



AN ASSOCIATION BETWEEN WORKING STATUS, PHYSICAL ACTIVITY, FOOD PREFERENCE AND BMI AMONG ADULT WOMEN OF DELHI

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ABSTRACT

The emerging epidemic of obesity represents an enormous public health burden with economic and societal consequences of major significance. It is important to understand the relationship between obesity and society, as with greater access to mechanized transportation and labor-saving devices, the need for utilitarian physical activity has declined, minimizing daily energy expenditure. The present study was conducted using multistage stratified random sampling. A data of 618 adult females from Delhi in the age range of 25-65 years comprised the sample. BMI was assessed using Tanita Body composition Analyser and an exhaustive information on physical activity, dietary habits and working status was collected. It was found that though majority of the women consumed vegetarian food nevertheless considerable percentages were found to be in overweight category; physical inactivity was then found to be one of the attributing factors. Emphasis of should be laid on complexities of the inter-relationships between diet, physical activity, and a host of possible confounding factors in the causation of obesity and its related metabolic disturbances.

KEYWORDS: Obesity, Multistage Stratified Random Sampling, Awareness.

Introduction

Globalization has had tremendous impact not only on international economy, but has made new food available to new places, thus bringing about changes in physical and food environment across the world. Over a period of time, physical activity has greatly reduced due to an easy access to mechanized transport and labor saving devices thereby minimizing daily expenditure. This accounts for imbalance between energy intake and energy consumed resulting in increasing adiposity. Obesity is rampantly spreading its tentacles not only in developed countries but is increasing at an alarming pace even in developing countries.

The prevalence of obesity is higher among women in India and also among the economically better off individuals who live in urban areas with sedentary lifestyles and have a family history of obesity. Women of lower socioeconomic status experience the greatest risk for underweight and those in higher socioeconomic status experience the greatest risk for being pre-overweight, overweight and obese (Shukla et al. 2002, Subramanian and Smith 2006). Several studies from India have shown that changes in dietary patterns, physical activity levels and lifestyles associated with diet and urbanization are related to increasing incidence of obesity (Zargar et al. 2000; Bhasin et al. 2001). However, among the women, weight gained at various physiological transitions like puberty, pregnancy and menopause make them vulnerable. In women the favored sites for the accumulation of fat are the buttocks, hips and thighs (Bose, 1995). The site of fat accumulation is considered a predominant factor for metabolic disorders of obesity (van Gaal et al., 1988). Obesity is now shifting towards poorer groups as countries improve their level of economic development (Monteiro et al. 2004b). Amongst the various changes observed is the increase in number of women opting to work and also an escalated proportion of use of labor saving devices minimizing daily energy expenditure resulting in increasing adiposity. To find the impact of working status, food preference and physical activity with BMI the present study was initiated.

Method and Methodology

The study was initiated involving a cross sectional data of 618 adult females both working and non-working from Delhi in the age range of 25-65 years. They were further classified into premenopausal and postmenopausal group depending on their menarchial status. Premenopausal women were those who had not attained menopause while postmenopausal women were those who had attained menopause.

An information on the pattern of lifestyle, diet consumption, working status of the women, exhaustive information on physical activity, and environment at the workplace was prepared. All this qualitative data generated was summarized and subjected to content analysis. Body Composition Analyzer was used to measure the Body Mass Index (BMI) for which stature required was measured using standard technique of Weiner and Lowrie (1981). The objectives of the study were explained to the learner, a letter of consent indicating their willingness for participating in the study initiated the data collection.

Results

Table 1: Mean and standard deviation of Age, age at menarche, age at menopause, weight, stature and BMI of the subjects

Variables	Premenopausal women		Postmenopausal women	
	Mean	+ SD	Mean	+ SD
Age (yrs)	34.55	6.51	53.46	7.05
Age at menarche (yrs)	13.39	1.42	13.81	1.40
Age at menopause (yrs)	-	-	46.19	4.55
Weight (kg)	63.69	11.47	68.42	12.00
Stature (cm)	155.24	5.82	153.43	4.96
Body Mass Index(kg/m ²)	26.47	4.37	29.34	5.50

Table 1 shows that the average age of women in premenopausal group is 34.55 years whereas that in postmenopausal group it is 53.46 years. The age at menarche is 13.39 years and 13.81 years in premenopausal and postmenopausal group respectively. The age at menopause is 46.19 years. Postmenopausal women are found to be heavier (68.42 kg) and shorter (153.43 cm) than premenopausal women (63.69 kg, 155.24cm) as shown in the table. Table 1 also shows that the body mass index (BMI) of postmenopausal women (29.34 kg/m²) is more than that of premenopausal women (26.47 kg/m²).

Table 2: BMI status among premenopausal and postmenopausal women

Variables Groups	Premenopausal women (%)	Postmenopausal women (%)
Underweight	1.3	0.5
Normal	35.9	12.7
Overweight	43.5	49.7
Obese I	15.6	28.0
Obese II	3.3	9.0
Obese III	0.5	-

Source: World Health Organization 2004 WHO expert consultation. Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. The Lancet: 157-163.

Maximum percent of women are found in overweight category in both premenopausal women (43.5%) and postmenopausal women (49.7%) as depicted in table 2. Premenopausal women have marginal (0.5%) representation of obese III category whereas postmenopausal women have none. Premenopausal women have 35.9% in normal category and 15.6% in obese I category while incase of postmenopausal women 28% are in obese I category and 12.7% in normal category.

Table 3: Cross tabulation of Working status and BMI in premenopausal women and postmenopausal women

BMI Category	Premenopausal Women		Postmenopausal Women	
	Working	Non-Working	Working	Non-Working
Underweight	089	0.29	-	0.58
Normal	30.45	3.58	4.62	7.51
Overweight	40.29	4.18	19/65	30.63
Obese I	14.03	2.69	12.72	15.03
Obese II	2.69	0.59	3.47	5.78
Obese III	0.29	-	-	-

Using cross tabulation of BMI an index of adiposity with working status more women are found to be in overweight category (40.297%) followed by 30.45 % in normal category, 14.03 in obese I category and only 2.69%. 0.89% and 0.29% in obese II, underweight and 0.29% in obese III category in working women among premenopausal women as shown in table 3. Very few samples constituted non-working women with maximum (4.18%) as overweight followed by 3.58% in normal category.

Cross tabulation of BMI an index of adiposity with working status, in the group non-working 30.63% are overweight followed by 15.03% as obese I, 7.51% normal category, 5.78% as obese II and 0.58 in underweight category as shown in table 3 among postmenopausal women. In case of working women 19.65% are overweight, 12.72% as obese, 4.62 in normal category and 3.47 in obese II category.

Table 4: Cross tabulation of Physical Activity and BMI in premenopausal women and postmenopausal women

BMI Category	Premenopausal Women		Postmenopausal Women	
	Physically Inactive	Physically Active	Physically Inactive	Physically Active
Underweight	1.19	-	0.55	-
Normal	33.23	0.59	8.89	2.77
Overweight	40.36	4.45	41.11	8.88
Obese I	13.65	2.97	19.44	9.44
Obese II	3.26	-	7.22	1.66
Obese III	0.29	-	-	-

Using cross tabulation of BMI an index of adiposity with physical activity level, more women are found to be in overweight category (40.36%) followed by normal category (33.23%), obese I (13.65%), obese II (3.26%), underweight (1.19%) and only 0.29% in obese III as shown in table 4 in Physically inactive premenopausal women. Very few samples constituted physical active women with maximum in overweight category (4.45%).

Cross tabulation of BMI an index of adiposity with physical activity highest percentage were in overweight category (41.11) followed by obese I, normal category (8.89%), obese II (7.22%) and underweight category as shown in table 4 among physically inactive postmenopausal women. Women who are physically active 8.88% fall in overweight category, 9.44% in obese I category, 2.77% in normal and 1.66% in obese II category. None are found either in underweight or obesity III category

Table 5: Cross tabulation of Food Preference and BMI in premenopausal women and postmenopausal women

BMI Category	Premenopausal Women		Postmenopausal Women	
	Vegetarian	Non-Vegetarian	Vegetarian	Non-Vegetarian
Underweight	0.89	0.29	0.56	-
Normal	22.69	11.34	11.23	0.56
Overweight	28.06	16.72	43.82	5.61
Obese I	10.75	5.67	23.59	5.61
Obese II	2.98	0.29	7.86	1.12
Obese III	-	0.29	-	-

Using cross tabulation of BMI an index of adiposity with food preference, more women are found to be in overweight category (28.067%) followed by 22.69 % in normal category, 10.75% as obese I, 2.98% in obese II and only 0.89% in underweight category among vegetarian consuming premenopausal women as shown in table 5. Women who ate non-vegetarian food 16.72% are in overweight category, 11.34% in normal category, 5.67% obese I and 0.29% in underweight, obese II and III category.

Cross tabulation of BMI an index of adiposity with food preference amongst the vegetarians 43.82% constituted overweight followed by 23.59% as obese I, 11.23% in normal category, 7.86% as obese II and only 0.56% in underweight category shown in table 5 among postmenopausal women. Those who consumed non-vegetarian 5.61% were overweight and obese I while 1.12% and 0.56% were obese II and underweight category respectively.

Discussion

This study was undertaken to study the association of Working Status, Physical Activity, Food Preference and BMI among Adult Women of Delhi. To achieve this, 415 premenopausal women + 203 postmenopausal women all residing in Delhi participated in the study. Their health status was found to be good, but mostly they all complained of backache and leg ache. They mostly did not go for annual medical check unless they had ailment. Working women worked either in schools or assisted in family business. Regular exercise was missing from the routine. Besides energy consumption and expenditure, the pattern of lifestyle plays a very important role in the genesis of obesity which needs to be ascertained as one of the causative factor for increasing adiposity.

It is noticed from table 1 that age at menarche in premenopausal women is earlier than in postmenopausal women. This early advent of menarche shows secular trend a resultant of improved condition of living, nutrition etc. quite similar to the study by Khanna and Kapoor (2004). Table 1 also shows taller and heavier premenopausal women than postmenopausal women, showing secular trend in these two variables, again an outcome of better living and improved condition of living, others such studies showing increase in stature in succeeding generations (Gordon-Larsen et al 1997, Khanna and Kapoor 2004) lending support to present findings. At this age, increase in weight can only be attributed to increase in fatness. A consistent increase in fatness establishes the fact that there continues to be an increase in fat content in females throughout life (Sinha and Kapoor 2007).

Table 2 indicated that maximum percent of women are found in overweight category in both premenopausal women and postmenopausal women. Premenopausal women have marginal representation of obese III category whereas postmenopausal women have none. In cross-sectional comparisons, BMI values is used to estimate the prevalence of obesity within a population and the risk associated with it. Most of the Asian countries more vulnerable to the obesity epidemic and its consequences, are rapidly developing in the socio-economic aspect. In fact, cardiovascular diseases (CVD) have become the leading cause of disability and death in many developing countries (Reddy 2004, He et al 2005).

Food consumed during child bearing time also increase the fatness level (Sinha and Kapoor 2009). Another important individual factor contributing to the development of obesity is physical inactivity. Table 4 shows that most women are not physically active and generally belong to overweight category. Historically speaking, walking used to be a coping mechanism for performing agrarian-related activities. In addition, beliefs related to fear of losing weight, poor environmental conditions, such as a high crime rate and overcrowding, contribute to minimal physical activity levels (Puoane et al, 2006).

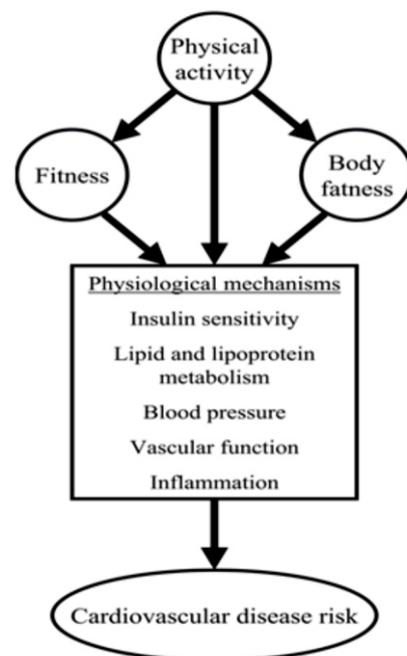


Fig 1: Pathway determinants between body measures and CVD risk

Source: Aneja et al (2004).

The impact of rapid urbanization and industrialization from labor intensive to computer based, has modified the overall pattern of living and change in food habit with consumption of diets that are energy dense, rich in fat and sugar content (Mohan and Deepa 2006). Thus diets containing high calories, refined carbohydrates and fat with less fibers and complex food in one hand as well as sedentary habits have contributed biochemically to insulin resistance and phenotypically to obesity. In the present study table 5 shows that most of the women were found to be consuming vegetarian food yet had substantial percentages in overweight category; physically inactivity could be attributed as the causative factor.

Stress is one of the factors at work place with varying levels. It is an individual-level factor associated with environmental phenomena; and mostly occurs when environmental demands exceed the adaptive capacity, the demands result in physiologic processes that results at risk for disease. Work stress have been associated with obesity-related behaviors among adults. In a study conducted by Barrington et al (2005-2007) concluded that dietary behavior and physical activity would be associated with overall perceived stress and recommended that longitudinal studies are needed, however, to support inclusion of stress in workplace obesity prevention efforts. It is believed that work stress promotes unhealthy eating habits and sedentary behavior and thereby contributes to weight gain, although Kouvonen (2005) found weak association between work stress and BMI. It becomes of utmost significance to lay emphasis on complexities of the inter-relationships between diet, physical activity, stress and a host of possible confounding factors in the causation of obesity and its related metabolic disturbances.

Working status, changing lifestyle, healthy food habits and increased physical activity need to be emphatically understood in mans' psyche to visualize the scenario. It is unmistakable that when women reach the momentous moment of maturation be it from menarchial status or aging, there is tendency to gain fat. It is this appropriate moment, when one needs counseling to curtail the increase in fat percent as it is found to be associated with obesity.

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