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An assessment of selected obesity indicators between physically active perimenopausal and physically inactive postmenopausal women

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Abstract

The aim of the study is to determine the selected obesity indicators between physically active perimenopausal and physically inactive postmenopausal women. A sample of 100 (50 physically active perimenopausal women and 50 physically inactive postmenopausal women) from various regions of Bilaspur and Raipur were taken as sample on the basis of stratified purposive random sampling. The age group of the subjects were ranged from 40 - 65 years. The selected various obesity indicators was assessed using Maltron Body Composition Analyser and Omron Body Fat Analyser. To compare the selected various obesity indicator variables between physically active and inactive women, Independent sample t-test was used. The level of significance was set at 0.05. It was concluded from the findings of the study that significant difference was obtained in Body Fat percentage, Body Mass Index, Total Body Water (The selected various obesity indicator variables) between active perimenopausal and inactive postmenopausal women ($t=19.020, 9.014$ and 13.691 respectively, $p<0.05$). It is seen that the mean scores of physically active perimenopausal women were lowest in Body Fat percentage, Body Mass Index and highest in Total Body Water when compared to physically inactive postmenopausal women.

Keywords: Obesity indicators, physically active perimenopausal women, physically inactive postmenopausal women, body fat percentage, body mass index, total body water

Introduction

Obesity

It has been found that the number one nutritional disorder in developed countries is obesity. The study conducted by National Health and Nutrition Examination Survey (NHANES III, 1988-1994) [1], between U.S. men and women, people above 20 years are overweight, and nearly one-fourth are clinically obese.

A percentage of population is found obese in the age group ranging from 50-59 years. Causes of obesity are mostly divided into genetic and environmental factors. The emerging causes of obesity in the population are primarily due to environmental factors acting on genetic susceptibility (JO Hill, 1998) [2]. BMI has shown a monotonic association with mortality in several recent cohort studies (Lee *et al.* 1993; Manson *et al.* 1995; Willett *et al.* 1995) [3].

Obesity and increase in weight gain of women had mentioned the significant decrease in physical activity (Jessica Nolen 2006) [4]. There is a greater dependency on motor vehicles by women, instead of walking for transportation purpose. Due to lack of employment there is more need of sedentary jobs. Various prominent factors affecting sedentary lifestyles were video games and computers, the increase in number of hours people watch television, and our propensity for convenience all contribute to our sedentary lifestyles (Spence-Jones, 2003) [5]. Numerous studies depict that cardiorespiratory fitness is greatly related with metabolic disorder (Lee *et al.*, 2005) [6], cardiovascular disease (Carnethon, Gulati, & Greenland, 2005) [7] and a greater risk of mortality (Katzmarzyk, Church, Janssen, Ross, & Blair, 2005) [8].

Menopause

Menopausal symptoms can affect women's health and wellbeing. It is important to develop interventions to alleviate symptoms, especially there have been evidence, where many women no longer choosing to take hormone replacement therapy.

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Pre-menopause

Premenopause: The span of time from puberty (onset of menstrual periods) to perimenopause. (NAMS, 2006) ^[9]

Perimenopause

The 2 to 8-years prior to menopause when fluctuating hormones cause menstrual changes and some of the symptoms experienced during menopause (NAMS, 2006) ^[9]. Perimenopause ends once you have been without a period for one full year.

Postmenopause

This time frame encompasses all of the years a woman remains alive after transitioning through menopause (NAMS, 2006) ^[9]. It is the period of time after a woman has experienced 12 consecutive months without menstruation.

Physically Active

In this study the researcher has defined the term physically active to those who go for physical work out in any form in spite of their daily routine of household work or job. It may include walking, running, gardening and any leisure activity.

Physically Inactive

In this study the researcher has defined the term physically inactive to those who did not achieve MET scores above 6000 MET - min/week. The MET scores were calculated from the amount of physical work out in any form in spite of their daily routine of household work or job. It included walking, running, gardening and any leisure activity. (Guidelines for data processing and analysis of International Physical Activity Questionnaire (IPAQ) November 2005) ^[10].

Objective of the Study

The following were the objective of the present study:

- To compare the selected obesity indicators between physically active perimenopausal and physically inactive postmenopausal women.
- To assess the selected obesity indicators in physically active perimenopausal women.
- To assess the selected obesity indicators in physically inactive postmenopausal women.

Methodology

Selection of Subjects

For the purpose of the present study 50 physically active perimenopausal women and 50 physically inactive postmenopausal women from various regions of Bilaspur and Raipur were selected. The sampling method for the study was stratified purposive random sampling. The age group of the subjects ranged from 40- 65 years.

Selection of Variables

The following were the selected obesity indicator variables selected for the present study:

1. Body Fat percentage.
2. Body Mass Index
3. Total Body Water.

Criterion Measures and Administration of Test

IPAQ – The physical activity level was assessed using the International Physical Activity Questionnaire. The questionnaire was used to assess physical activity undertaken across a comprehensive set of domains including Leisure time physical activity, domestic & gardening (yard) activities,

work related physical activity and transport related physical activity.

Administration of International Physical Activity Questionnaire

Both perimenopausal and postmenopausal women were asked to fill IPAQ questionnaire for assessing their physical activity level. The questionnaire was administered on the subjects to inquire about the previous 7 days version of physical activity levels. Additionally, questions relating to “work” will be modified to “college” to reflect the population being samples. IPAQ assesses physical activity undertaken across a comprehensive set of domains including:

- a) Leisure time physical activity.
- b) Domestic and gardening (yard) activities.
- c) Work-related physical activity.
- d) Transport-related physical activity.

Structure

The IPAQ is used to assess PA during the past 7 days. There are two versions, the long form (27 items) and the short form (7 items), which can be self administered or administered during in-person or telephone interviews. The IPAQ used in the present study is the long version which covers four domains of PA: occupational (6 items), transportation (6 items), household/gardening (6 items) and leisure-time activities (6 items), time spent sitting (2 items). The IPAQ Long form asks details about the specific types of activities undertaken within each of the four domains. The items in the IPAQ long form were structured to provide separate domain specific scores for walking, moderate-intensity, vigorous-intensity activity within each of the work, transportation, domestic chores and gardening (yard) and leisure-time activities. The questionnaire also includes two questions about the time spent on sitting as an indicator of sedentary behavior. The number of days per week and the time spent on walking per day as well as moderate and vigorous activities from all four domains were recorded. Computations of the total scores of the long form were done with the summation of the duration (in minutes) and frequency (days) for all the types of activities in all domains. Domain specific scores or activity specific sub-scores was calculated. Domain specific scores require summation of the scores for walking, moderate-intensity and vigorous intensity activities within the specific domain and activity - specific scores require summation of the scores for the specific type of activity across domains.

Administration Method and Scoring

The IPAQ data were converted to metabolic equivalent scores (MET-minweek-1) for each type of activity, by multiplying the number of minutes dedicated to each activity class by the specific MET score for that activity. METs are multiples of resting metabolic rate and a MET- minute is computed by multiplying the MET score of an activity by the minutes performed. The MET score weighs each type of activity by its energy expenditure. Based on the MET value, groups were divided into physically active and inactive women. Scores above 6000 MET - min/week are in physically active group and those MET scores below 6000 MET – min/week are in physically inactive group. (Guidelines for data processing and analysis of International Physical Activity Questionnaire (IPAQ) November 2005) ^[9].

1. Body Fat Percentage

Body Fat percentage is the amount of fat present (in

percentage) in human body. It is a measure of body composition typically used in large scale public studies. The calculated Body Height & Weight is fed into the OMRON Body Fat Analyser and the subject is asked to hold the equipment with both hands. The equipment would display the Body Fat percentage value in few minutes.

2. Body Mass Index

Body Mass Index is the weight/height ratio often used in field settings. It is a measure of body composition typically used in large scale public studies.

- Weight is the simplest measurement of growth and nutritional status (Swaminathan, 1985). Weight was operationalised as the exact body weight measured with minimal clothes, footwear and marked in an erect standing posture with head, abdomen and legs in the same plane, using standard weighing machine, by Jeliffe method (1966). It was measured using Standard weighing machine in Kilograms.
 - Height was measured using Stadiometer.
- BMI was computed using the following formula:

$$BMI = \text{Weight (kg)} / \text{Height (meter square)}$$

3. Total Body Water Content

Required details of the subject were fed in the MALTRON Body Composition Analyser. The subject was asked to lie down in supine position for sometime. After the electrodes are placed on the hands and legs, the machine gives the value of Total Body Water Percentage and also the amount of water in litres. Since the study conducted by researcher did not include the variable water in litres, its data was not used for analysis.

Statistical Method

A detailed descriptive statistics i.e. mean, standard deviation, minimum and maximum scores on each test selected obesity indicator variables were calculated. To compare the selected obesity indicator variables between physically active and inactive women, Independent sample t-test were used. The level of significance was set at 0.05.

Result and findings of the study

Table 1: Descriptive Statistics of Selected obesity Indicator of Physically Active Perimenopausal and Physically Inactive Postmenopausal Women

Variables	GROUPS	N	Mean	Std. Deviation	Std. Error Mean
Body Fat %	Physically Active Peri	50	24.510	3.8045	.5380
	Physically Inactive Post	50	40.960	4.7882	.6772
BMI	Physically Active Peri	50	25.356	2.1883	.3095
	Physically Inactive Post	50	30.298	3.2000	.4525
Water %	Physically Active Peri	50	60.14	8.003	1.132
	Physically Inactive Post	50	43.42	3.246	.459

Table no.1 reflects the number of subjects in the physically active perimenopausal and physically inactive postmenopausal category mean and standard deviation on various selected obesity Indicator variables.

It is evident from the above table that the mean and standard deviation values obtained on various selected obesity indicator variables of physically active perimenopausal women were 24.510±3.804; 25.356±2.188; 60.14±8.003; respectively.

Further explaining, the above table shows that the mean and standard deviation values obtained on various selected obesity indicator variables of physically inactive postmenopausal women were 40.960±4.788;30.298±3.200; 43.42±3.246; respectively.

After going through the various selected obesity indicator variables in physically active perimenopausal and physically inactive postmenopausal women, it is seen that the mean scores of physically active perimenopausal were lowest in Body Fat % and Body Mass Index and greater in Total Body Water percentage respectively when compared to physically inactive postmenopausal women. Before we interpret these means, we can examine the results through Independent T-test. To find out significant difference in the various selected obesity indicator variables between physically active perimenopausal and physically inactive postmenopausal women, Independent T-test was employed and result are depicted in table no. 2.

Table 2: Independent T-Test

		T- Test for equality of means						
		T	DF	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
BF%	Equal variances assumed	19.020*	98	.000	16.4500	.8649	18.1663	14.7337
	Equal variances not assumed		93.238				18.1674	14.7326
BMI	Equal variances assumed	9.014*	98	.000	4.9420	.5482	3.8540	6.0300
	Equal variances not assumed		86.605				3.8522	6.0318
W%	Equal variances assumed	13.691*	98	.000	16.720	1.221	14.296	19.144
	Equal variances not assumed		64.696				14.281	19.159

*Significant at 0.05 level.

Table no. 2 above clearly indicates that significant difference were obtained in Body Fat percentage, Body Mass Index, Total Body Water Content between physically active

perimenopausal and inactive postmenopausal women, since t-values obtained was 19.020, 9.014and 13.691 respectively at p value of 0.05 level.

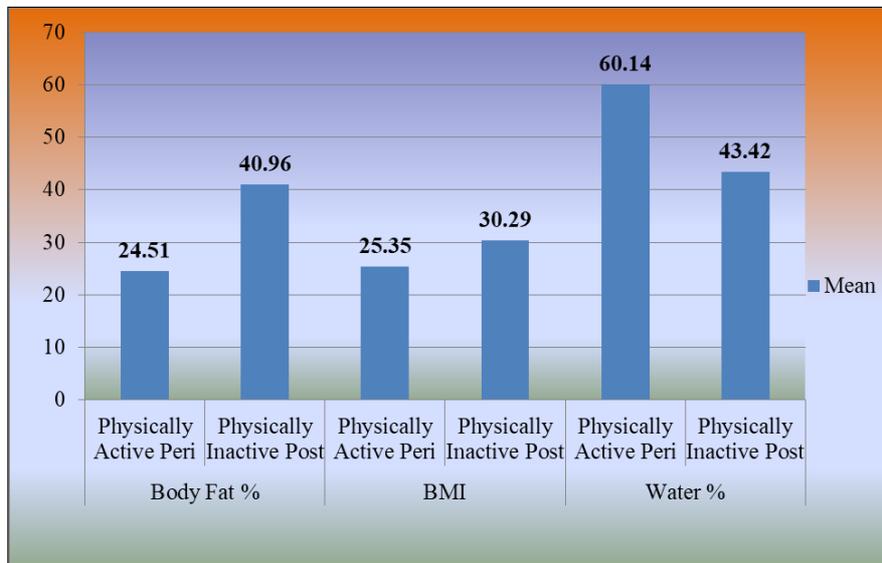


Fig 1: Graphical representation of mean scores of Physically Active Perimenopausal and Physically Inactive Postmenopausal Women in relation to Selected Obesity Indicator variables

Discussion and conclusion of Results

Analysis of data pertaining to the assessment of various selected obesity indicator variables Body Fat percentage, Body Mass Index, Total Body Water Content between active perimenopausal and inactive postmenopausal women revealed significance differences. It is seen that the mean scores of physically active perimenopausal were lowest in Body Fat % and Body Mass Index and greater in Total Body Water percentage respectively when compared to physically inactive postmenopausal women.

The probable reason for better mean of obesity variables in physically active perimenopausal women was regular exercise, as the researcher feels the active life style of a woman in perimenopausal stage gives greater results than inactive postmenopausal women. Also, the inactive lifestyle in addition to postmenopausal stage, is also the probable reason for greater obesity. Results of this study are supported by Song & Ahn *et al.* (2009) [11], experimented a form of physical activity, Tai Chi exercise favorably affected total cholesterol, LDL-cholesterol, and their 10 year cardiovascular disease risk in postmenopausal women after 6 months than the control group. The researcher feels any form of physical exercise, reduces obesity parameters of postmenopausal women, which is not present in the study. The probable reason are also the physiological factors, higher responsibilities, higher age, frequency of falling ill and chances of getting supporting hands in postmenopausal stage than in perimenopausal stage.

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