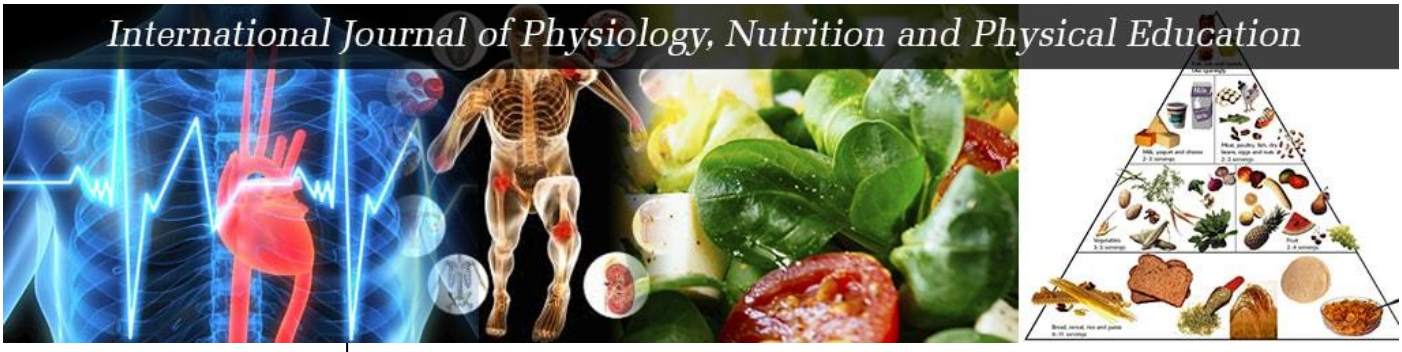

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Pattern of diet and exercise amongst urban adults

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Abstract
This cross-sectional descriptive online study was conducted on 359 participants (183 females: 50.98% and 179 males: 49.02%) using a pre-tested and pre-validated questionnaire to determine the pattern of diet and exercise among urban adults. The mean age of female participants was 48.02 +/- 7.67 years, while that for their male counterparts was 48.84 +/- 9.52 years without significant gender difference in mean age (Z=0.896; p=0.369). There was significant gender difference in preference for non-vegetarian diet (Z=3.021; p=0.002) and pure vegetarian diets (Z=3.094; p=0.002), with no significant gender difference in choice of vegetarian plus egg diet (Z=0.493; p=0.624). Significantly (Z=3.363; p=0.0007) more females preferred to consume fish. The gender difference was not significant for performance of physical (Z=0.234; p=0.818) and breathing exercises (Z=0.432; p=0.667). There was significant gender difference (Z=2.177; p=0.029) in those reporting Type-2 diabetes mellitus. Community-based behavioural change communication campaigns can help inculcate healthy eating habits and exercise patterns.

Keywords: Diet, exercise, self-reported patterns, urban adults

1. Introduction
India has unique and diverse food cultures and is also in the middle of a "nutrition transition", [1] shifting from diets high in cereals and fibre to diets high in sugar, fats, and animal-source foods [2]. The nutrition transition has been driven by the edible oil-vegetable oil revolution, high sugar consumption, shift toward high intake of animal-source foods, and diminished intake of legumes, millets and vegetables [3]. Inclusion of fats improves the taste of foods and preference for fats in diet is chiefly determined by brain mechanisms that may include central levels of neurotransmitters, hormones, or neuropeptides [4]. The development of cheaper techniques to extract oil from oil seeds and to increase the oil content of these oil seeds led to increase in availability of inexpensive vegetable oils in the developing world [3]. Data on sugar availability suggest that the global dietary intake of sugar is at alarming levels [5]. The worldwide increases in animal-source foods have primarily occurred in low- and middle-income countries; [3] excessive consumption of animal-source foods is associated with excessive intake of saturated fats and increased mortality [6]. In the developed as well as the developing countries, the consumption of legumes, vegetables and millets has declined significantly. [7-10] A multi-centre cross-sectional Indian study [11] found three dietary patterns: "cereals-savoury foods", "fruit-veg-sweets-snacks" and "animal-foods" and moderate intake of the "cereals-savoury foods" pattern was linked with diminished risk of obesity and central obesity. The prevalence of obesity is higher in rural areas and among the poor in the higher-income countries, which is the reverse of what is seen in lower-income countries and the increasing rate of obesity among the poor has important implications for the distribution of health inequalities [12].
Currently, composite dietary patterns [13, 14] are assessed because composite diets might have a distinct influence on health as compared to assessment of their isolated intake and also because such an assessment on disease risk might be more pertinent for preparing dietary recommendations [15-17]. Two dietary patterns have been observed: high intake of meat, high-fat dairy, refined grains, and fast food (the "Western diet") and high intake of low fat dairy products, fruits, vegetables, fish, whole grains, legumes (the "prudent diet") [15, 17-19] Longitudinal studies [20-22] have correlated high consumption of fruit, vegetables, low-fat dairy products and high-fibre grains with reduced weight gain as compared to high ingestion of meat, potatoes and refined grains.

Physical inactivity is a major contributor to mortality. [23] Low level of physical activity is linked to low cardiovascular fitness [24] and many non-communicable chronic health conditions that are prevalent in both developed and developing countries. [25, 26] It has been estimated that elimination of physical inactivity would remove between 6% and 10% of coronary heart disease, type 2 diabetes, and breast and colon cancers, and increase life expectancy by 0.68 (0.41 - 0.95) years. [27] Incidental physical activity is generally of low intensity but often contains some sporadic bouts of moderate intensity activity and occurs throughout the course of the day during activities of daily living. [28] A moderate intensity of incidental physical activity for 20–30 min per day in persons aged between 35 and 65 years was positively associated with measures of cardiovascular fitness. [29]

The purpose of the present study was to determine the patterns of diet and exercise among urban adults.

2. Materials and Methods

This cross-sectional descriptive online study was conducted using a pre-tested and pre-validated questionnaire. This questionnaire was administered, using the chain sampling technique, via Google forms, to adults of either gender, who were residing in a metropolitan city in Western India. Informed consent was taken on the Google forms. The height, weight, diet and exercise patterns were self-reported by the respondents and these could not be verified in this online study. The data were adapted to Microsoft Excel spreadsheet (Microsoft Corporation, Redmond, WA, USA) and analyzed using SPSS statistical software Windows Version 25.0 (IBM Corporation, Armonk, NY, USA). For discrete data, the percentage of responses and the standard error of difference between two sample proportions were calculated. For continuous data, the standard error of difference between two means was calculated. 95% Confidence interval (CI) was stated as: [Mean-(1.96)*Standard Error)] - [Mean+(1.96)* Standard Error)]. The statistical significance was determined at $p<0.05$.

3. Results and Discussion

There were a total of 359 participants (183 females: 50.98% and 179 males: 49.02%). There was no significant gender difference (Z=1.605; p=0.107) in urban-rural background of participants.

3.1 Age distribution: The mean age of female participants was 48.02 +/- 7.67 years (95% CI: 46.91 – 49.13 years), while that for their male counterparts was 48.84 +/- 9.52 years (95% CI: 47.13 – 49.95 years). The gender difference in mean age was not significant (Z=0.896; p=0.369). The first quartile, median and third quartile of the age distribution was higher for males, while the maximum and minimum ages were higher for females (Fig-1).

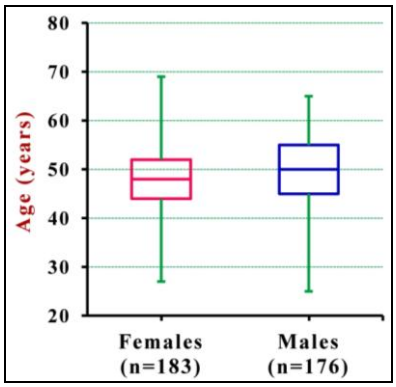

Fig 1: Box plot of age distribution

3.2 Body Mass Index: The mean body mass index (BMI) was 26.68 +/- 4.92 kg/m^2 (95% CI: 25.97 – 27.40 kg/m^2) and 26.42 +/- 4.35 kg/m^2 (95% CI: 25.78 – 27.07 kg/m^2) for females and males, respectively. The gender difference in mean BMI was not significant (Z=0.530; p=0.595). The first quartile of BMI was lower for females, but the minimum, third quartile and maximum values were higher for females. (Fig-2).

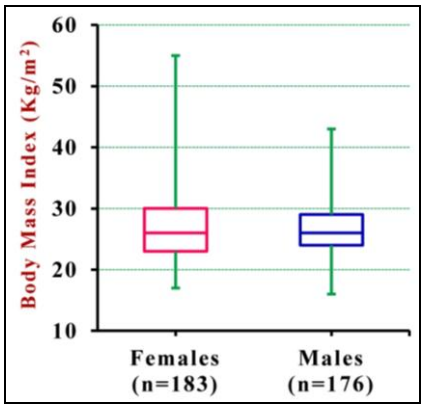

Fig 2: Box plot of Body Mass Index

3.3 Dietary patterns: There was significant gender difference in preference for non-vegetarian diet (Z=3.021; p=0.002) and pure vegetarian diets (Z=3.094; p=0.002), with no significant gender difference in choice of vegetarian plus egg diet (Z=0.493; p=0.624). Among non-vegetarians, a significantly higher (Z=3.363; p=0.0007) proportion of females preferred to consume fish, as compared to males (30.77%). A Kolkata-based study [30] reported that females consumed more cereals, vegetables, fruits and non-vegetarian foods as compared to their male counterparts. Vegetarianism, consumption of fast foods and carbonated beverages and snacking habits [31, 32] determine body fat, bone density and serum cholesterol levels [33, 34]. Increased prevalence of obesity, atherogenic dyslipidemia, subclinical inflammation, metabolic syndrome, type 2 diabetes mellitus, and coronary heart disease in Indians is the consequence of reduced physical activity, diminishing consumption of coarse cereals, pulses, fruits and vegetables coupled with a rising consumption of meat products [35]. In the present study, though a higher proportion of males (53.41%) consumed nutritional and vitamin supplements, as compared to females (46.45%), the gender difference was not significant (Z=1.318; p=0.186). Another study [36] reported significant gender differences in self-reported eating under stress, non-consumption or rare consumption of leafy vegetables, eggs, fish/sea foods, meat products, branded snacks, fried snacks, carbonated beverages and additional sugar intake. A 7% decline in energy derived from carbohydrates and a 6% rise in energy derived from fats has been observed in the nutrition transition during the years 1973-2004 [35].

3.4 Exercise patterns: Though a marginally higher proportion of females (54.64%) performed physical exercises, as compared to males (53.41%), the gender difference was not significant (Z=0.234; p=0.818). Likewise, a marginally higher proportion of females (57.38%) performed breathing exercises, as compared to males (55.11%), without significant gender difference (Z=0.432; p=0.667). A cross-sectional Indian study [36] has reported significant gender differences in pattern of physical exercise and approximate duration of exercise. As per the ICMR-INDIAB study (Phase-1) [37], less than 10% of urban and rural Indians reported recreational

physical activity. In China, only 28.9% of rural residents and 7.9% of urban residents reported leisure time physical activity [38]. Most Indians reported that they were physically active at their workplaces [37], with comparable reports from studies conducted in China [39] and Vietnam [40]. An Indian study [41] found that only 19.59% respondents were engaged in high-intensity exercises, such as, jogging, aerobic dancing, or swimming. A study [42] from Kerala reported that selective workouts for strengthening core muscles (rectus abdominis, external and internal obliques, transverse abdominis, multifidus, quadratus lumborum and lumbar erector spinae) along with a healthy diet significantly reduced body weight and waist-to-hip ratio among college teachers.

3.5 Morbidity profile: One female participant (0.55%) reported having suffered from gestational diabetes. The number of females and males with Type-1 diabetes mellitus was 07 (03.83%) and 06 (03.41%), respectively, without any significant gender difference (Z=0.210; p=0.833). However, there was significant gender difference in those reporting Type-2 diabetes mellitus (Z=2.177; p=0.029). 71 (38.80%) females and 74 (42.05%) males reported family history of diabetes mellitus in parent or sibling. The gender difference was not significant for patients who self-reported hypertension (Z=0.272; p=0.787), ischemic heart disease (Z=0.079; p=0.936) and arrhythmias (Z=0.546; p=0.582). Tobacco consumption among females and males was 01.64% and 15.34%, respectively, exhibiting highly significant gender difference (Z=4.689; $p<0.0001$). 12 (06.56%) females and 65 (36.93%) males had varying frequencies of alcohol consumption and the gender difference was highly significant (Z=7.009; $p<0.0001$). The number of females and males who underwent regular testing for blood sugar levels was 63 (34.43%) and 68 (38.64%), respectively, without any significant gender difference (Z=0.828; p=0.406). In all, 63 females and 68 males reported having diabetes mellitus. There was no significant gender difference (Z=0.756; p=0.447) in the 42 (66.67%) females and 41 (60.29%) who had got their blood sugar levels checked in a laboratory, while the rest opted for home-testing of blood sugar levels. There was no significant gender difference (Z=0.185; p=0.849) in the 70 (38.25%) females and 69 (39.20%) who had got their cholesterol levels checked regularly. 90 (49.18%) females and 91 (51.70%) males got their blood pressure checked regularly, without significant gender difference (Z=0.478; p=0.631). There was no significant gender difference (Z=1.608; p=0.107) in the 39 (21.31%) females and 26 (14.77%) males, who regularly followed up with their doctors.

4. Conclusion

This cross-sectional study was conducted in a metropolitan population with diverse dietary and exercise habits. Longitudinal studies would help unravel dietary patterns specific development of lifestyle diseases. Though previous studies have reported that India is undergoing a nutrition transition from cereal-based diets to meat-based diets, 114 (62.30%) females and 81 (46.02%) males were pure vegetarians in the present study. In other countries, meat consumption rose steeply with urbanization and rising income level, but in India, the preference for vegetarian diet seems to be influenced by socio-cultural and religious factors. Despite the fact that this study did not attempt to verify the existence of noticeably "healthy" or "prudent" dietary or exercise pattern, the findings of this study may be helpful in developing dietary guidelines for heterogeneous metropolitan populations and also in formulating interventions for preventing obesity and other risk factors for chronic lifestyle diseases. For effecting changes in the dietary patterns and galvanize people to indulge in recreational physical activity, it will be necessary to conduct community-based behavioural change communication campaigns. It may be necessary to develop structured exercise programs for inhabitants of metropolitan cities who may have time constraints due to a busy lifestyle.

5. References

1. Shetty PS. Nutrition transition in India. Public Health Nutr. 2002; 5(1A):175-182.
2. Popkin BM. The nutrition transition and its health implications in lower-income countries. Public Health Nutr. 1998; 1(1):5-21.
3. Popkin BM, Adair LS, Ng SW. Global nutrition transition and the pandemic of obesity in developing countries. Nutr Rev. 2012; 70(1):3-21.
4. Drewnowski A, Popkin BM. The nutrition transition: new trends in the global diet. Nutr Rev. 1997; 55(2):31-43.
5. Duffey KJ, Popkin BM. High-fructose corn syrup: is this what's for dinner? Am J Clin Nutr. 2008; 88(6):1722S-1732S.
6. Sinha R, Cross AJ, Graubard BI, Leitzmann MF, Schatzkin A. Meat intake and mortality: a prospective study of over half a million people. Arch Intern Med. 2009; 169(6):562-571.
7. Popkin BM. The world is fat-The fads, trends, policies, and products that are fattening the human race. New York: Avery-Penguin Group, 2008.
8. Du S, Lu B, Zhai F, Popkin BM. A new stage of the nutrition transition in China. Public Health Nutr. 2002; 5(1A):169-174.
9. Popkin BM, Siega-Riz AM, Haines PS. A comparison of dietary trends among racial and socioeconomic groups in the United States. N Engl J Med. 1996; 335(10):716-720.
10. Popkin BM, Keyou G, Zhai F, Guo X, Ma H, Zohoori N. The nutrition transition in China: a cross-sectional analysis. Eur J Clin Nutr. 1993; 47(5):333-346.
11. Satija A, Hu FB, Bowen L, Bharathi AV, Vaz M, Prabhakaran D *et al*. Dietary patterns in India and their association with obesity and central obesity. Public Health Nutr. 2015; 18(16):3031-3041.
12. Jones-Smith JC, Gordon-Larsen P, Siddiqi A, Popkin BM. Emerging disparities in overweight by educational attainment in Chinese adults (1989-2006). Int J Obes (Lond). 2012; 36(6):866-875.
13. Millen BE, Quatromoni PA, Copenhafer DL, Demissie S, O'Horo CE, D'Agostino RB. Validation of a dietary pattern approach for evaluating nutritional risk: the Framingham Nutrition Studies. J Am Diet Assoc. 2001; 101(2):187-194.
14. Hu FB, Rimm E, Smith-Warner SA, Feskanich D, Stampfer MJ *et al*. Reproducibility and validity of dietary patterns assessed with a food-frequency questionnaire. Am J Clin Nutr. 1999; 69(2):243-249.
15. van Dam RM, Rimm EB, Willett WC, Stampfer MJ, Hu FB. Dietary patterns and risk for type 2 diabetes mellitus in U.S. men. Ann Intern Med. 2002; 136(3):201-209.
16. Hu FB. Dietary pattern analysis: a new direction in nutritional epidemiology. Curr Opin Lipidol. 2002; 13(1):3-9.
17. Fung TT, Rimm EB, Spiegelman D, Rifai N, Tofler GH,

Willett WC *et al*. Association between dietary patterns and plasma biomarkers of obesity and cardiovascular disease risk. Am J Clin Nutr. 2001; 73(1):61-67.
18. Schulze MB, Fung TT, Manson JE, Willett WC, Hu FB. Dietary patterns and changes in body weight in women. Obesity (Silver Spring). 2006; 14(8):1444-1453.
19. Kerver JM, Yang EJ, Bianchi L, Song WO. Dietary patterns associated with risk factors for cardiovascular disease in healthy US adults. Am J Clin Nutr. 2003; 78(6):1103-1110.
20. McNaughton SA, Mishra GD, Stephen AM, Wadsworth ME. Dietary patterns throughout adult life are associated with body mass index, waist circumference, blood pressure, and red cell folate. J Nutr. 2007; 137(1):99-105.
21. Newby PK, Muller D, Hallfrisch J, Andres R, Tucker KL. Food patterns measured by factor analysis and anthropometric changes in adults. Am J Clin Nutr. 2004; 80(2):504-513.
22. Newby PK, Muller D, Hallfrisch J, Qiao N, Andres R, Tucker KL. Dietary patterns and changes in body mass index and waist circumference in adults. Am J Clin Nutr. 2003; 77(6):1417-1425.
23. Taylor D. Physical activity is medicine for older adults. Postgrad Med J. 2014; 90(1059):26-32.
24. Blair SN, Sallis RE, Hutber A, Archer E. Exercise therapy - the public health message. Scand J Med Sci Sports. 2012; 22(4):e24-e28.
25. American College of Sports Medicine, Chodzko-Zajko WJ, Proctor DN, Fiatarone Singh MA, Minson CT, Nigg CR *et al*. American College of Sports Medicine position stand. Exercise and physical activity for older adults. Med Sci Sports Exerc. 2009; 41(7):1510-1530.
26. Paterson DH, Jones GR, Rice CL. Ageing and physical activity: evidence to develop exercise recommendations for older adults. Can J Public Health. 2007; 98(Suppl 2):S69-S108.
27. Lee IM, Shiroma EJ, Lobelo F, Puska P, Blair SN, Katzmarzyk PT. Lancet Physical Activity Series Working Group. Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. Lancet. 2012; 380(9838):219-229.
28. Tremblay MS, Esliger DW, Tremblay A, Colley R. Incidental movement, lifestyle-embedded activity and sleep: new frontiers in physical activity assessment. Can J Public Health. 2007; 98(Suppl 2):S208-S217.
29. McGuire KA, Ross R. Incidental physical activity is positively associated with cardiorespiratory fitness. Med Sci Sports Exerc. 2011; 43(11):2189-2194.
30. Rathi N, Riddell L, Worsley A. Food consumption patterns of adolescents aged 14-16 years in Kolkata, India. Nutr J. 2017; 16(1):50.
31. Chitra U, Reddy CR. The role of breakfast in nutrient intake of urban schoolchildren. Public Health Nutr. 2007; 10(1):55-58.
32. Jenkins S, Horner SD. Barriers that influence eating behaviors in adolescents. J Pediatr Nurs. 2005; 20(4):258-267.
33. Chapelot D, Marmonier C, Aubert R, Allegre C, Gausseres N, Fantino M *et al*. Consequence of omitting or adding a meal in man on body composition, food intake, and metabolism. Obesity. 2006; 14(2):215-227.
34. Deutz RBD, Martin D, Cody MM. Relationship between energy deficits and body composition in elite female gymnasts and runners. Med Sci Sports Exerc. 2000; 32(3):659-668.
35. Misra A, Singhal N, Sivakumar B, Bhagat N, Jaiswal A, Khurana L. Nutrition transition in India: secular trends in dietary intake and their relationship to diet-related non-communicable diseases. J Diabetes. 2011; 3(4):278-292.
36. Carvalho S, Bhattacharya S, Kartikeyan S. Gender differences in dietary and exercise patterns among young adults in an urban area of Maharashtra. Int J Physiol Nutr Phy Educ. 2020; 5(1):128-131.
37. Anjana RM, Pradeepa R, Das AK, Deepa M, Bhansali A, Joshi SR *et al*. ICMR– INDIAB Collaborative Study Group. Physical activity and inactivity patterns in India - Results from the ICMR-INDIAB study (Phase-1) [ICMR-INDIAB-5]. Int J Behav Nutr Phys Act. 2014; 11(1):26.
38. Muntner P, Gu D, Wildman RP, Chen J, Qan W, Whelton PK *et al*. Prevalence of physical activity among Chinese adults: results from the International Collaborative Study of Cardiovascular Disease in Asia. Am J Public Health. 2005; 95(9):1631-1636.
39. Jurj AL, Wen W, Gao YT, Matthews CE, Yang G, Hong-Lan L *et al*. Patterns and correlates of physical activity: A cross-sectional study in urban Chinese women. BMC Public Health. 2007; 7:213.
40. Trinh OTH, Nguyen ND, Dibley MJ, Phongsavan P, Bauman AE. The prevalence and correlates of physical inactivity among adults in Ho Chi Minh City. BMC Public Health. 2008; 8:204.
41. Jogdand K, Yerpude P, Jogdand M. A cross-sectional study in 20-40 yrs old participants for exercise pattern and its association with various demographic factors. Ind J Applied Res. 2020; 10(2):50-51.
42. Chakravarthy MS, Vivekanandhan T. Effect of selected core strengthening workouts & Balanced diet in reducing weight among college teachers under Calicut University. Int J Physiol Nutr Phy Educ. 2020; 5(1):109-112.