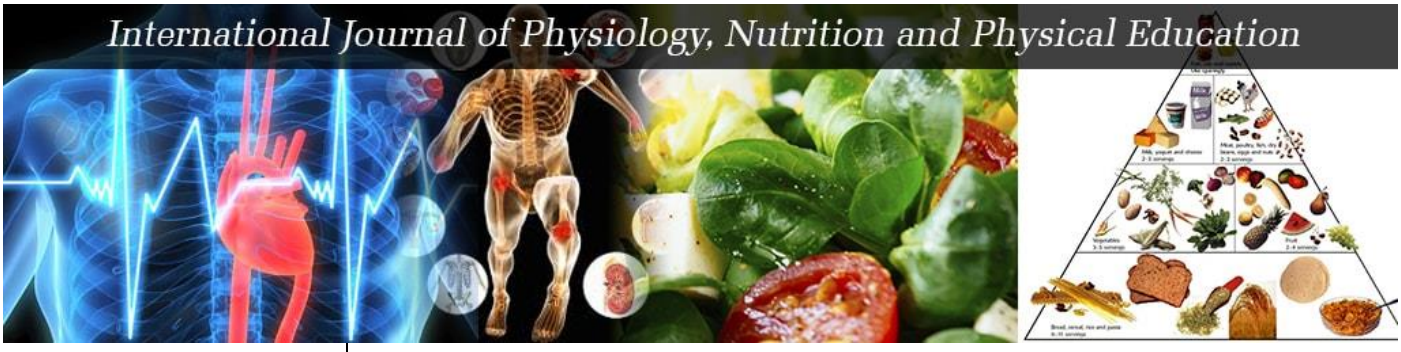

ISSN: 2456-0057
IJPNPE 2020; 5(1): 128-131

www.journalofsports.com
Received: 27-11-2019
Accepted: 30-12-2019

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Gender differences in dietary and exercise patterns among young adults in an urban area of Maharashtra

Sherwin Carvalho, Srabani Bhattacharya and Sundaram Kartikeyan

Abstract
This cross-sectional comparative study was conducted on 304 young adults (135 females: 44.40% and 169 males: 55.60%) to determine their dietary and physical activity patterns. After obtaining their written informed consent, the participants were administered a pre-tested validated questionnaire and their self-reported dietary and physical activity patterns were tabulated and analyzed. Significant gender differences were observed in self-reported eating under stress ($Z=5.541$; $p<0.0001$), non-consumption or rare consumption of leafy vegetables ($Z=3.065$; $p=0.002$); eggs ($Z=6.873$; $p<0.0001$); fish/sea foods ($Z=6.261$; $p<0.0001$); meat products ($Z=4.979$; $p<0.0001$); branded snacks ($Z=5.009$; $p<0.0001$); *Vada pav*, *Samosa*, *Kachori* ($Z=2.879$; $p=0.003$); carbonated beverages ($Z=2.219$; $p=0.033$); food cooked in ghee/butter ($Z=2.125$; $p=0.033$); additional sugar intake ($Z=1.999$; $p=0.045$); pattern of physical exercise ($Z=3.675$; $p=0.0002$) and approximate duration of exercise ($Z=2.695$; $p=0.006$). The gender difference in the mean sitting time was not significant ($Z=1.338$; $p=0.180$). Mass awareness campaigns will be required for bring about changes in dietary and physical activity patterns.

Keywords: Diet, Gender difference, Physical activity, sitting time, Young adults

1. Introduction
Youth residing in urban India are afflicted by a dietary dichotomy that comprises under-nutrition as well as over-nutrition [1]. Consumption of unhealthy energy-dense foods, inadequate physical activity and excessive sitting time may put youth at higher risk for obesity and cardiovascular disease in later years.[2]However, trends in food habits, such as, decreasing total fat, saturated fat and cholesterol intake, and increasing consumption of vegetables and fruits might reduce the prevalence of these health disorders [3, 4]. Though the general determinants of eating behavior include social, cultural, and economic conditions; changing social norms and the adoption of new food cultures may irreversibly change eating behavior among young adults. [5, 6] Eating patterns, which include adoption of specific diets (vegetarianism, consumption of fast foods, carbonated beverages), skipping of meals or breakfast and snacking [7, 8] determine energy expenditure, body fat, bone density, serum cholesterol and other related parameters [9-11].

Numerous studiesin the developed countries have found high prevalence of physical inactivity. A study conducted in the United States in 2003 reported that 52.8% (50.2% men and 55.4% women) physically inactive, [12] while 31% of the Swedish population was found to be inactive (2002-2003) [13]. A survey conducted in England found that 63% of men and 76% of women were physically inactive. [14] The ICMR-INDIAB study (Phase-1) [15] found that less than 10% of urban and rural Indians reported recreational physical activity. Thiscompares with the situation in China [16] where only 28.9% of rural residents and 7.9% of urban residents reported leisure time physical activity; 19.3% recreational physical activity in Brazil; [17] and9.4% recreational physical activity in Vietnam [18]. Most Indians reported that they were physically active at their workplaces [15]. This was similar to the conditions reported in China [19] and Vietnam [18].

Sedentary behaviours are those that involve low levels of energy expenditure, including sitting while commuting, sitting in the workplace and at home, television viewing, computer use, are in the energy-expenditure range of 1.0 to 1.5 METs i.e. metabolic equivalents or multiples of the basal metabolic rate [20].

Light intensity activity is done while standing and requires expenditure of not more than 2.9 METs, while moderate-to-vigorous physical activity, such as, bicycling, swimming, walking, or running require an energy expenditure of 3 to 8 METs [20].

Inadequate physical activity and prolonged sitting habit contribute to obesity, which is a major risk factor for metabolic syndrome [21]. A person with a sedentary lifestyle is habitually sitting or lying down for much of the day, when engaged in reading, socialising, watching television, playing video games, or using a mobile phone or computer [22]. A person who does a lot of sitting and spends less than 10% of daily energy expenditure in moderate- to high-intensity activities should be regarded as "sedentary" [23]. The available evidence suggests that prolonged sitting time is associated with heart disease, type 2 diabetes mellitus and metabolic syndrome [24]. Physical activity alone, in spite of its health-enhancing benefits, may not suffice to diminish the risk for disease and illness. Population-based studies have reported that a larger part of an average person's waking day is spent in sedentary activities associated with prolonged sitting. Some persons, who achieve their recommended physical activity targets, may be highly sedentary during the rest of their waking hours; whereas others who may not regularly indulge in physical activity may be non-sedentary because of their active leisure activities, work habits, or both [24]. The objective of this study was to determine the dietary and physical activity patterns among young urban adults.

2. Materials and Methods

This cross-sectional comparative study was conducted in Thane city, Maharashtra, India. Young adults, of either gender, were explained about the study and their written informed consent was obtained. The participants included only adults since they would have acquired clear long-term dietary preferences [25]. The participants were administered a pre-tested validated questionnaire. The questionnaire contained question spertaining to vegetarianism; pattern and frequency of consumption of vegetables, fruits, branded snacks, branded fried foods, fried snacksand carbonated beverages; pattern of physical exercise and sitting time. The data were entered in Microsoft Excel (Microsoft Corporation, Redmond, WA, USA) and were statistically analyzed using EpiInfo Version 7.0 (public domain software package from the Centers for Disease Control and Prevention, Atlanta, GA, USA). Categorical data were presented as percentages while continuous data were presented as mean and standard deviation (SD). The 95% confidence interval (CI) was presented as: [Mean-(1.96)*Standard Error)] to [Mean+ (1.96)*Standard Error)]. The standard error of difference between two means and standard error of difference between two proportions were calculated. Statistical significance was determined at $p<0.05$.

3. Results and Discussion

3.1. Age distribution

Out of 304 participants, there were 135 females (44.40%) and 169 (55.60%) males. The mean age of female participants was 18.87 +/- 1.08 years (95% CI: 18.68– 19.05 years) while that for their male counterparts was 19.18 +/- 1.15 years (95% CI: 19.01-19.36 years).

3.2. Dietary pattern

132 (97.77%) females and 167 (98.81%) males had two or more major meals per day. The gender difference was not significant (Z=0.707; p=0.477). 54 (40.0%) females and 21 (12.42%) reported that they tended to eat more when under stress, exhibiting highly significant (Z=5.541; p<0.0001) gender difference. Significant gender differences were observed in self-reported non-consumption or rare consumption of – leafy vegetables (Z=3.065; p=0.002); eggs (Z=6.873; p<0.0001); fish and sea foods (Z=6.261; p<0.0001); meat and meat products (Z=4.979; p<0.0001); branded fried snacks (Z=5.009; p<0.0001); *Vada pav*, *Samosa*, *Kachori* (Z=2.879; p=0.003); carbonated beverages (Z=2.219; p=0.033); food cooked in ghee or butter (Z=2.125; p=0.033) and additional sugar intake (Z=1.999; p=0.045). (Table-1)A French study [25] reported that food habits and tastes were associated with age and gender. Adolescent females tended to be more diet conscious and consumed less snacks as compared to their male counterparts; while pre-pubertal teenagers stopped consuming many foods they previously liked, while the spectrum of foods consumed by them after puberty broadened due to various influences [25].

3.3. Physical exercise pattern

104 (77.03%) of the females and 124 (73.37%) of males indulged in some form of physical exercise with an average of 3.48 +/- 2.60 days per week (95% CI: 3.04 – 3.92 days per week) and 4.63 +/- 2.02 days per week (95% CI: 4.32 – 4.93 days per week) for females and males respectively. The gender difference in the pattern of physical exercise was highly significant (Z=3.675; p=0.0002). The gender difference in approximate duration of exercise (15-30 minutes) was also highly significant (Z=2.695; p=0.006). Lack of physical activity is a risk factor for many chronic diseases, such as, cardiovascular diseases, diabetes mellitus, obesity, hypertension, osteoporosis, osteoarthritis and mental depression [26].

Table 1: Self-reported never-consumed and rarely consumed food items

Never consumed / rarely consumed food item	Females (n=135)	Males (n=169)	Z value	'p' value
Fruits & salads	35 (25.93%)	42 (24.85%)	0.213	0.833
Leafy vegetables	31 (22.96%)	17 (10.06%)	3.065	0.002 *
Sprouted pulses	34 (25.19%)	28 (16.57%)	1.852	0.063
Eggs	90 (66.67%)	46 (27.22%)	6.873	<0.001 *
Fish & sea foods	113 (83.70%)	83 (49.11%)	6.261	<0.001 *
Meat& meat products	80 (59.26%)	52 (30.77%)	4.979	<0.001 *
Branded fast foods	61 (45.19%)	72 (42.60%)	0.450	0.652
Branded fried snacks	40 (29.63%)	13 (07.69%)	5.009	<0.001 *
Vada pav, Samosa, Kachori	47 (34.81%)	34 (20.12%)	2.879	0.003 *
Carbonated beverages	89 (65.93%)	91 (53.85%)	2.129	0.033 *
Food cooked in ghee/butter	60 (44.44%)	55 (32.54%)	2.125	0.033 *
Additional salt intake	92 (68.15%)	108 (63.91%)	0.774	0.441
Additional sugar intake	100 (74.07%)	107 (63.31%)	1.999	0.045 *

Z= Standard error of difference between two proportions; SD = standard deviation; CI = 95% confidence interval; * Significant

Contrasting results have been reported by a Kolkata-based study [27]. Which found that females consumed more cereals, vegetables, fruits and non-vegetarian foods as compared to their male counterparts.

3.4. Sitting time

The mean sitting time of female participants was 8.76 +/- 2.51 hours/day (95% CI: 8.33 – 9.18 hours/day, while that for their male counterparts was 8.37 +/- 2.54 hours/day (95% CI: 7.99-8.76 hours/day). Though the gender difference in the mean sitting time was not significant (Z=1.338; p=0.180), the maximum and third quartile of sitting time was identical in both genders while the median sitting time, first quartile and minimum sitting time was higher for female participants (Fig.1).

Prolonged sitting is associated with development of metabolic syndrome, [28] deficient physical and mental health and premature death [29-31]. Metabolic syndrome is an interconnected cluster of metabolic abnormalities involving glucose and lipid dysregulation, abdominal obesity and elevated blood pressure [32]. Those with a sedentary lifestyle tend to sit for much of their waking time and are at high risk. [33, 34] To minimize this risk, individuals ought to replace sitting with standing or light activity [35]. and regularly break up sitting and accrue 2-4 hours standing per eight-hour workday [36]. As a consequence of automation, physical activity levels at the workplaces will decline in future and individuals will have to indulge in physical activity during their leisure time.

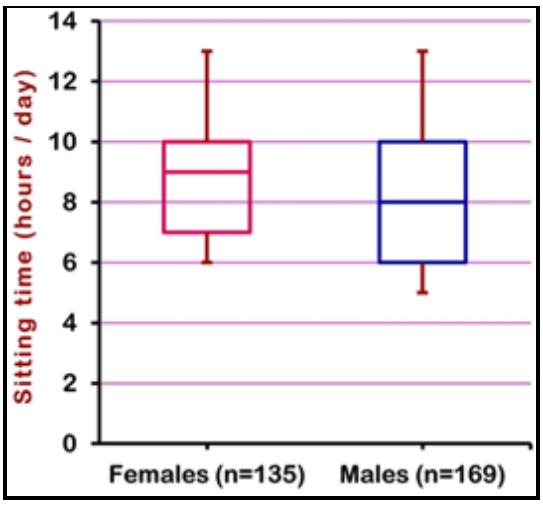

Fig 1: Box plot depicting gender difference in sitting time (hours per day)

Conclusion

Mass awareness campaigns will be required to make people realize the need for making changes in their dietary patterns, indulging in recreational physical activity and reducing their sitting time when they are awake.

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