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Comparative Study of Impact of Age on Physiological Variables, Body Composition and Blood Cholesterol in Selected Physical Education Professionals

Silawat, N., Savalia, J. K. and Patel, D.
Mahadev Desai Sharirik Shikshan Mahavidyalay, Gujarat Vidyapeeth, Sadra, Dist. Gandhinagar, Gujarat

Abstract

The purpose of the present study was to find out the impact of age on the physiological variables, body composition and blood cholesterol in selected physical education professionals. The study was conducted on 45 physical education professionals who came to attend a National level Workshop on Research Methodology and Statistical Techniques (Funded by Special Assistance Program of UGC) and organized by Mahadev Desai Sharirik Shikshan Mahavidyalay, Gujarat Vidyapeeth, Gujarat. The age of the subjects ranged between 21 to 50 years. The subjects' were selected randomly and divided into three ten yearly age groups. Measured physiological variables included pulse rate (PR), diastolic blood pressure (DBP) and systolic blood pressure (SBP). Body composition was measured by Tonika Body Composition Analyzer and Bio-Chemistry Auto Analyzer was used for the measurement of blood cholesterol. Statistically significant differences were witnessed in the body composition profiles between the three age groups. However no significant differences in PR, SBP, DBP and blood cholesterol were observed.

Keywords: Physical education professionals, Age related changes, Physiological variables, Body composition, Blood cholesterol

Introduction

Aging refers to the normal yet irreversible biological changes that occur throughout a person's lifetime. It is a very complex phenomenon and is influenced by genetic, environmental and life style factors (*Tuomi, et al, 1997; Guo et al, 1999; Brach et al, 2004*). The aging process takes place at all ages, but for those over sixty five; it often becomes more evident with significant changes in quality of life. With aging, there is accumulation of fat and a substantial loss of muscle mass. Comparison between average young and elderly adult suggest a decrease in the fat free mass to the extent of fifteen to thirty percent by age eighty, with the rate and degree of loss varying widely depending on both genetic and life style influences. During middle age there is typically a gain in body fat, and in some individuals, centralization of body fat with its attendant health risk may also occur. In very old age, both fat free and fat mass are lost as body weight declines. Previous studies of the relation between body fat and aging found 1 of 2 patterns: either an increase in body fat until early old age, followed by a decrease, or a pattern of steadily increasing body fat with aging (*Silver et al, 1993 and Going et al, 1995*). Some previous studies of the relation between age and fatness used methods such as measurement of skinfold thicknesses (*Najjar & Rowland, 1987*) or bioimpedance analysis (*Silver et al, 1993*) that had problems with reliability. All the various components of the fat free mass – muscle and bone mineral mass, and total body water are reported to be decreased in older men and women relative to young adults. The decline in resting metabolic rate with advancing age is primarily due to this decline in fat free mass. The importance of the issue become all the more important when the age related

changes of physical education professionals are the focus of the attention as most of these professionals have more opportunity for physical activity. A serious exploration has been made in the literature about the impact of age on physical fitness. Results obtained by *Hawkins et al (2001)* have shown a decrease of 2.4 to 5 percent in VO_2 max in women in the course of a year. *Fitzgerald et al (1997)* also showed a reduction in VO_2 max with increasing age. Similarly *Trappe et al (2006)* reported that the aerobic capacity of exercising individuals decreased by 5 to 7 percent with every 10 years increase in age. Only the study conducted by *Daniel et al (1978)* has reported that cardio-respiratory fitness increased with age in proportion to the increase in weight of subjects. It has been suggested that sample size, limited age ranges and lack of a sedentary control group are responsible for the conflicting results (*Fitzgerald et al, 1997, Hankins et al, 2001*). The review of literature in general indicates that with increase in age there is a decline in cardio-respiratory fitness that is linked to changes in physiological variables, body composition and blood lipids.

Although a number of studies are available in the literature regarding age related changes in different physiological variables, body composition and blood lipids (*Poehlman et al, 1991; Dinenno, et al, 1999; Denti et al, 2000*), no study in this matter with physical education professionals as subjects has been cited.

In view of the importance of the matter with regard to physical education professionals, the present study was aimed to assess the age related changes in selected physiological variables, body composition and blood lipids in physical education professionals in Gujarat.

Material & Method

Forty five male physical education professionals who came to attend a National level workshop on Research Methodology and Statistical Techniques organized by Mahadev Desai Sharirik Shikshan Mahavidyalay, Gujarat Vidyapith, Sadra dist. Gandhinagar, Gujarat were selected for this study. All the important and requisite information about the study was given to participants. Age of the subjects' was checked from their application forms which were filled by participants. All the subjects were screened and homogenized for absence of any diseases related to the cardiovascular, respiratory systems or any other serious disease and then divided into three ten yearly age groups viz young age group (Mean age 23 years), adult young age group (Mean age 34 years) and middle age group (Mean age 44 years). Physiological variables like resting pulse rate, systolic and diastolic blood pressures, and vital capacity were measured using standard techniques. Tonika Body Composition Analyzer was used to measure body mass index, total body water, fat mass and body weight. Hematological variables like hemoglobin, blood cholesterol and fasting blood sugar were also measured by Biochemistry Auto Analyzer.

Statistical Analysis

Statistical analysis of the data was done to study the age related impact on the physiological variables and body composition in the three different age groups. One way analysis of variance (***ANOVA***) and F-test was applied.

Table-1: The Body Compositional, Blood Lipids and Physiological Variables Characteristics of the Physical Education Professionals

VARIABLES	Young Age Group		Young Adult Age Group		Middle Age Group		F- VALUE
	Mean	SD	Mean	SD	Mean	SD	
Total Body Water (TBW), kg	40.64	4.65	44.45	4.81	46.61	3.91	**6.83***
Body Mass Index (BMI)	21.09	2.61	23.24	3.40	24.94	2.33	**7.01***
Body Weight (BW), kg	61.34	8.02	69.56	10.68	74.53	7.45	**8.53***
Fat Mass (FM), kg	5.93	2.78	9.34	4.44	10.95	3.60	**7.29***
Blood Cholesterol, mg%	127.45	29.06	143.35	34.03	145.59	24.74	1.68
Blood Sugar, mg%	95.13	7.11	106.43	19.91	98.27	23.69	1.51
Hemoglobin, gm%	13.76	1.14	14.15	0.75	13.92	0.80	0.72
Pulse Rate, beats/min	73.4	9.26	76.33	5.23	78.93	4.94	0.035
Systolic Blood Pressure, mm Hg	123	10.39	128.4	12.24	132.33	7.52	3.14
Diastolic Blood Pressure, mm Hg	76.8	8.60	78.73	7.95	80.2	5.40	0.029

* $P < 0.05$

Results

The results of the study reveal significant differences between young age group, young adult age group and middle age group in body composition variables like total body water (F = 6.83), body mass index (F = 7.01), body weight *(*F = 8.53) and fat mass (F = 7.29).

Regarding analysis of the results of the age related impact on the physiological variables, it was observed that age was not observed to have significant impact in statistical terms on the resting pulse rate, systolic and diastolic components blood pressure in the three age groups (Table 1).

Comparison of mean values of fasting blood glucose, hemoglobin and cholesterol also reveal a similar picture as is depicted by the physiological variables. In other words no significant impact of age on the blood chemistry has been observed in the three age groups of physical education teachers of the present study.

Discussion

The results of the study suggested that there was significant difference in body composition (*TBW*, *FM*, *BMI* and *BW*) among the young age group, adult young age group and middle age group. In other words, increase in age has significant effect on the body mass index, total body water, fat mass and body weight in different age groups. Study indicated that total body water, body mass index, fat mass and body weight increased with the increase in age.

The obtained results indicate non existence of statistically significant differences in pulse rate, systolic blood pressure, diastolic blood pressure (physiological variables) among the three age groups. This means that increase in

age has no statistically significant effect on the pulse rate, systolic blood pressure and diastolic blood pressure in the physical education teachers of the present study, although the value of pulse rate was lower in the young age group then the other two age groups.

No significant difference has been revealed in the average blood cholesterol, fasting blood sugar and hemoglobin concentration profiles of the three different age groups of physical education teachers in the present study. In general, it can be concluded from the results obtained in the present study that increasing age has no significant impact on most of the variables like blood cholesterol, blood sugar, hemoglobin, pulse rate, systolic blood pressure and diastolic blood pressure.

Although no significant impact of aging has been noticed on some selected physiological and biochemical parameters in the present study on physical education teachers but there is a warning sign in the form of a significant negative impact of aging on the body composition of these subjects'. These changes in overall adiposity and fat appear to be important factors in many common "age-related" disorders such as hypertension, glucose intolerance and diabetes, dyslipidemia, and atherosclerotic cardiovascular disease (*Krotkiewski et al., 1983; Larsson et al., 1984*). In addition, it is possible that the age-associated decrement in muscle mass, and subsequently in strength and endurance, may be a critical determinant for functional loss, dependence, and disability (*Buchner et al., 1992*).

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