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Food Consumption Practices of Men and Women across Rural-Urban Interface of South Indian Megacity Bangalore

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Authors' contributions

This work was carried out in collaboration among all authors. Author KG designed the study and objectives, developed methodological approaches for the set objectives, monitoring and evaluation of data collection and implementation. Author SY conducted research according to the set methodological approaches, performed data management, assessment and developed draft manuscript. Author DV reviewed and provided suggestions for results and discussion. Author CD provided suggestions, support for evaluation and assessment of results and discussion. All authors read and approved the final manuscript.

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ABSTRACT

Background: Food consumption practices involving dietary diversity, healthy and unhealthy practices have greater influence on nutritional and health status of the individual. Men and women always behave differently and have different consumption pattern due to various factors. Urbanization gradients along rural-urban interface of Bangalore mega city helps for comparative study of these factors.

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Aims: To compare food consumption practices between men and women across rural-urban interface of Bangalore, India.
Methodology: Men (n=150) and women (n=150) from 300 middle income households in the rural-urban interface of Bangalore, were surveyed for dietary diversity score (DDS), healthy and unhealthy dietary practices and response to questions on health and nutrition.
Results: Findings revealed that, least DDS was recorded in transition area among both men (48.0%) and women (47.7%). In rural maximum difference for healthy habit score was existed between men (50.8%) and women (44.0%). Average unhealthy habits score was more among women in rural (33.2%) and transition (35.4%) areas, whereas in urban , men had higher score (41.8%). Health and nutrition aspects indicated, fasting on religious belief was more practiced by women in transition area (56%). Consumption of health supplements was more among women, especially in urban (34%).
Conclusion: It can be concluded that, women have poor food consumption practices compared to men. Even though women are observed to be more health conscious than men, their dietary habits are compounded with various factors such as socio-cultural, occupational and urbanization. In this regard nutrition programmes must be strengthened to decrease risk factors for non-communicable diseases and to improve overall health of the individuals.

Keywords: Gender; rural-urban interface; dietary diversity; healthy practices.

1. INTRODUCTION

The relationship between our foods, the nutrients present in them and our health are complex, but has significant and far-reaching influence on individuals and society. In recent days, changing diets and dietary habits place an increasing burden on healthcare systems. Eating a well-balanced diet, with adequate nutrients and appropriate calories, is a fundamental requirement for continued health. An appropriate diet contributes to healthy development, healthy ageing and greater resilience against disease [1]. Similarly, a poor or inappropriate diet places people at greater risk of infection and a range of chronic illnesses including cancer, type 2 diabetes and cardiovascular disease [2].

Unhealthy dietary practices, sedentary lifestyle and obesity have emerged as major risk factors of NCDs. All these risk factors are lifestyle related and are influenced by change from rural to urban lifestyle. Even in rural areas with modernization and advent of mass media, there is gradual shift to urbanized lifestyle [2].

Male and female always behave differently and have different consumptions pattern. Food choice is a complex human behaviour and is controlled by many interrelating factors ranging from biological mechanism and genetic profiles to social and cultural factors [3]. This has influence on food preferences and eating styles. For example, female consume less calories than male which shows that females tend to eat in a more feminine style [4]. Women consume more fruit and vegetables, legumes, and whole foods, but they also consume more sweets and cakes. Men tend to have more fat and protein rich foods and to drink more wine, beer, spirits, and sweet carbonated drinks. In general, they show dietary behaviors potentially favouring over weight and obesity [5]. Literatures indicate that urbanization is one of the major causes of nutrition transition, which is governed by various factors such as dietary intake, food consumption and socio-cultural practices [6]. This transition is root cause for increasing overweight and obesity. In recent days not only men, women are also at great risk of non-communicable diseases. Individual's diet and healthy practices decides their risks for non-communicable diseases. The study of healthy and unhealthy practices among men and women, directly relates to their health status and risks for non-communicable diseases. This study along rural-urban gradient will correlates, its relationship with extent of urbanization. Hence, this study, carried out with the objective to compare food consumption practices between men and women across rural-urban interface of Bangalore.

2. MATERIALS AND METHODS

Methodological steps followed to carryout present investigation are as follows:

2.1 Selection of Localities

Rural-urban interface of the Bangalore comprises two transects, (north and south transects), which are defined as a common space for interdisciplinary research. The northern transect (N-transect) is a rectangular strip of 5 km width

and 50 km length, the lower part of this transect cuts into urban Bangalore, and the upper part contains rural villages. The Southern transect (S-transect) is a polygon covering a total area of 300 km^2. Rural-Urban interface was further divided into three sub regions *viz*., Rural, Transition and Urban areas based on the simplified Survey Stratification Index (SSI) by following the logic of the Urban-Rural Index which considered distance to the city centre (Vidhana Soudha) and percentage of built-up area [7]. This classification of regions, formed basis for selection of 300 middle income households based on purposive random sampling, in the rural-urban interface of Bangalore. Among these households 50 men and 50 women were interviewed for healthy and unhealthy habits from each gradient (rural, transition and urban).

2.2 Data Collection

A questionnaire was developed and pretested among selected localities for standardization. Data from men and women was collected through personal interviews, on dietary diversity, healthy and unhealthy habits. Individual's response towards, foods, health and nutrition related aspects was also collected and compared between men and women.

2.3 Dietary Diversity

Dietary diversity is the sum of the number of different food groups consumed over a given reference period [8]. It is considered as a proxy to food security. Dietary Diversity Scores (DDS) were calculated by summing the number of food groups consumed by the household members over the 24-hour recall period and expressed in percentage.

2.4 Healthy and Unhealthy Habits

A structured questionnaire comprised of questions related to ten healthy and unhealthy habits, related to routine activities were included and scores were recorded and expressed in-terms of percentage based on individual's responses.

2.5 Health and Nutrition

Apart from healthy and unhealthy habits, men and women were interviewed for their responses towards questions related to health and nutrition aspects, which are indirectly related to life style and risk factors for non-communicable disease.

2.6 Statistical Analysis

The collected data was pooled and analyzed by application of student 't' test to draw inferences based on study objectives.

3. RESULTS AND DISCUSSION

Results are presented under following headings:

3.1 Dietary Diversity

Across the rural-urban gradient, least DDS was recorded in transition area among men (48.0%), however among women it was in both rural and transition (47.7%). Findings revealed that, DDS score of men and women in rural was, 48.5 and 47.7 per cent respectively. It was observed that majority of the men consumed pulses, meat/fish/chicken, milk and milk products whereas, more women consumed green leafy vegetables and fruits. Quite same findings were evident in transition, but in urban, DDS score for male was slightly high (49.0%) compared to female (48.3%). It was surprising to note that, both men and women dietary diversity was below 50 per cent. Irrespective of gender, people mainly consumed five food groups (such as) cereals, pulses, oils, fats and sugars. But only few of them consumed protective food groups, which are most essential to regulate body mechanisms as they are good sources of vitamins and minerals. A research study conducted in selected South African towns, reported that, the peri-urban populations had limited dietary intake and were more food insecure because of high levels of poverty, unemployment, and lack of land. Peri-urban dwellers are therefore more sensitive to changes in incomes and food prices because they lack safety nets to absorb income or price shocks as they purchase more, rather than growing their own food. This compromises dietary diversity as they have limited access to diverse foods [9]. In the present study quite similar observations were made, as the least DDS score was observed in transition area both among male and female. Two main reasons were identified for slight differences in DDS score of men and women. First one is, irrespective of gradients (rural, transition and urban areas) it was observed that influence of socio-cultural practices on food choices and consumption (Such as, fasting on religious belief, avoiding certain foods during menstruation, compromising when the quantity of nutritious food prepared is less, with other foods, serving first men the family etc.) was more

among women compared to men. Second one is occupational status, most of the men were employed and tend to consume outside food, whereas majority of the women were housewives and restricted with household food.

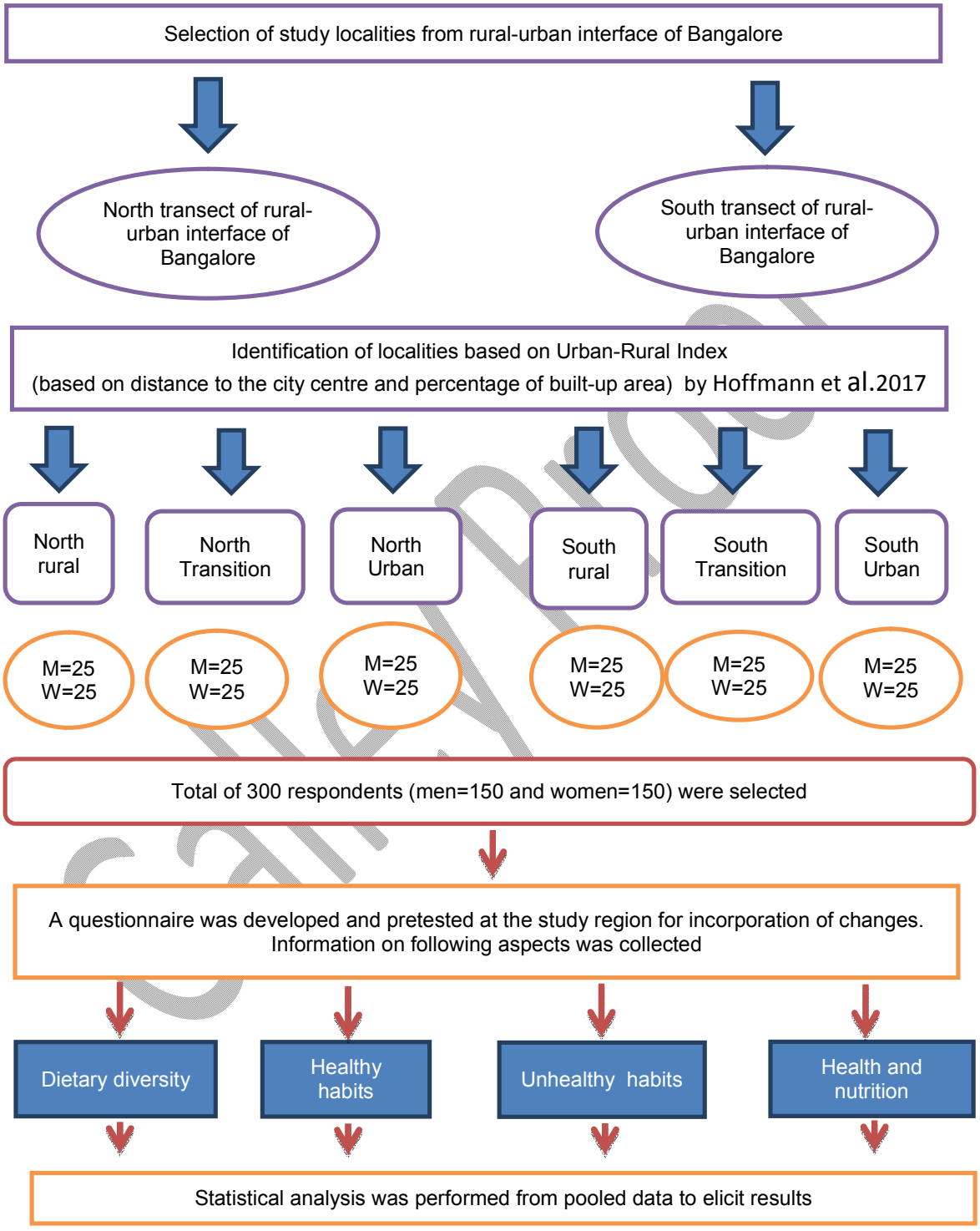

Fig. 1. Study design

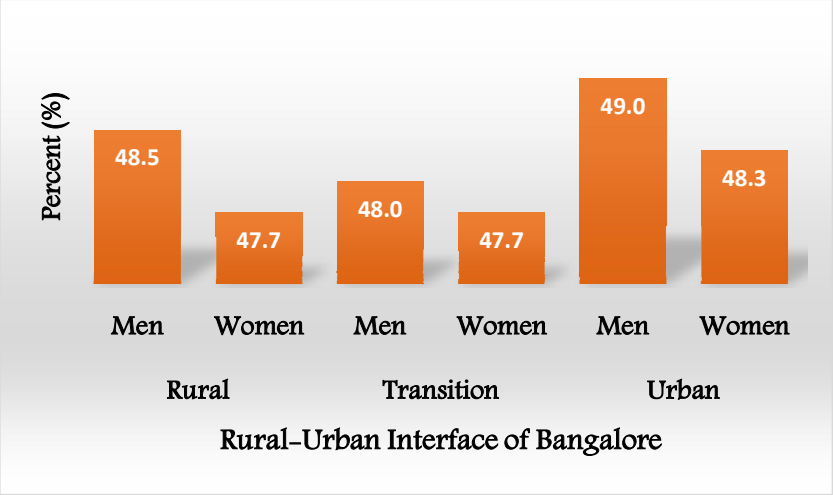

Fig. 2. Dietary diversity score comparison between male and female across the rural-urban interface of Bangalore

3.2 Healthy Habit Score

In rural maximum difference for healthy habit score was existed between men (50.8%) and women (44.0%). In rural 68 per cent of men were consuming meals on time regularly, whereas this was only 48 per cent among women. Milk and milk products were consumed by 90 per cent of rural men, however it was 78 per cent among rural women. Both in rural and urban, response of men towards daily consumption of vegetables was more (rural=86%, urban=90%) compared to women (rural=74%, urban=74%). It was noticed that, foods with additional health benefits (fenugreek seeds, flax seeds, green tea etc.) was consumed by greater number of women (20%) in urban compared to men (8.0%). In transition almost same score for healthy habits was obtained for both men and women. Among urban men healthy habit score (50.0%) recorded was slightly higher, compared to women (48.4%). However, these differences were statistically non significant irrespective of study areas and between the genders.

A study on gender differences in food choices reported that, women were more likely than men to avoid high-fat foods, eating fruit and fiber, and limiting salt (to a lesser extent) in almost all of the 23 countries. They were also more likely to be dieting and attached greater importance to healthy eating. Gender differences in food choices therefore appear to be partly attributed to women's greater weight control involvement and partly to their stronger beliefs in healthy eating [10]. These findings correlate with present investigation (except in transition). Women who preferred whole fruits over fruit juice, responded positively towards consumption of foods with additional health benefits and for involvement in exercise. These responses were found to be more among women and found to be increased towards urban. Indirectly, this indicates that, urbanized lifestyle and related health issues, may increase health consciousness among women compared to men. A study on gender differences in eating behaviour reported that, eating behaviour shows differences between men and women and it is controlled by social, biological and familial factors. Healthy eating behaviour is very important for both men and women, to avoid problems of obesity and overweight. Family members, friends, media and behavioural control of individual are the main factors to develop healthy eating behaviour [6]. Present study revealed similar healthy habit pattern among men and women across rural-urban gradient.

3.3 Unhealthy Habit Score

Women had higher score for average unhealthy habits in rural (33.2%) and transition (35.4%). Whereas, urban men scored more average (41.8%) compared to women (35.2%) in unhealthy habits. Among rural women, practice of skipping meal (46.0%), eating breakfast very late (54.0%) and sedentary lifestyle (64.0%) are attributed to higher unhealthy habit score. Similar reasons were identified in transition area too. Statistically significant difference between men and women was observed for eating late breakfast ($\chi 2 = 6.42^*$) and for late dinners ($\chi 2 = 8.95^*$), across rural-urban interface.

Table 1. Healthy habit Score comparison between men and women (Combined) (n=300)

Sl. no.	Healthy habit Statements	Rural-urban gradient of Bangalore						χ2 test	*p* value
		Rural		Transition		Urban			
		M (%)	F (%)	M (%)	F (%)	M (%)	F (%)		
1	Do you consume your meals on time regularly	68	48	68	46	58	44	0.17^{NS}	0.91
2	Do you eat at least 3-4 times fruits in a week	36	24	38	48	56	48	3.78^{NS}	0.15
3	Do you consume whole grains/sprouts at least 4-5 times a week	52	48	40	22	24	24	3.11^{NS}	0.21
4	Do you consume vegetables daily	86	74	76	80	90	74	1.36^{NS}	0.50
5	Do you consume GLV at least 3-5 times in a week	52	42	46	58	38	42	2.52^{NS}	0.28
6	Do you consume eggs at least 3-5 times in a week	26	24	24	38	30	26	3.15^{NS}	0.20
7	Do you exercise daily	28	16	20	30	36	36	5.24^{NS}	0.07
8	Do you consume milk and milk products daily	90	78	96	90	96	94	0.33^{NS}	0.84
9	Do you prefer whole fruits over fruit juice?	62	76	56	48	64	76	2.22^{NS}	0.32
10	Do you consume foods with additional health benefits apart from basic nutrition	8	10	6	16	8	20	1.64^{NS}	0.43
	Average healthy habit score (%)	50.8	44.0	47.0	47.6	50.0	48.4		
	't' Test	1.69^{NS}		0.17^{NS}		0.12^{NS}			
	'F' test across rural-urban gradient								
	Men							0.59^{NS}	0.55
	Women							1.15^{NS}	0.31

Note: NS -Non significant

In urban, consumption of outside food (46.0%), very late dinner (54.0%) and non-food habits (38.0%) are reasons noticed for higher average unhealthy score among men, which was significantly more (F= 5.46**) compared to transition and rural men. Statistically significant difference for average unhealthy habit score between men and women noticed only in urban (t=1.96 *). Gender differences are influenced by socio-demographic factors in different countries. These differences may be more consistent among less educated and rural subgroups because of traditional beliefs. On the other hand, the differences tend to be lower in developed countries [11]. These statements may be true for gender differences with respect to unhealthy habit score, in present study. Certain unhealthy food consumption practices among women, in rural and transition, were influenced by socio-cultural practices and traditional beliefs. However, few unhealthy practices influenced by urbanized lifestyle were acquired more by urban men than women.

3.4 Health and Nutrition Aspects

Health and nutrition aspects indicated, among the study regions, majority of the women knew about type of foods consumed for good health. In support to this most of the women had altered their regular food habits especially in transition (32%) and urban (38%) areas. Fasting on

religious belief was more practiced by transition women (56%), compared to rural (26%) and urban (28%), which was statistically significant ($\chi 2$= 6.205*). Consumption of health supplements was significantly more ($\chi 2$=10.270**) among women, especially in urban (34%) compared to men. Rural women preference for preparation of foods at home was least considered (54.5%). Morbidity in past two months was more among women and majority was observed in transition area. Number of individuals stressed due to various reasons was more among men in rural, whereas in transition areas it was women. Almost equal response was obtained by men and women in urban area for their stress condition. Consumption of tea or coffee was more among men along the rural-urban gradient. However these observations were found to be non significant across rural-urban interface among men and women. These observations reveal that, even though women are known about healthy foods, morbidity was more among women and their food preferences were less considered compared to men. It was also noticed that, majority of women have altered their regular foods and were taking health supplements, which are generally practiced due to health conditions. Especially in transition area, majority of women responded that, they are stressed and about their morbid conditions in past two months. This may be correlated to their frequent fasting on religious believes and other unhealthy practices. According to a study, non-communicable diseases, that taken all together represent the first cause of death worldwide, are greatly influenced by individual behavior as regards, in particular, dietary habits and physical activity. These factors are both greatly influenced by gender, which is, consequently, a main determinant of human health [12].

Table 2. Unhealthy Habit Score comparison between men and women

(n=300)

Sl. no.	Unhealthy habit Statements	Rural-urban gradient of Bangalore						$\chi 2$ test	*p* value
		Rural		Transition		Urban			
		M (%)	F (%)	M (%)	F (%)	M (%)	F (%)		
1	Do you take additional salt with your regular meals ?	30	32	26	22	32	22	1.37	0.50
2	Do you skip your meal very often ?	34	46	46	62	44	42	1.76	0.41
3	Do you consume outside food routinely?	40	6	32	6	46	10	0.44	0.80
4	Do you have habit of taking tea or coffee immediately after your meals	14	14	24	36	28	22	2.86	0.23
5	Do you eat your breakfast late?	34	54	20	60	34	44	6.42*	0.04
6	Do you eat late at night very often?	6	12	20	6	54	30	8.95*	0.01
7	Is your activity level sedentary ?	44	64	54	70	60	94	0.60	0.74
8	Do you have any non-food habit?	40	22	50	24	38	10	2.97	0.22
9	Do you take additional sugar with your meals / regular tea/coffee	14	20	18	20	24	16	2.76	0.25
10	Do you watch T.V / mobile while having food	52	62	48	48	58	62	2.76	0.25
	Average unhealthy habit score (%)	20.2	33.2	33.8	35.4	41.8	35.2	5.46**	0.005
	't' Test	**0.78** ^{NS}		**0.41** ^{NS}		**1.96***			
	'F' test across rural-urban gradient								
	Men							5.46**	0.005
	Women							0.24^{NS}	0.781

*Note : NS -Nonsignificant * Significant @ 5%, **Significant @ 1%*

Table 3. Comparison of responses to nutrition and health related questions between men and women

(n=300)

S. no.	Statements/ Questions	Rural-urban gradient of Bangalore						χ2 test	*p* value
		Rural		Transition		Urban			
		M (%)	F (%)	M (%)	F (%)	M (%)	F (%)		
1	Do you know what type of foods to be consumed for good health?	10	15.5	16	30	20	32	0.129	0.937
2	Have you ever altered your regular food habits?	10	9	16	32	26	38	0.622	0.732
3	Do you fast on religious belief?	28	26	22	56	2	28	6.205*	0.044
4	Are you sick anytime in past 2 months?	30	35.5	42	52	36	38	0.499	0.778
5	Do you drink more tea/ coffee?	30	8.5	34	20	34	34	1.658	0.436
6	Do you take any health supplements	6	0	2	20	4	34	10.270**	0.005
7	Is your preference considered for preparation of foods at home?	100	54.5	96	86	96	80	0.147	0.928
8	Are you stress due to various reasons?	42	26	48	64	48	46	0.994	0.608

*Note: NS -Nonsignificant * Significant @ 5%, **Significant @ 1%*

Gender roles are socially constructed: the behaviors, activities, and attributes considered appropriate for men and women are specific to a given society. Answering the question of why women are more likely than men to be malnourished requires a gender analysis [13]. Present study reveals, food consumption practices of women is influenced by their socially constructed roles and cultural patterns. Nutritional status is affected when; socially constructed gender roles of men and women interact with their biological roles. Additionally, a recent study highlights that, gender has been recognized as an important factor that influences lifestyle habits and consequently, the onset and course of chronic diseases [14].

4. CONCLUSION

Present study reveals that, food consumption practices of men and women differ only in few aspects across rural-urban interface of Bangalore. Unhealthy habits among men increases with urbanization. Unhealthy food habits are highest among rural women which is gradually decreased towards urban, indicating urbanized environment and related health problems are increasing health consciousness especially among women. Whereas, reverse scenario is evident among men, exhibited by increased unhealthy habits towards urban. Overall it can be concluded that, food consumption practices of men and women are poor with one or the other aspects considered. Further, comparison of dietary intake and physical activity and family history of NCDs of both men and women is of added value to future research.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Anonymous, The importance of nutrition for health and society. Available: https://bbsrc.ukri.org/research/briefings/food-nutrition-health/

2. WHO, Unhealthy diets & physical inactivity, NMH Fact Sheet, 2009 : 1-2. Available:https://www.who.int/nmh/publications/fact_sheet_diet_en.pdf (2)
3. Arganini C. and Saba A., Gender Differences in Food Choice and Dietary Intake in Modern Western Societies. Public health- Social and Behavioural health. IntechOpen, 2012: 83-103. Available:https://cdn.intechopen.com/pdfs/36935/InTech-Gender_differences_in_food_choice_and_dietary_intake_in_modern_western_societies.pdf
4. Tripathy JP., Thakur JS., Jeet GS., Jain S. and Prasad R., Urban rural differences in diet, physical activity and obesity in India: are we witnessing the great Indian equalisation? Results from a cross-sectional STEPS survey. BMC Public. 2016 : 16:816: 1-10.
5. Varì R., Scazzocchio B., Del Papa S., Dietary habits and gender differences. Ital J Gender-Specific Med, 2017: 3(2): 55-58.
6. Wah CS. Gender differences in eating behaviour. International journal of accounting and business management. 2016 : 4(2): 116-121
7. Hoffmann EM. Jose M. Nölke N. Möcke T. Construction and Use of a Simple Index of Urbanization in the Rural–Urban Interface of Bangalore, India. Sustainability. 2017: 1-21.
8. Hoddinott J. and Yohnnes Y., Dietary diversity as a household food security indicator, Wahington DC, Food and Nutrition Technical Assistance Project . FHI. 2002: 360
9. Chakona G. and Shackleton C., Minimum Dietary Diversity Scores for Women Indicate Micronutrient Adequacy and Food Insecurity Status in South African Towns. Nutrients. 2017: 12 (9); 1-16.
10. Wardle J. Haase AM. and Steptoe A**.** Gender differences in food choice: the contribution of health beliefs and dieting. Annuals of Behavioural Medicine. 2016: 27(2):107-16.
11. Missagia SV. Riveli OS. and Carvalho RD., Food choice motives and healthy eating: assessing gender differences. Rio de Janeiro. 2012: 1-13.
12. Masella R. and Malorni W., Gender related differences in dietary habits. Clinical Management Issues, 2017, 11(2): 59-62.
13. Mucha, N.M.P.A., Enabling and equipping women to improve nutrition. Briefing paper, Bread for the world institute. 2012: 1-6. Available : https://www.bread.org/sites/default/files/downloads/briefing-paper-16.pdf
14. Varì R., Scazzocchio B., D'Amore A., Giovannini C., Gessani S. and Masella R., Gender-related differences in lifestyle may affect health status. Ann Ist Super Sanità, 2016: 158-166.