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A Comparative and Correlational Study of the Body-Image in Active and Inactive Adults and with Body Composition and Somatotype

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Abstract: The purpose of present study were to examine the effects of regular participation in physical activities on body image and its relationship with body composition and somatotype. One hundred and twenty men and women (25-65 years) were randomly selected and then divided into two active and inactive groups through the Median split technique based on the physical activities index scores. Physical Self-Description Questionnaire (PSDQ), which consisted of body fat, global physical and appearance sub-scales, were used. 2×2 MANCOVA (gender × group) with covariates of body fat percent and Body Mass Index (BMI) was used to analysis the data. The results show significant interaction ($F = 3.55, p < 0.01$) for gender and group in body image sub-scales. Also, the results revealed inverse significant relationships between body image and body fat percent ($r = -0.49, p < 0.01$), BMI ($r = -0.38, p < 0.01$), endomorphy ($r = -0.48, p < 0.01$) and mesomorphy ($r = -0.38, p < 0.01$) and direct relationship with ectomorphy ($r = 0.39, p < 0.01$). In conclusion, one's attitude toward his/her body stems from his/her physical ability and size. In addition, active men have more positive body-image than women.

Key words: Regular physical activities, body image, somatotype

INTRODUCTION

The physical activity has many benefits for males and females in all ages. But it is more beneficial when it meets some essential needs in human. Physical activity can produces physical advantages such as functional improvement in body systems (McArdel *et al.*, 1996) and psychological advantages such as well-being and positive mood enhancement, stress reduction (Dishman, 1995) and self-efficacy (Berger, 1988) and self-concept increments (Gallahue and Ozmon, 2002; Seefeldt, 1986).

Some findings revealed that active groups had better physical concept or body image than inactive groups (Jankauskience *et al.*, 2005; Annesi, 2005; Franzoi, 1986; Vandevilet and Vancoppenolle, 1999; Finkenber *et al.*, 1998; Huddy and Cash, 1997; Davis *et al.*, 1994; Gutherie *et al.*, 1994; Vanfraechem-Raway and Sumy, 1994; Hallinan and Schuler, 1993; Davis and Fox, 1993; Pierce *et al.*, 1991; Arms, 1989; Berger, 1988). First, such research findings have shown in the developed countries and little is known about the effect of physical activity on body image or physical-concept in the Iranian population that has Islamic culture. Also, some studies showed that a short-term exercise program couldn't change body image (Anderson *et al.*, 2004). Thus one of the purposes of present investigation is the effect of physical activity

participation on body image in the adult population. Second, Marsh and Readmayne (1994) in regarding to study of self-concept structures and by developing PSDQ demonstrated that self-concept has varied dimensions and each of which are associated with health-related and skill-related fitness, sport competency, body composition and appearance. Thus to know which of the physical self-concept structures have an important role, the associations of body image and physical characteristics has been studied in present investigation as previous researches (Shaw *et al.*, 2000; Ward and Mc Keown, 1987) have shown it for body composition but not for somatotype.

Men and women differ physiologically, physically and psychologically (Wilmore and Costill, 1994), in addition, there are some differences between them in their expectancy from sex role and social and occupational activities (Dishman, 1995). Enhancing appearance attraction along with health promotion that are some important reasons for women to participate in weight reduction programs such as physical activity, were some consequences of the society stress on women to have attractive physique (Green *et al.*, 1997). Research findings generally showed that women had more negative attitude toward body than men (Gross *et al.*, 1998; Shaw, 1994, Arms, 1989; Cole, 1989; Frederick and Morrison, 1996; Salusso-Deonier and Schwarzkopf, 1991). In developed

countries, fashion plays an important role in women's life and it can, in turn, impose an anxiety on them (Dishman, 1995). In contrast, in Iranian nation Hijab plays an important role in women's life and this can, in turn, protect them from social physique anxiety. Thus another important purpose of present investigation is the effect of gender differences on physical-concept.

In general, this study has focused on the relationships between physical activity, gender differences and body composition and somatotype in Iranian adults. Since the current research findings about body image have come from western countries.

MATERIALS AND METHODS

Subjects: Participants in this study were 120 adults (60 males 60 females) between 25-65 years who randomly sampled from Tehran city at 2005 August. Subjects were divided into two active and inactive groups through the Median Split Technique on the physical activity index score.

Instruments: Physical Activity Index Questionnaire was used to measure physical activity level. To measure physical-concept, Physical Self-Description Questionnaire (PSDQ) was used. This questionnaire has eleven sub-scales and for the purpose of present investigation three sub-scales were selected and before main study, it was applied to same population and alpha Cronbach 0.90 computed.

Body composition consisted of percent body fat and body mass index. Jackson and Pollock equation and Brozok equation (Wilmore and Costill,1994) were used to measure body density and body fat respectively. BMI is division of mass (kg) to square height (m²). Somatotype that consisted of endomorphy, ectomorphy and mesomorphy computed through Heath-Carter method (Duqut and Carter, 1996).

Procedure: Physical Self-Description Questionnaire (PSDQ) was completed before any physical measurements to prevent subjects' bias. All measurements conducted by two experts, one for males and the other for females.

Statistical analysis: 2*2 MANCOVA (gender*group) with covariate of body fat percent and BMI was used to analysis data and after significant results, follow-up univariate analysis of variance was used. Canonical and Pearson correlation coefficient were used to associate between physical-concept sub-scales and body composition and somatotype. Significant level was determined at p<0.05.

RESULTS

The results related to subject's demographic measurements, body composition, somatotype and body image sub-scales have been shown in Table 1 according to gender and group separately. The results revealed that mean age, weight and height are greater in males than females. In addition, females have more body fat percent (32.88%) than males (22.95%) but least BMI (22.65) than males (25.87).

Somatotype measures show that females have more score on endomorphy (7.23 vs. 5.49) mesomorphy (5.62 vs. 5.49) and ectomorphy (1.48 vs. 1.44) than males.

Also, active group has greater mean age, body fat percent, height but less weight than inactive group and same BMI. Results on somatotype showed that, inactive group has more score on endomorphy and mesomorphy but less score on ectomorphy than active group.

Table 2 shows the results of MANCOVA on the effect of gender and group on the body image with covariate for %fat and BMI. The results showed that there is a significant interaction ($F_{3,112} = 3.55, p<0.01$) on body image. Follow-up univariate ANOVA showed that there are significant interactions on body fat sub-scale ($F_{1,114} = 7.46, p<0.01$) global physical ($F_{1,114} = 5.12, p<0.05$)

Table 1: Means and standard deviations for demographic measures, body composition, somatotype and body-image subscales in gender and physical activity groups

	Male		Female		Active		Inactive	
	M	SD	M	SD	M	SD	M	SD
Age	44.90	11.82	38.00	11.39	42.81	11.33	40.37	12.67
Weight	76.08	10.29	64.45	9.38	69.89	10.75	70.66	12.13
Height	171.48	7.32	161.21	6.62	167.20	8.88	167.20	8.39
Fat (%)	22.95	6.51	32.88	7.96	28.55	9.02	27.52	8.52
BMI	25.87	6.00	24.65	4.14	25.00	3.14	25.52	4.13
Ectomorphy	1.44	1.14	1.48	1.11	1.52	1.15	1.39	1.09
Mesomorphy	5.49	1.20	5.62	1.86	5.50	1.60	5.62	1.53
Endomorphy	5.49	1.76	7.23	1.85	6.20	2.05	6.52	1.94
Fat sub-scale	5.11	7.52	21.66	8.38	24.42	7.48	22.32	8.66
Global physical sub-scale	26.70	6.46	22.51	7.55	25.37	7.30	23.81	7.29
Appearance sub-scale	26.06	5.44	25.25	5.32	26.75	5.04	24.52	5.51

Table 2: Mancova results for the effects of gender and group on body-image

		Mancova			Ancova	
		W	F	P	F	P
Gender	Fat	0.99	0.342	0.79	0.22	0.63
	Global				1.01	0.31
	Appearance				0.23	0.62
Group	Fat	0.93	2.70	0.049	4.54	0.035
	Global				2.41	0.12
	Appearance				5.49	0.021
Gender* group	Fat	0.91	2.55	0.017	7.46	0.007
	Global				5.12	0.025
	Appearance				4.69	0.032
Fat © (%)		0.88	4.68	0.004		
BMI (c)		0.86	5.77	0.001		

Table 3: The correlation results between body-image sub-scales and body composition and somatotype

Body-image body measures	Fat sub-scale	Global physical sub-scale	Appearance sub-scale
Fat (%)	-0.63 **	-0.37**	-0.04
BMI	-0.61**	-0.17	0.08
Endomorphy	-0.52**	-0.36**	-0.10
Mesomorphy	-0.51**	-0.21*	-0.09
Ectomorphy	0.61**	0.21*	-0.01

* p<0.05, ** p<0.01

and appearance sub-scale ($F_{1, 114} = 4.69, p<0.05$). In addition, there is significant main effect for group ($F_{3, 112} = 2.7, p<0.05$) in body fat sub-scale ($F_{1, 114} = 4.54, p<0.05$) and appearance ($F_{1, 114} = 5.49, p<0.05$) but not for global physical ($p>0.05$). There isn't significant main effect for gender, too.

The results of canonical correlation showed that the strong relationships ($R = 0.73, \chi^2 = 99.46, p<0.05$) between body-image and body composition and somatotype. Table 3 shows the results of Pearson correlations between body-image sub-scales and body composition and somatotype characteristics. The results showed there are significant inverse relationships between %fat with body fat sub-scale ($r = -0.63, p<0.01$) and global physical ($r = -0.37, p<0.01$). Also, there is significant inverse relationship ($r = -0.61, p<0.01$) between BMI and body fat sub-scale. There are significant inverse relationships between endomorphy with body fat sub-scale ($r = -0.52, p<0.000$), global physical sub-scale ($r = -0.31, p<0.01$) and mesomorphy with body fat sub-scale ($r = -0.51, p<0.01$) and global physical sub-scale ($r = -0.21, p<0.05$). In addition, there are significant relationships between ectomorphy with body fat sub-scale ($r = 0.61, p<0.01$) and global physical sub-scale ($r = 0.21, p<0.05$). There aren't significant relationships between appearance sub-scales with body measures.

DISCUSSION

The purposes of present study were comparing body image between active and inactive males and females and

its association with body composition and somatotype. The results of body-image comparison between two groups and males and females showed that, active males had better attitude toward his body than others. In addition, active adults had more positive body image than inactive adults, but there were no significant differences between males and females. These findings are according to some investigators' findings such as Franzoi (1986), Davis (1997), Arms (1989), Davis and Fox (1993), Daley and Parfitt (1996), Huddy and Cash (1997), who showed that active adults had more positive body-image than inactive adults.

It seems that participating in physical activity can increase physical abilities and fitness and changes one's estimation from his/her capabilities. This, in turn, results in self-esteem improvement and positive attitude toward body. Sonstroem (1997) in his Exercise and Self-esteem Model (EXEM) proposed that, the objective evaluation from physical capabilities may be increased by exercise. This evaluation can improve self-acceptance or self-worth without considering perceived competency. Fox and Corbin (1989) in the development of Physical Self-Perception Profile (PSPP) showed that there are strong relationships between efficacy and physical fitness. Sonstroem and Bouchard (1996) also proposed self-esteem improvement following participation in physical activity can be related to physical fitness increment, meeting one's personal goals, competency improvement, health behavior promotion such as sufficient sleep and nutrition and confront with new social experiences as a result of activity with others. These factors can enhance one's self-satisfaction.

The results of present study revealed that there are no significant differences between males and females. This finding is according to Netz *et al.* (1988) and is contrary to Cash *et al.* (1986), Bruchon-Schweitzer (1987) and Arms (1989), who in their studies showed that the males had better body-image than females. It seems that gender differences is related to physiological and anatomical differences (Wilmore and Costill, 1994) as well as sex role and society expectancy about the special roles of males and females. For example, males' expectancy from females is about her slimming and good shape, which its manifestation is, differs in different societies. For instance, body image can be influenced by mass media propagations on beautiful standard and sexual attractiveness or considering fashion (Dishman, 1995). It is proposed that the lack of gender difference in our study is related to our cultural and social setting. Since, there isn't the topics as mentioned above and Moslem females seldom participate in the fashion competition in society, thus they feel less social physique anxiety and their body image don't deteriorate.

In the regard to body image and body composition relationships, present findings revealed that there are significant inverse correlation between body image with percent body fat and BMI. These findings are according to the findings of Cash *et al.* (1986), Hart *et al.* (1989) Sullivan (1993), Kaufman (1994), Eklund and Crawford (1994), Judish-berg (1995) and Riely *et al.* (1998). In addition, there are significant inverse correlation between body image with endomorphy and mesomorphy and direct correlation with ectomorphy. These findings show that adult's attitude toward body emanate from their body size and type. That is, one with less percent body fat has better body image and vice versa. One of the interesting findings for present study might be the inverse correlation between body image with mesomorphy. One reason for such findings, maybe related to body changes as following aging that in turn affect somatotype (McArdel *et al.*, 1996). Another reason can be related to the method of somatotype assessment in this study. In the Heath-Carter method the classification criterion for dominant body type is 0.5 differences between three kinds of somatotype, thus it seems that it isn't possible to separate mesomorph person with endomorph in these subjects.

CONCLUSIONS

In conclusion, these findings reveal that adults who participate in physical activity can benefit from its physical, physiological and psychological effects such as physical-concept. Also, the findings showed that one's body size can influence his/her body image and thus physical fitness and shape up are associated with positive physical-concept formation and self-esteem development in the social setting and personal living.

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