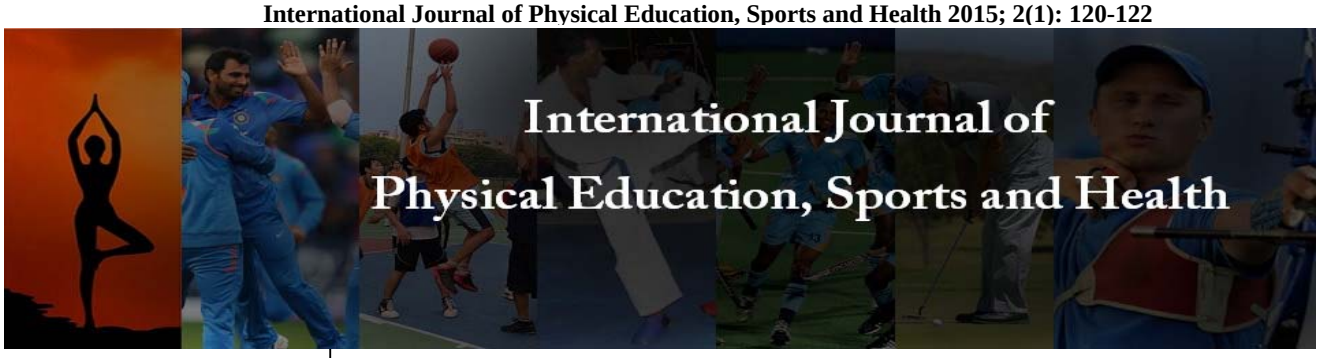

P-ISSN: 2394-1685
E-ISSN: 2394-1693
Impact Factor (ISRA): 4.69
IJPESH 2015; 2(1): 120-122

www.kheljournal.com
Received: 25-06-2015
Accepted: 26-07-2015

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The relationship between anthropometric characteristics with balance in non-athlete old females

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Abstract
The relationship between anthropometric characteristics with balance in non-Athlete old females was aims of this article. The current research is a quasi-experimental study. The research project is pretest posttest and application of independent variable. 150 questionnaires were distributed among old female volunteers and from the individuals who had the required conditions to participate in the study 36 individuals were chosen as the research sample. The examinees' balance was measured by the use of Berg Balance Scale (BBS) (measuring the balance function based on 14 items used in daily life). Descriptive statistics was used for calculating mean and standard deviation of age, height, and weight of examinees and also the achieved scores in BBS. Pearson's correlation coefficient was used to assess the correlations between the variables (Balance). The results showed, that there is significant and negative relationship between weight and balance rate. There is significant and negative relationship between height and balance rate of non-athlete old females. There isn't significant relationship between age and balance rate of non-athlete old females.

Keywords: Anthropometric, Age, Height, and Weight, Balance, Non-Athlete Old Females

Introduction
Socio-economic changes along with advancement of medical sciences have resulted in increased longevity and life expectancy during the recent centuries; which ultimately have resulted in elderly and aged population growth. Compared to the past, despite the increasing number of old people during the recent decades, their status has been weakened especially in major cities and have made them to confront some problems.

Aging and decreased physical activity cause disorders in many physiological functions such as sensorimotor functions and they could result in loss of postural control in old people and they could increase the likelihood of injuries (Beers, 2000) [5]. By decreased postural control the immunity of old people during daily activities and physical activities decreases and this could be the reason to decreased activities and the following disorders for old people. Also by decreasing the physical activity accompanied by aging, alarming changes happen in the capacity of organ systems such as cardiovascular system, respiratory system, nervous system and musculoskeletal system that have the highest and most important changes.

Balance is defined as the ability to maintain the body's center of mass within the base of support. The balance is maintained through the movement of body weight in different directions with safety, speed (response time), and coordination. Balance is dynamic and requires constant adjustments to adapt to external perturbations, through the use of vision, muscle activity, articular positioning and proprioception, and the vestibular system, all acting in concert (Prado, 2007; Alonso, 2009) [3]. Balance evaluation tests that simulate functional activities are the most appropriate type of test to determine the contributions of the musculoskeletal, vestibular, and visual systems. Systems of maintaining postural balance can be affected by lesions, musculoskeletal, or neurological limitations, anthropometric factors, aging, use of medications, physical conditioning, and specific training (e.g., high impact sports), as well as extrinsic factors such as the type of shoes and the type of ground (Alonso, 2011) [4].

Many balance assessment methods exist, ranging from simple observation, clinical tests, scales, and posturographic measurements, to integrated assessment systems of greater complexity. All of them have advantages and limitations and can demonstrate different results with multiple interpretations, and this is exacerbated by the lack of consensus regarding which

individual characteristics (especially anthropometric factors) should to be controlled for, so that quantitative evaluations can be considered reliable. This lack of consensus impedes the use of such tests in clinical practice as a safe tool for assessing the risk of falls and the results from therapeutic interventions (Alonso, 2011; Greve, 2007) [4].

Imbalance (and therefore falling down) in old people creates serious problems for them. Some of the usual and common results of imbalance in people who have osteoporosis are dislocation of the spine, pelvic fracture, femur fracture and wrist fracture. These types of problems have adverse consequences such as high medical costs, dependence on others, change of lifestyle (inactivity) and great caution. Stumbling of old people depends on many different factors such as lifestyle, family problems, socio-economic status, diseases and medications which are some of the most important factors (Laurence, 2006) [6].

Progress of science in different field has resulted in emergence of new horizons of thoughts and lifestyles of human beings. These progresses have resulted in highlighting the insufficiencies and defects existing in different fields and they have revealed the necessity of providing new strategies. In this path physical education and sports sciences have gone through some changes. The aim of the present study was to relationship between anthropometric characteristics with balance in non-Athlete old females.

Materials and methods

The current research is a quasi-experimental study. 150 questionnaires were distributed among old female volunteers and from the individuals who had the required conditions to participate in the study 36 individuals were chosen as the research sample. The examinees' balance was measured by the use of Berg Balance Scale (BBS) (measuring the balance function based on 14 items used in daily life).

Descriptive statistics was used for calculating mean and standard deviation of age, height, and weight of examinees and also the achieved scores in BBS. The data were stored and analyzed using the SPSS 17.0 software. The Kolmogorov-Smirnov test was used to ascertain whether the continuous variables presented normal distributions; the variables that did not present normal distributions. Pearson's correlation coefficient was used to assess the correlations between the dependent variables (Balance) and the independent variables (Age, Height, and Weight) in the whole population.

Results & Discussion

Table 1 and 2 shows information related to the individual characteristics and balance of examinees that they had mean age of 54.61±3.98, mean weight of 68.08±7.25, mean height of 161.92±4.47 and mean balance of 45.17±4.43.

Table1: Statistical distribution of individual characteristics of Non-Athlete Old Females

Variable	Statistic			
	Mean	Std. Deviation	Minimum	Maximum
Weight(Kg)	68.08	7.25	57	85
Height(Cm)	161.92	6.47	152	180
Age(year)	54.61	3.98	46	60

Table2: Statistical distribution of Balance of Non-Athlete Old Females

Variable	Statistic			
	Mean	Std. Deviation	Minimum	Maximum
Balance	45.17	4.430	36	54

The results of test of hypothesis concerning the relationship between Balance and variables are shown in table 3.The date showed that there is significant and negative relationship between weight and balance rate.

Table3: Results of Spearman correlation coefficient test.

variable		Weight	Height	Age
Balance	r	-0.669	-0.274	-0.199
	P	0.000	0.106	0.245

Correlation is significant at the 0.05 level

Conclusions

Identifying factors that influence balance can help improve the accuracy of diagnosis and quality of treatment and rehabilitation (indication of specific exercises) and is fundamental for preventing falls and incapacities (kejonen, 2003; Cote,2005) [13, 9]. Anthropometric variables influence the stability limits of the organism and can affect the motor strategies relating to balance control (kejonen, 2003) [13].

The current research results showed that that there is significant and negative relationship between weight and balance rate of non-athlete old females.Normal aging results in significant changes in body composition with increases in abdominal fat and losses of muscle mass. The increase in obesity alters the risks for type 2 diabetes, cardiovascular disease, and hypertension, whereas the decline in fat-free mass (FFM) may alter energy expenditure and resting metabolic rate. Overweight, central obesity and overall level of muscular fitness are strongly associated with balance deficiencies in the elderly. BMI is a major performance determinant in a wide range of both static and dynamic balance field tests (Hassinen, 2005; Manckoundia, 2008) [11, 15]. Obesity also increases the need for attention resources to maintain postural stability. This may lead to compromised balance when subjects are required to maintain stability during distraction such as while multi-tasking during daily life activities. This finding was similar to that of Ledin and Odkvist (1993) who demonstrated that a 20% increase in body mass reduced the ability to make adjustments in response to external perturbations in the orthostatic position, with a consequent increase in postural instability. Hue et al. (2007) [12] found that body mass was responsible for more than 50% of balance at speed and Chi ari *et al*. (2002) [8] demonstrated a strong correlation between body mass, antero-posterior movements, and the area of detachment.

The current research results showed that that there isn't significant relationship between height and balance rate of non-athlete old females. There is a consensus that the greater the height is, the worse the balance. Berger *et al*. (1992) [7] and Alonso *et al*. (2012) [3] stated that ankle displacements and the response of the gastrocnemius increased with increasing height. Allard *et al*. (2001) [1] reported that ectomorph (lanky) individuals present greater postural sway than do endomorph or mesomorph individuals, and they attributed this to the higher position of the center of mass. Other studies have found that body stability is inversely related to the height of the center of gravity and that, for this reason, post urography measurements are affected by individuals' anthropometric characteristics (kejonen, 2003, Hue, 2007). [12, 13]

Acknowledgments

The author would like to express his appreciation to the subjects for their participation and gorgan branch of Islamic Azad University for financial and moral support in this study.

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