

Gender differentials in food consumption and dietary diversity among Indian adults and couples

Authors: Preeti Dhillon, Kabita Khatoon, Apyayee Sil

Background: In developing countries dietary diversity is given greater importance specially to address nutritional deficiencies (WHO/FAO, 1996) as there is widespread recognition that low dietary diversity is associated with chronic nutritional deficiencies (Ruel, 2003). Studies have proved that low dietary diversity has negative consequences for health, immunity, mental health and reproductive and social capacities (Underwood, 1998). Lack of food diversity is an important issue, particularly in developing countries where diets consist mainly of starchy staples, with less access to nutrient-rich food (World Bank, 2007). Developing countries like India not only experienced rapid economic transformation but also substantial changes in many other dimensions of well-being, including in its diet pattern (Ali 2007; Atibudhi 2006; Giri 2006; Golait and Pradhan 2006; Nasurudeen et al. 2006; Radhakrishna 2006; Singh et al. 2006; Viswanathan 2001; Shariff and Mallick 1999; Radhakrishna and Reddy 2004) with undernourished populations face the risk of low productivity and growth.

There are few studies on gender gaps in feeding practices for infant and young children and found that girl children are at disadvantage state. Further, a longitudinal study on Indian adolescents suggested that boys are advantaged at all ages (except for the Younger Cohort at 12 years old), the pro-boy gap widens markedly at 15 years old. Disparities between mid-adolescent boys and girls are driven by the increased likelihood of boys to consume protein- and vitamin-rich foods (Aurino 2016). However, there is lack of such work which shows the gender gaps in diet and dietary diversity or nutrition status among adults. Under nutrition in women leads to poor reproductive health outcomes leading to increased preterm births, infant mortality and maternal mortality. On the other hand, Indian women have experienced a drastic increase in the overweight and obesity during 2005-15 (IIPS and ICF, 2017). Males prefer to consume fish and meat but females prefer to eat vegetables and fruits. If the men eat less and slowly, they are considered to be less masculine (Monge-Rojas, et al., 2015).

The present paper attempts to answer the research questions- How does food consumption pattern vary between Indian adult men and women? What are the factors affecting diet diversity among male female in India? Do women's decision-making behaviour and their control over resources influence their diet diversity? What are the factors that can explain gender

differentials in dietary diversity among Indian couples? Therefore, this study attempts to identify the pattern of consumption of different food groups among adult men, women and couples. Further, we find out the factors associated with dietary diversity among adult men and women and gender gaps in dietary diversity in Indian couples.

Methods and Materials

Data for this analysis were obtained from the National Family Health Survey 2015–16 (NFHS-4) which is a cross-sectional, nationally representative survey that provided socio economic and demographic information on health, and nutrition for India and each state/union territory. Analytical sample of the study is 6,99,686 women aged. 15-49 and 1,12,122 men aged 15-54. and 63,696 couples in the reproductive age.

Measurement of Food consumption and dietary diversity

We considered seven food groups in order to construct the dietary diversity measure proposed by (Swindale and Bilinsky (2006): (i) milk and dairy product (ii) pulses and beans; (iii) dark green and legumes (iv) fruits (v) eggs (vi) meat, and fish; (vii) fried food, and composite variable of diet diversity score for men and women is computed separately. The dietary diversity measure accordingly ranges from 0 to 7, but NFHS-4 for adults 24 hours consumption of food is not available. That's why the diet diversity score is calculated by asking respondents how often they consume various foods. Responses to the frequency of consumption of any food group was assigned 3 for daily, 2 for weekly, 1 for occasionally, and 0 for never consumed. The dietary diversity score was constructed by collating information on food consumption, which resulted in ranging from zero to twenty-one (i.e., zero indicated that the adults did not consume any of the 7 food groups means no diversity of diet and a value of twenty-one indicated that the high diversity of diet among adults. Further, gender gap in diet diversity was constructed in couple file.

Explanatory variables

This study included some socio-economic and demographic covariates as they may influence dietary diversity among adults. The main explanatory variables related to demographic and socio-economic like age, place of residence (urban, rural), education (no education, primary , secondary , high school), religion (Hindu, Muslim, Christian and others), and caste (schedule caste, scheduled tribe, other backward caste and others) wealth index, marital status, sex of the

head and working status are considered as explanatory variables. Further, decision making variables, and ownership of assets were considered as predictors of dietary diversity.

Statistical analyses

All analyses were conducted using STATA statistical software package Version 14 (College Station, Texas). Descriptive analyses were calculated for all variables to understand the mean of diet diversity among adults with respect to some socio-economic and demographic variables. Chi square test was performed separately for men and women to find the association between diet diversity with some selected background characteristics. Multiple linear regressions model was used to understand the association between the dietary diversity score and gender-gap in dietary diversity score with covariates.

Results: The frequency of consumption of each food groups among adult men and women is shown in figure-1. Around 46% for men, and 45% of women consume milk/curd daily while only 25% of men as compare to 32% of women never consumed. Around 59% of women never consumed eggs as compare to 50% of men; 66% of women and 61 percent of men never consumed fish.

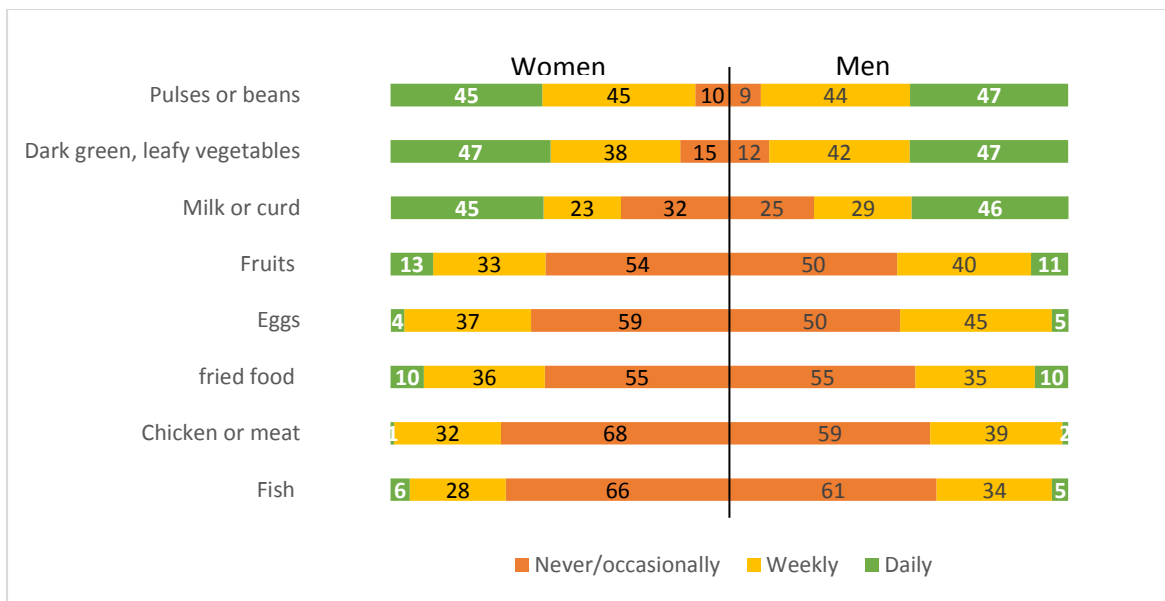


Figure: Percentage distributions of men and women according to frequency of consumption of different food groups, India, 2015-16

The predictors of dietary diversity score among adult men and women are shown in table-1. The study indicates that women who were pregnant and breastfeeding their child having 0.23(p<.01) and 0.09 (p<.01) more diverse diet. It was seen that men and women from female

Extended Abstract

headed household has higher dietary diversity than their counterparts. Both men (-.027, $p < .05$) and women (-.021, $p < .01$) working as agricultural labourers, and domestic workers are having lower diversity in their diet than non-workers. For both the genders, seasonal and occasional workers are having significantly less diet diversity than regular workers.

Individuals who have control over the resource like land, owns house by jointly and alone, spend respondent earning and decision over large household purchase by partner alone allow to go market with someone or alone are consuming diverse diet. It is also observed that among couples if the wife is more educated than husband gender gap in dietary diversity score is lower (-0.07, $p < 0.05$) as compare to couples with equal level of education. Similarly, the gaps in the diet diversity score is significantly lower among couple where only wife was working (-0.08, $p < 0.1$) than where only husband is working. The gender gap in dietary diversity was lower among the couples where the wife owns a house or land or decide on large household purchases (table-2).

Conclusion:

The study found that there is a strong and significant pro-rich inequality in diet diversity among adults in India. For both men and women, the factor that were associated with more dietary diversity were small household size with, higher years of education and from household of higher wealth index with working status and single marital status. Adults from rural areas, from the lower social groups had lower dietary diversity. Individuals who have control over the resource like land, owns house by jointly and alone, spend respondent earning and decision over large household purchase by partner alone allow to go market with someone or alone are consuming diverse diet. The gaps in the diet diversity score is significantly lower among couple where only wife was working than where only husband is working The gender gap in dietary diversity was lower among the couples where the wife owns a house or land or decide on large household purchases.

- Ali, J. (2007). Structural changes in food consumption and nutritional intake from livestock products in India. *South Asia Research*, 27(2), 137-151.
- Agrawal, S., Kim, R., Gausman, J., Sharma, S., Sankar, R., Joe, W., & Subramanian, S. V. (2019). Socio-economic patterning of food consumption and dietary diversity among Indian children: evidence from NFHS-4. *European journal of clinical nutrition*, 73(10), 1361-1372.
- Aurino, E. (2017). Do boys eat better than girls in India? Longitudinal evidence on dietary diversity and food consumption disparities among children and adolescents. *Economics & Human Biology*, 25, 99-111.
- Glanz, K., Basil, M., Maibach, E., Goldberg, J. and Snyder, D.,(1998). Why Americans eat what they do: taste, nutrition, cost, convenience, and weight control concerns as influences on food consumption. *Journal of the American Dietetic Association*, 98(10), 1118-1126
- Gupta, A., & Mishra, D. K. (2013). Poverty and calorie deprivation across socio-economic groups in rural India: a disaggregated analysis. *Journal of Regional Development and Planning*, 2(1), 15-33.
- Habte, T. Y., & Krawinkel, M. (2016). Dietary diversity score: A measure of nutritional adequacy or an indicator of healthy diet. *J. Nutr. Health Sci*, 3, 303.
- Hebert, J. R., Ma, Y., Clemow, L., Ockene, I. S., Saperia, G., Stanek III, E. J., ... & Ockene, J. K. (1997). Gender differences in social desirability and social approval bias in dietary self-report. *American journal of epidemiology*, 146(12), 1046-1055.
- Hill, S. W., & McCutcheon, N. B. (1984). Contributions of obesity, gender, hunger, food preference, and body size to bite size, bite speed, and rate of eating. *Appetite*, 5(2), 73-83.
- IIPS (2016) National Family Health Survey 2015–16. International Institute for Population Sciences, Mumbai, India.
- Kennedy, G. L., Pedro, M. R., Seghieri, C., Nantel, G., & Brouwer, I. (2007). Dietary diversity score is a useful indicator of micronutrient intake in non-breast-feeding Filipino children. *The Journal of nutrition*, 137(2), 472-477.
- Kennedy, G., Ballard, T., & Dop, M. C. (2011). *Guidelines for measuring household and individual dietary diversity*. Food and Agriculture Organization of the United Nations.
- Klasen, S. (1996). Nutrition, health and mortality in sub-Saharan Africa: Is there a gender bias?.
- Kolyesnikova, N., Dodd, T. H., & Wilcox, J. B. (2009). Gender as a moderator of reciprocal consumer behavior. *Journal of Consumer Marketing*.
- Krebs-Smith, S. M., Smiciklas-Wright, H., Guthrie, H. A., & Krebs-Smith, J. (1987). The effects of variety in food choices on dietary quality. *Journal of the American Dietetic Association*, 87(7), 897-903.
- Löwik, M. R. H., Hulshof, K. F. A. M., & Brussaard, J. H. (1999). Food-based dietary guidelines: some assumptions tested for The Netherlands. *British Journal of Nutrition*, 81(S1), S143-S149.
- Macaux, A. L. B. (2001). Eat to live or live to eat? Do parents and children agree?. *Public health nutrition*, 4(1a), 141-146..
- Monge-Rojas, R., Fuster-Baraona, T., Garita, C., Sánchez, M., Smith-Castro, V., Valverde-Cerros, O., & Colon-Ramos, U. (2015). The influence of gender stereotypes on eating

- habits among Costa Rican adolescents. *American Journal of Health Promotion*, 29(5), 303-310.
- Nithya, D. J., & Bhavani, R. V. (2018). Dietary diversity and its relationship with nutritional status among adolescents and adults in rural India. *Journal of biosocial science*, 50(3), 397-413.
- Pal, S. (1999). An analysis of childhood malnutrition in rural India: role of gender, income and other household characteristics. *World Development*, 27(7), 1151-1171.
- Roos, E., Lahelma, E., Virtanen, M., Prättälä, R., & Pietinen, P. (1998). Gender, socioeconomic status and family status as determinants of food behaviour. *Social science & medicine*, 46(12), 1519-1529
- Rolls, B.J., Fedoroff, I.C. and Guthrie, J.F(1991) Gender differences in eating behaviour and body weight regulation. *Health Psychology*, 10(2), 133-142.
- Ruel, M. T. (2002). *Is dietary diversity an indicator of food security or dietary quality?* (No. 140). International Food Policy Research Institute (IFPRI)..
- Ruel, M. T. (2003) Operationalizing dietary diversity: a review of measurement issues and research priorities. *Journal of Nutrition* 133, 3911S–3925S.
- Shetty, P. S., & James, W. P. (1994). Body mass index. A measure of chronic energy deficiency in adults. *FAO Food and Nutrition paper*, 56, 1-57.
- Solomon, M. R., & Wolny, J. (2015). An old model for a new age: Consumer decision making in participatory digital culture. *Journal of Customer Behaviour*, 14(2), 127-146.
- Swindale, A., & Bilinsky, P. (2006). Household dietary diversity score (HDDS) for measurement of household food access: indicator guide. *Washington, DC: Food and Nutrition Technical Assistance Project, Academy for Educational Development*.
- Wah, C. S. (2016). Gender differences in eating behaviour. *Int J Bus Econ Man*, 4, 116-121.
- World Health Organization. (2006). *Adolescent nutrition: a review of the situation in selected South-East Asian countries* (No. SEA-NUT-163). WHO Regional Office for South-East Asia.
- World Bank, W. (2006). *Repositioning Nutrition as Central to Development: A Strategy for Large-Scale Action*.

Table 1: Predictors of dietary diversity score (DDS) in Indian Men and women: results from Ordinary-least-square regression

Background variables		Men		Women	
		Coef.	95% CI	Coef.	95% CI
Household Size	Less than 4®				
	4-6	-0.03	(-0.08 , 0.02)	-0.02*	(-0.04 , 0.00)
	More than 6	-0.08***	(-0.14 , -0.03)	-0.06***	(-0.08 , -0.04)
Residence	Urban®				
	Rural	-0.13***	(-0.17 , -0.08)	-0.23***	(-0.24 , -0.21)
Education	No education®				
	Primary	0.27***	(0.20 , 0.33)	0.16***	(0.14 , 0.18)
	Secondary	0.4***	(0.35 , 4.46)	0.39***	(0.37 , 0.41)
	Higher	0.59***	(0.51 , 0.66)	0.7***	(0.67 , 0.73)
Religion	Hindu®				
	Muslim	0.9***	(0.84 , 0.95)	1.15***	(1.13 , 1.17)

Extended Abstract

	Christian	-0.49***	(-0.57, -0.40)	-0.63***	(-0.66, -0.6)
	Others	0.08*	(0.00, 0.17)	-0.26***	(-0.29, -0.23)
Caste	General®				
	OBC	-0.37***	(-0.42, -0.32)	-0.3***	(-0.31, -0.28)
	SC	0.02	(-0.04, -0.07)	0.27***	(0.25, 0.29)
	ST	-0.2***	(-0.27, -0.14)	0.13***	(0.10, 0.15)
Wealth	Poorest®				
	Poorer	0.58***	(0.52, 0.64)	0.42***	(0.40, 0.44)
	Middle	0.91***	(0.85, 0.97)	0.73***	(0.70, 0.75)
	Richer	1.19***	(1.12, 1.25)	0.98***	(0.96, 1.01)
	Richest	1.53***	(1.46, 1.62)	1.37***	(1.34, 1.4)
	Single®				
	Married	-0.57***	(-0.75, -0.38)	-0.14***	(-0.15, -0.12)
	Widowed	-0.61***	(-0.80, -0.42)	-0.3***	(-0.34, -0.26)
Marital status	Others	-0.4***	(-0.60, -0.20)	-0.3***	(-0.36, -0.24)
Currently pregnancy	No®				
	Yes			0.23***	(0.20, 0.26)
Breastfeeding	No®				
	Yes			0.09***	(0.07, 0.11)
Sex of the household head	Male®				
	Female	0.13***	(0.07, 0.19)	0.07***	(0.05, 0.09)
Working status	No®				
	Yes	0.14***	(0.06, 0.2)	0.09***	(0.02, 0.16)
Occupation	Not in work®				
	Professional/clerical/sales	0.05	(-0.05, 0.14)	0.02	(-0.14, 0.17)
	Agriculture/service/domestic	-0.27**	(-0.38, -0.18)	-0.21***	(-0.36, -0.07)
Employed all year/seasonal	All year®				
	Seasonal	-0.34***	(-0.39, -0.30)	-0.18***	(-0.24, -0.12)
	Occasional	-0.43***	(-0.55, -0.32)	-0.08	(-0.20, 0.03)
Land	Does not own®				
	Alone	0.15***	(0.09, 0.20)	0.22***	(0.14, 0.30)
	Jointly	0.21***	(0.14, 0.28)	0.3***	(0.24, 0.37)
	Both alone and jointly	0.05	(-0.04, 0.01)	0.05	(-0.03, 0.13)
House	Does not own®				
	Alone	-0.02	(-0.08, 0.03)	0.05	(-0.02, 0.12)
	Jointly	0.01	(0.14, 0.28)	0.11***	(0.05, 0.18)
	Both alone and jointly	0.08*	(-0.04, 0.15)	-0.06	(-0.13, 0.01)
	Respondent/partner®				
Spend respondent earning	Alone	-0.01	(-0.07, 0.04)	0.14***	(0.04, 0.24)
	Partner alone	0.06***	(0.08, 0.24)	0.14**	(0.03, 0.24)
	Someone else/others	-0.11	(-0.39, 0.16)	-0.35**	(-0.70, -0.01)
	Respondent/partner				
Large household purchases®	Alone	-0.05*	(-0.10, 0.00)	-0.09**	(-0.16, -0.02)
	Partner alone	0.38***	(0.29, 0.46)	-0.04	(-0.08, -0.02)
	Someone else/others	0.07	(-0.09, 0.23)	-0.39***	(-0.48, -0.31)
Allow to go to market	Not at all®				
	Alone			0.38***	(0.33, 0.43)
	Someone			0.21***	(0.15, 0.26)
Region	North®				
	North east	2.12***	(2.05, 2.09)	2.67***	(2.65, 2.70)
	Central	0.3***	(0.25, 0.36)	0.5***	(0.48, 0.52)

Extended Abstract

Eastern	1.73***	(1.67 , 1.79)	2.36***	(2.34 , 2.38)
Western	0.48***	(0.41 , 0.55)	0.83***	(0.80 , 0.85)
Southern	2.69***	(2.63 , 2.76)	2.59***	(2.57 , 2.62)

Table2: Predictors of Gender gap in dietary diversity score (GDDS) in Indian couples: results from Ordinary-least-square regression

Background variables		Coefficient	95% CI	
Residence	Urban®			
	Rural	0	(-0.07	0.06)
Religion	Hindu®			
	Muslim	-0.15***	(-0.23	-0.07)
	Christian	0.2***	(0.07	0.32)
	Others	0.29***	(0.17	0.41)
Caste	General®			
	OBC	0.11***	(0.04	0.18)
	SC	0.04	(-0.05	0.12)
	ST	-0.05	(-0.14	0.04)
Wealth	Poorest®			
	Poorer	0.03	(-0.06	0.11)
	Middle	0.01	(-0.08	0.10)
	Richer	-0.07	(-0.17	0.03)
	Richest	-0.16***	(-0.27	-0.05)
Education	No education®			
	Primary	0.03	(-0.05	0.11)
	Secondary	0.09**	(0.01	0.16)
	Higher	0.04	(-0.09	0.16)
Couple Education	Both educated ®			
	Wife more educated	-0.08*	(-0.16	0.01)
	Husband more educated	0.1***	(0.04	0.17)
Couple working status	Husband working ®			
	Both working	0	(-0.10	0.10)
	Both not working	0	(-0.10	0.10)
	Only wife working	-0.17**	(-0.36	0.03)
Wife Occupation	professional/clerical/sales®			
	not in work /no occupation	0.08	(-0.07	0.23)
	agricultural/service /household domestic	0.22***	(0.08	0.36)
Sex of household head	Male ®			
	Female	-0.07	(-0.18	0.03)
Access of bank	No®			
	Yes	-0.17	(-0.22	-0.11)
Wife land	Alone®			
	Both alone and jointly	-0.15*	(-0.32	0.03)
	Jointly only	-0.13*	(-0.29	0.02)
	Does not own	0.01	(-0.13	0.15)
Wife house	Alone®			
	Both alone and jointly	0.25***	(0.10	0.40)
	Jointly only	-0.03	(-0.16	0.10)

Extended Abstract

Large household Purchases	Does not own	0.08	(-0.04	0.20)
	Respondent and wife/partner®			
	Alone	0.09*	(-0.01	0.23)
	Husband/partner alone	0.06*	(-0.03	0.12)
Region	Someone else/other	0.33***	(0	0.15)
	North ®			
	North east	-0.76***	(-0.86	-0.65)
	Central	-0.18***	(-0.26	-0.10)
	Eastern	-0.52***	(-0.61	-0.43)
	Western	-0.53***	(-0.62	-0.43)
	Southern	-0.32***	(-0.42	-0.23)

Note: Significance level ***p<0.01, **<0.05, *<0.1; ®Reference category