790 (2.445)
WDDS	Number of food groups consumed by the women in the last 24 h	2.766 (1.398)	3.811 (1.756)	5.01 (1.817)	3.862 (1.67)
Earning status of women	=1 if the women earned money	0.589 (0.492)	0.765 (0.424)	0.864 (0.342)	0.739 (0.419)
Asset bring status of women	=1 if women bring asset from parent's home during marriage	0.737 (0.440)	0.826 (0.379)	0.789 (0.408)	0.784 (0.409)
Age of women	Age of women (years)	36.653 (12.101)	39.742 (12.148)	42.065 (12.708)	39.487 (12.319)

Education of the women	Years of schooling of the women (years)	3.105 (3.512)	3.243 (3.479)	3.304 (3.521)	3.217 (3.504)
Household size	Number of family members belongs to the HH	4.101 (1.532)	3.667 (1.431)	4.280 (1.762)	4.016 (1.575)
Sex of the household head	=1 if the household is male	0.944 (0.227)	0.921 (0.238)	0.794 (0.404)	0.886 (0.290)

Source: Authors' analyses using BIHS panel data of 2011/12, 2015 and 2018/19. Mean values are presented with standard errors in parentheses.

Status of Women's Decision Making Autonomy

Table 5 provides comprehensive information on direct measures of women's participation, such as decision-making, mobility, and intimate partner abuse, as well as information on their components. The majority of women are engaged in household decision-making to some extent. Joint decision with husband or partner is higher than the sole decision in all cases. A significant positive change has been found in women decision making autonomy from the first wave to the third wave which is impressive. More than 78% of women have reported that decisions about the purchase of food items are made alone or along with their spouses.

The majority of women have stated that they have a final say on major household purchases with their husbands. Thirty percent of women have no contribution in child education which may be due to the low education status of women. Decisions about children's health are usually taken with the help of husband or someone else. More than 90% women have opined that they have a final say on how to spend their earned money which is encouraging. Around 30% women are lacking mobility to go outside in Bangladesh. Women have a greater degree of contribution in the family planning decision either with the husband or alone (96%). About

30% of women have reported that they undergo with verbal abuse by their male counterparts or other household members.

Table 5: Status of women decision making autonomy (%)

Items	2011-12	2015	2018-19	Total
Purchase of food items				
No input in decision making	30.97	27.24	21.02	26.41
Sole decision making	14.70	19.72	22.20	18.87
Joint decision making	54.33	53.04	56.78	54.72
Purchase of major household amenities				
No input in decision making	32.04	28.79	23.80	28.21
Sole decision making	12.99	16.26	17.25	15.50
Joint decision making	54.97	54.94	58.94	56.29
Spending money on health of HH				
No input in decision making	25.54	20.39	15.20	20.38
Sole decision making	14.25	19.71	20.39	18.12
Joint decision making	60.21	60.14	64.41	61.59
Spending money on education of children				
No input in decision making	43.70	32.74	13.71	30.05
Sole decision making	10.49	15.95	19.72	15.39
Joint decision making	45.81	51.31	66.57	54.56
Purchase of clothing				
No input in decision making	29.81	24.96	20.06	24.94
Sole decision making	13.82	19.87	21.02	18.24
Joint decision making	56.86	55.17	58.92	56.98
Decision regarding how to spend money earned by women (in case of working women)				
No input in decision making	5.80	5.35	2.83	4.66
Sole decision making	32.94	45.03	47.77	41.92
Joint decision making	61.26	49.62	49.42	53.44
Family planning decision				

No input in decision making	3.45	6.00	3.21	4.22
Sole decision making	7.79	21.48	21.52	16.93
Joint decision making	88.76	72.52	75.26	78.85
Mobility to visit friends or relatives				
No input in decision making	23.23	29.17	16.67	23.02
Sole decision making	27.02	26.91	31.50	28.48
Joint decision making	49.75	43.91	51.83	48.50
Mobility to go market or haat				
No input in decision making	53.59	34.64	23.14	37.12
Sole decision making	18.93	23.76	27.98	23.56
Joint decision making	2.75	41.60	48.88	31.08
Mobility to visit doctor or hospital				
No input in decision making	26.63	27.50	15.62	25.25
Sole decision making	22.56	25.46	28.77	25.60
Joint decision making	50.81	47.04	55.61	49.15
Mobility to attend training for NGO or other program				
No input in decision making	25.09	30.38	13.98	19.81
Sole decision making	23.52	19.53	25.24	20.76
Joint decision making	51.98	50.11	61.73	54.61
Percentage of women who can control the money to buy the necessities				
Food items from market	48.460	62.135	88.634	66.409
Clothes for her	50.098	68.437	90.622	69.718
Medicine for her	52.175	71.004	83.680	72.286
Toiletries or cosmetics for her	54.277	70.470	93.323	72.690
Percentage of women who suffer domestic violence				
Verbal abuse	24.951	36.264	37.691	32.968
Physical abuse	8.431	15.299	6.983	10.237

Source: Authors' analyses using BIHS panel data of 2011/12, 2015 and 2018/19. Figures are shown in percentage.

Effect of Women's Decision Making Autonomy on Dietary Diversity

The result of pooled, fixed and random effects Poisson regression models are shown in Table 6. In our model HHDS and WDDS are used as outcome variables and the women decision making variables are used as the explanatory variables. We have used different indicators for assessing the association between dietary diversity and decision making status including the decision regarding food item expenditure, expenditure of major HH purchases, mobility and domestic abuse. The results showed that women's decision regarding food expenditure is significantly positively related to dietary diversity both at household level and individual level (i.e. WDDS) irrespective of model specifications. Our outcomes are in line with previous research for example, in India and Bangladesh, women's participation in household decision-making and the opportunity to buy food has a positive effect on household diet diversity as well as women's and children's dietary diversity (Bhagowalia et al., 2010; Menendez et al., 2006). Another important variable namely earning status of women is significantly positively related to dietary diversity which indicates women empowerment. Different previous studies also found positive connections between women's empowerment and dietary diversity (Bhagowalia, 2012; Smith 2000; Smith, 2003). The variables of women control over money for food and medicine for themselves are found positively significant which means that women who have financial autonomy can have a positive influence on their health as well as nutrition. This is because women with greater financial autonomy have more negotiating leverage when it comes to food purchases. The variable of domestic violence harm both WDDS and HDDS which suggests that domestic abuse can have a negative effect on nutritional status of women as well as on the households.

Some socio-demographic variables are also included which are significantly linked with WDDS and HDDS. One of such variables is the education status of women which has a positive

significant contribution on dietary diversity. The findings show that higher level of female education increases the possibility of having higher DD score. The results are consistent with the earlier studies conducted in Vietnam, Ethiopia and Bangladesh for example maternal education and dietary diversity were positively and significantly related (Nguyen et al., 2013). However, evidence of Japan shows that the effect of education on individual food intake is mixed (Mukarami et al., 2009). The age of women also has a positive significant association with dietary diversity. The relationship between socioeconomic status (SES) and women's dietary intake was found positive in previous studies (Amugsi et al., 2016; Mirmiran et al., 2002). Higher SES is related to more regular consumption of major food groups and diverse diets, which includes fruits, vegetables etc. (Campbell et al., 2014; Mayen et al., 2014). The outcome of this study supports previous research which indicates that SES is a key factor of women's dietary intake.

Table 6: Results of Pooled, random and fixed-effects Poisson regression models

Explanatory Variables	Pooled		Fixed Effect		Random Effect	
	HHDS	WDDS	HHDS	WDDS	HHDS	WDDS
Expenditure of food item-joint	0.058*** (0.008)	0.064*** (0.0119)	0.053*** (0.012)	0.083*** (0.017)	0.045 *** (0.022)	0.049*** (0.015)
Expenditure of food item-sole	-0.042 (0.022)	0.021 (0.032)	-0.010 (.029)	0.0512 (0.0416)	-0.0153 (0.0208)	-(0.020) (0.032)
Expenditure of major HH -joint	0.004 (0.019)	0.015*** (0.028)	0.005 (0.026)	0.011 (0.036)	-0.004 (0.020)	0.015 (0.028)
Expenditure of major HH-sole	-0.043 (0.022)	-.072*** (0.032)	-0.038 (0.029)	-0.050 (0.042)	-0.044** (0.023)	- (0.060) (0.032)

Healthcare decision	0.010 (0.021)	-0.018 0.030	0.010 (0.026)	-0.021 (0.038)	0 .009 (.021)	-0.017 (0.0309)
Education decision	-0.005 (0.009)	-0.0712*** (0.0134)	0.009 (0.012)	-0.102 (0.018)	-0.009 (0.009)	-(0.071) (0.014)
Control money to food	(0.009) (0.011)	0.089*** (0.0155)	-0.014 (0.013)	0.095*** (0.019)	0.0172*** (0.010)	0.090*** (0.016)
Control money to medicine	0.066*** (0.011)	0.104*** (0.016)	0.086*** (0.014)	0.093*** (0.021)	0.057*** (0.011)	(0.104)*** (0.016)
Mobility to visit relatives/friend	0.057 *** (0.010)	0.004 (.029)	0.041*** (0.013)	0.038 (0.0381)	0.058*** (0.011)	0.0038 (0.029)
Mobility to visit market	0.013 (0.009)	0.037*** (0.013)	-0.0016 (0.011)	0.111*** (0.019)	0.013 (0.009)	0.038*** (0.013)
Earning status of women	0.092*** (0.008)	0.068*** (0.0114)	0.112*** (0.011)	0.0954*** (0.016)	0.086*** (0.008)	0.068*** (0.011)
Asset bring status of women	0.098 (0.011)	-0.004 (0.029)	0.005 (0.026)	0.016 (0.018)	0.058*** (.008)	0.042 (0.025)
Domestic abuse	0.058*** (0.008)	-0.092*** (0.016)	0.033*** (0.014)	-0.099*** (0.022)	0.0031*** (0.011)	-0.0922*** (0.016)
Age of women	0.003*** (0.0003)	0.0029*** (0.0004)	0.007*** (0.001)	0.019*** (0.0014)	0.003*** (0.003)	0.0029** (0.0004)
Education of the women	0.011*** (0.001)	0.016*** (0.001)	0.0218*** (0.004)	0.022*** (0.006)	0.011*** (0.001)	0.016*** (0.001)
Household size	0.0401***	0.027	0.029	0.129	0.042***	0.027

	(0.002)	(0.035)	(0.04)	(0.075)	(0.002)	(0.022)
Sex of the HH head	0.014 0.011	-0.103*** (0.016)	-0.014 0.014	-0.1985*** (0.021)	(0.0214 ** (0.0117)	-0.104*** (0.016)
Constant	1.572*** 0.024	1.57*** (0.024)	-	-	1.569 (0.023)	0.776*** (0.032)
Log likelihood	-27357.819	-12295.147	-14600.345	-12295.147	-27357.819	-23321.033
Wald $\chi 2$	1015.46***	1497.4***	453***	1173.60***	1099.36***	1498.90***
LR test	-	-	-	-	0.003	0.001
Number of observations	11,901	11,901	11,500	11,500	11,901	11,901

Source: Authors' analyses using BIHS panel data of 2011/12, 2015 and 2018/19. Figures in the parentheses are standard errors. ** and ***indicates significance at 5%, and 1% level, respectively

Conclusions

The present analysis reveals that women's participation in household decision-making has a strong connection with greater degree of dietary diversity at the household as well as individual level. It indicates that increasing women's participation can improve dietary intake and nutrition. Earning status of women, control over money and mobility are also found to have a positive significant relationship with DD. Domestic abuse is negatively associated with dietary diversity. Improving earning status of women, promoting more opportunities for female education, encouraging mobility to go outside for household necessities and discouraging domestic abuse of any type (either verbal or physical) have a significant positive effect on the dietary intake of women which can improve the nutrition status of the household.

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