THE INFLUENCE OF PHYSICAL ACTIVITY ON BODY IMAGE IN PEOPLE WITH AND WITHOUT ACQUIRED MOBILITY DISABILITY

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BACKGROUND: Body image in people with physical disability is important, but it has received little attention in the research literature.

OBJECTIVE: The aim of the study was to determine whether differences exist between adolescents with acquired mobility disability (AMD) and those without AMD regarding body image, and whether physical activity influences these differences.

METHODS: Fifty-eight adolescents, aged 16 to 18 years, participated in this study. Half the participants had some form of AMD while the other half were healthy. Body image was evaluated with the Multidimensional Body Self Relations Questionnaire (MBSRQ) before and after 6 weeks of playing darts. A two way ANOVA was used to analyse the results.

RESULTS: At the end of the study, the healthy adolescents scored significantly higher than the AMD group on the subscales of fitness perception, orientation and overall health perception. No interaction was found between disability and exercise on any subscales of the MBSRQ.

CONCLUSIONS: The results of this study demonstrate that people with AMD evaluate their health and fitness levels as being lower than healthy adolescents and that they are less concerned with fitness as compared with healthy adolescents. Six weeks of playing darts as a physical activity had no effect on improving the self perceptions of the AMD group.

Keywords: Lifestyle physical activity, adolescent, dart, MBSRQ.

INTRODUCTION

Body image in people with physical disability is important, but it has received little attention in the research literature. *Body image* refers to an individual's personal view of his or her own body (Rodin, 1992). Because body image is highly subjective, this physical self-perception may or may not reflect reality. Feeling positive about one's own body is important in establishing one's identity and self esteem, and for this reason, body image may play a significant role in the lives of people with physical disabilities (Drench, 1994).

Negative body image, which is defined as dissatisfaction with one's own personal body image, is a principal component and predictor of a variety of health problems, such as depression, obesity, body dysmorphic disorder, and eating disorders (Stice, 2002). *Body dissatisfaction* is defined as a person's negative thoughts and feelings about his or her body (Cash, 1990), and it can result from body image distortion, a misperception of one's appearance, disruption of mobility, body control, or the loss of a body part (Dolan, Birtchnell, & Lacey, 1987). Body image distortion that results in negative body image and body dissatisfaction can have a debilitating effect on health and wellness. In spinal cord injury (SCI) or lower extremity amputation referred to in this manuscript as acquired mobility disability (AMD), the lack of sensory input and motor experience and/or muscle atrophy may affect their perception and evaluation of their body.

Studies have reported conflicting results regarding the impact of AMD SCI on body image. They have found lower scores on body image, body perception, and satisfaction with one's bodily capabilities in individuals who have spinal cord injury than in those who are able bodied (Stensman, 1989). Some studies have suggested that considerable body image distortion and dissatisfaction with one's body are prevalent in individuals who have had lower extremity amputation (Rybarczyk et al., 1992). However, many people who have SCI cope well with their disability in spite of changes in their body image. They resume work, attend school, and remain active in all aspects of family and social life (Kruger, 1984). Body image needs to be adjusted to adapt to the change in both body function and appearance as a result of traumatic injury. Studies have reported that exercise and regular physical activity may play a significant role in a person's body image, not only in healthy people

(Hayes, Crocker, & Kowalski, 1999; Loland, 1998) but also in those with disabilities (Goldberg, 1984; Sonstroem, 1997).

Unfortunately, much is unknown about the relationship between exercise and body image, particularly in adolescents with AMD. Research has shown that children may not be engaging in sufficient physical activity (Armstrong, Welsman, & Kirby, 2000; Duncan, Woodfield, Al-Nakeeb, & Nevill, 2002) and this finding is worrying as physical activity habits that develop in childhood are likely to continue into adult life (Harro & Riddoch, 2000). Thus, the need to promote a positive body image and to establish good exercise habits in childhood may be of vital importance to children's future health, regardless of disability.

Another uncertain issue concerns the types of exercise or physical activities that have a more positive influence on self perceived body image in people with AMD. Previous studies have evaluated the effect of weight-bearing exercise on body image (Wise, 2000; Yuen & Hanson, 2002). Darts as a lifestyle physical activity (Corbin, Welk, Corbin, & Welk, 2006). Lifestyle activities are encouraged as a part of everyday living and can contribute significantly to good health, wellness, and fitness. Any person who has at least one healthy upper extremity and normal mental health can play it easily. People can throw darts from a wheelchair, on crutches and even in a head brace. It is not necessary to adapt the game to accommodate a student's physical disabilities.

The aim of the study was to determine whether differences exist between adolescents with AMD and those without AMD regarding body image, and whether physical activity influences these differences.

METHODS

Participants

A total of 58 participants, ranging in age from 16 to 18, volunteered for this study. Half of the participants (N = 29) had AMD (study group) and half of the participants were not disabled (control group). Participants with AMD were students of a special education program at a local boarding school. Individuals with AMD were functional verbal communicators and were cognitively able to respond to all questions. The whole group consisted of 24 girls and 34 boys. The AMD group included participants with spinal cord injury (n = 14) and lower limb amputation (n = 15). Ten of them used a manual wheelchair, 12 of them used crutches, and seven of them had prostheses. None had multiple disabilities. The other group consisted of adolescents without disabilities (n = 29) from a local high school. The study was conducted in accordance with the ethical standards of the International Journal of Sport Medicine (Harris & Atkinson, 2009).

Materials

Dartboard and darts: A compact sisal dartboard 45cm in diameter was hung so that the centre of the bull's eye was 1.72 m from the floor. The throw line was 2.37 m from the face of the board. The darts were 15 cm long and weighed 22 g each.

Around the World: For the beginner, "Around the World" is a simple game and is good for beginners. The object of the game is to obtain the highest score by hitting all the numbers on the board in order. Starting with the number one, players throw 1 dart at each number on the board from 1 to 20. After hitting number 1, the target is changed to 2 and 3 so on. Twenty throws are made in total. Hitting the numbers with single points earns the player 1 point; hitting the double region, 2 points; and hitting the triple region, 3 points. The score is then tallied. For example, if a player hits the double region of the number 1, then his score is 2 (2 × 1). To calculate the final score, each player's 20 throws from 1 to 20 are added up (Pratt, 1995).

Multidimensional Body Self Relations Questionnaire (MBSRQ): The MBSRQ (Cash, 1990) is a 69 item self-reporting inventory of self perception on body image. The MBSRQ consists of three groups of scales: the Body Self Relations Questionnaire (BSRQ) (54 items), the Body Areas Satisfaction Scale (BASS) (9 items), and the weight related attitude scale (6 items) (Cash, 1990).

The BSRQ consists of three somatic domains: physical appearance (aesthetics), fitness (ability), and wellness (physical integrity). Within each of the domains, questions address either the evaluation of (i. e., the extent of attainment, liking, or satisfaction) or orientation to (i. e., the importance of or the attention paid to) the domain. The BSRQ comprises seven subscales – appearance evaluation, appearance orientation, fitness evaluation, fitness orientation, health evaluation, health orientation and illness orientation. A five point Likert type scale ranging from "definitely disagree" to "definitely agree" was used (1= definitely disagree, 5 = definitely agree). Higher scores on each subscale indicate greater satisfaction. The BASS measures satisfaction with face, hair, lower torso, mid-torso, upper torso, muscle tone, weight, height and overall appearance. Each item was rated on a five-point scale from very dissatisfied (1) to very satisfied (5).

The weight related attitude scale consisted of two subscales – overweight preoccupation and self classified weight, which consisted of 2 items. The self classified weight subscale evaluated how each participant perceives their subjective weight and their beliefs about others' perception of their weight; items were rated on

a five-point scale from very underweight (1) to very overweight (5). The overweight preoccupation subscale (WPS) assessed a construct reflecting fat anxiety, weight vigilance, current dieting, and eating restraint. WPS with 1 = definitely disagree, 5 = definitely agree (three first items), and 1 = never, 5 = very often (last item). Because of the multidimensional nature of the MBSRQ, no overall composite score was calculated (Brown, Cash, & Mikulka, 1990; Cash, 1990).

In this present study, we used Gürsel's (2010) adapted reliability and validity of the MBSRQ for the able bodied Turkish population aged 16 to 30. Tests on the internal consistency of each of the subscales yielded a coefficient alpha for appearance evaluation (a = .63), for appearance orientation (a = .76), fitness evaluation (a = .54), fitness orientation (a = .75), health evaluation (a = .47), health orientation (a = .59), illness orientation (a = .55), body areas satisfaction (a = .78), weight preoccupation (a = .57), subjective weight (a = .83). The sample size of people with AMD was insufficient to obtain reliable scores on the MBSRQ. The total coefficient alpha was .86. The test-retest reliability of the data was obtained from the able bodied Turkish population aged 16 to 30 over a two week period. The test-retest correlation coefficients r = .52–.67 were found.

Procedures

Participants participated in the "Around the World" game three times a week for 6 weeks. We performed a pilot study to determine how long each training period should be in order to increase adolescents' performance in 10 healthy adolescents. At the end of the 6th week we detected 30 to 40% increments in the performance level of the adolescents and decided to use 6 weeks as a training period. A written consent form was obtained from all participants. Each group practiced and played the game in their school gymnasium. The groups had no contact with each other during the study. Each session lasted approximately 3 to 10 minutes per player. The players practised throwing the darts at the board a few times as a warm up. Both groups were led by the same instructor while practising. All the participants took the MBSRQ before and after 6 weeks of playing the dart game.

Data analysis

A quasi-experimental design was used to examine the effects of a 6 week dart game on self perceived body image between the control group and the AMD group. Descriptive data analysis was conducted with and without the AMD group. A 2 (time; pre, post) × 2 (group; disability, able bodied) two way repeated ANOVA measurement was conducted in order to examine differences in self perceived body image while checking for potential pre-physical activity group differences. An alpha level of .05 was used for all statistical tests.

In ANOVA, the effect size is expressed as a partial eta-squared (η^2), which describes the proportion of total variability attributable to the main effect. The magnitude of effect size is regarded as small when the magnitude is 0.01; medium when it is 0.06; and large when it is 0.14. Inspection of the partial eta-squared of the factor disability was .19 in the magnitude of health evaluation (a large effect size). Inspection of the partial eta-squared of the factor disability was 0.7 in the magnitude of Fitness Orientation (medium effect size). Inspection of the partial eta-squared of the factor disability was .04 in the magnitude of fitness evaluation (medium effect size).

RESULTS

The mean age of the AMD and control groups was 17.66 ± 1.51 years and 17.38 ± 1.37 years, respectively. The results of descriptive statistics of the participants are shown in TABLE 1.

The results of the two way ANOVA revealed a significant main effect in the healthy adolescents on the subscales of fitness evaluation [$F(1.56) = 4.27$, $p < 0.05$; $\eta^2 = .04$], fitness orientation [$F(1.56) = 4.81$, $p < 0.05$; $\eta^2 = .07$], and health evaluation [$F(1.56) = 13.220$, $p < .001$; $\eta^2 = .19$], when compared with the AMD group (TABLE 1).

The results revealed no significant interaction between the factors of disability and physical activity on the 10 subscales of the MBSRQ scores of the adolescents with and without AMD (TABLE 1).

According to the table at the beginning of the study during baseline measurements there were statistically significant differences between the study and control groups in the fitness evaluation and orientation ($p < 0.05$) and health evaluation ($p < 0.001$), and the study group had significantly lower scores than the control group. When the pre and post scores were compared, none of the items showed significant differences between the pre and post scores in both of the groups ($p < 0.05$).

DISCUSSION

The study aimed to investigate if body self relations in adolescents who have lower extremity disabilities is different from able bodied adolescents and if they have any problem, could the playing of the game of DARTS modify or improve it? The study group is very special and important since they are adolescent and disabled so it is worthwhile to investigate any intervention to improve and modify any body self relations problems. Another originality of the study is to use DARTS as a training tool in this special group. It would have been a good tool for this study group. Results of the study

TABLE 1
Comparison of the mean baseline and post-training scores of the able-bodied and AMD groups' MBSRRQ scores

MBSRQ subscale	Able bodied (n = 29)				AMD group (n = 29)			
	Pre		Post		Pre		Post	
	M	(SD)	M	(SD)	M	(SD)	M	(SD)
Appearance evaluation δ	3.94	(.54)	3.92	(.52)	3.72	(.61)	3.84	(.69)
Appearance orientation δ	4.04	(.54)	4.11	(.58)	3.94	(.58)	3.93	(.68)
Fitness evaluation δ	4.36	(.71)*	4.51	(.54)	4.05	(.72)*	4.20	(.71)
Fitness orientation δ	4.13	(.46)*	4.10	(.63)	3.80	(.56)*	3.89	(.44)
Health evaluation δ	4.33	(.52)**	4.11	(.68)	3.82	(.60)**	3.71	(.55)
Health orientation δ	3.84	(.45)	3.73	(.52)	3.56	(.67)	3.54	(.54)
Illness orientation δ	3.52	(.55)	3.55	(.58)	3.46	(.72)	3.42	(.69)
Body areas satisfaction δ	4.17	(.45)	4.29	(.49)	4.10	(.45)	4.06	(.60)
Overweight preoccupation δ	2.62	(.56)	2.60	(.66)	2.58	(.85)	2.48	(.64)
Self classified weight δ	2.77	(.57)	2.89	(.52)	2.91	(.58)	2.94	(.36)

Legend: M – Mean; SD – Standard Deviation; Significance level of the difference across the AB and AMD Groups' baseline measurements – *$p < 0.05$, **$p < 0.001$; Significance levels of the difference between the pre and post measurements in the both group δ $p > 0.05$

showed us that this young disabled population feels unhealthy and experienced bodily symptoms of illness or vulnerability to illness and they do not value physical fitness and do not regularly incorporate exercise activities into their lifestyle. Six weeks of physical activity (Darts) could not change the groups' reality.

Conflicting results have been reported in the few studies conducted on the body image of individuals who have SCI or a lower extremity amputation. Krueger (1984) has showed that considerable body image distortion and dissatisfaction with one's body are prevalent in persons with AMD. Other studies have indicated that there are no significant differences in the degree of body satisfaction and other measures of body image between persons with AMD and able bodied people (Stensman, 1989) or have concluded that persons with AMD experienced little body image distortion (Fisher, 1998). It seems that the contradictory findings are attributed to discrepancies in defining body image as well as the use of different instruments in measuring body image (Gardner, 1996). In this study, the able bodied group scored themselves higher than did the AMD group on 3 subscales of body image, overall fitness and health evaluation. This result suggests that individuals with AMD can control their appearance in many ways but cannot always improve their fitness and health. Even in the study of Yuen and Hanson (2002), individuals with mobility disabilities scored higher themselves on appearance orientation. Previous literature has also emphasised that young adults with mobility disabilities are extremely concerned with their physical appearance and go to great efforts to dress well and use strategies such as covering atrophied body parts with clothes (Stensman, 1989). On the other hand, it is not surprising that the disabled group scored lower on health evaluation compared with the able bodied group. When a disability is present, it may be more difficult to evaluate one's overall health since the injury itself may diminish the perception of good health (Dewis, 1989).

The treatment of body image disturbance primarily involves cognitive therapy, which includes the use of automatic and rational thought processes, with counter arguments, and rational belief strategies. In addition to cognitive therapy for body image disturbance, exercise is also a viable method for reducing negative body related self perceptions of body image disturbed individuals (Gee, Abbott, Conway, Etherington, & Webb, 2003). Previous studies have shown that exercise may alter body image for the better, not only in patients or disabled people, but also in healthy people (Rosen, Cado, Silber, Srebnik, & Wendt, 1990). Exercise, including aerobic and resistance training, improves the self perceptions and body image of healthy people, independent of their body image prior to exercise (Depcik & Williams, 2004; Hayes et al., 1999; Hayes, Crocker, & Kowalski, 1999; Loland, 1998).

On the other hand, not all body image research supports the benefits of exercise. For example it found that women who exercised more often scored lower than women who did not participate in regular physical activity on the physical self worth scale, probably because of increased self consciousness brought on by an over emphasis on exercise (Sonstroem, Harlow, & Josephs, 1994).

Conflicting results have also been reported in studies investigating the effect of exercise on body image in people with disabilities. Wise (2000) investigated the benefits of weight exercise in four men with SCI and discovered that weight training not only improved their performance in activities of daily living and recreational

activities but also enhanced their body images. A study of 56 individuals with lower limb amputations examined the difference in body image between active and non-active lower-limb amputees (Wetterhahn, Hanson, & Levy, 2002). Using the MBSRQ, the study reported that body image was significantly and positively related to exercise. Yueng and Hanson (2002) investigated whether differences existed in self perceived body image between 60 adults with and without AMD and whether a relationship existed between exercise and self perceived body image in adults with AMD. They found that the AMD group appeared to evaluate their physical appearance and health as being better, were more concerned with fitness, and were more satisfied with different body parts when compared with their counterparts, who had a non-active mobility disability. On the other hand, Hider et al. found that body image was not related to the physical therapies used for treating ankylosing spondylitis (Hider, Wong, Ortiz, Dulku, & Mulherin, 2002).

In this study, physical activity had no effect on body image in both groups. Some possible explanations of this finding are; first, the type and intensity of the physical activity (darts) may not be enough to alter the body image of either group. Hausenblas and Falon (2006) showed in their study that to improve body image, at least moderate intensity aerobic and anaerobic activity is required. Second, depression in the AMD group may interfere with their psychological adjustment to disability and scoring. Previous studies have shown that among people with lower-limb amputations, depression is associated with lower levels of activity, increased feelings of vulnerability and poor self-rated health (Rybarczyk, Nyenbuis, & Nicholas, 1995).

Last, and partly related to the second issue, a life style including physical activity alone may not improve body image, especially in the mobility disability group, and cognitive therapy may be necessary.

CONCLUSIONS

The results of this study suggest that the fitness evaluation, orientation, and health evaluation of the AMD group are lower than in the able-bodied group and that the dart physical activity did not influence this perception. Further studies are necessary to investigate which types of exercise are more effective in improving body image perception and whether a combination of physical activity with cognitive therapy can improve body image in people with mobility disabilities.

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VLIV POHYBOVÉ AKTIVITY NA SUBJEKTIVNÍ VNÍMÁNÍ TĚLA U OSOB SE ZÍSKANÝM TĚLESNÝM POSTIŽENÍM A BEZ NĚJ

(Souhrn anglického textu)

POZADÍ: Subjektivní vnímání těla u lidí s tělesným postižením je důležitý aspekt, v odborné literatuře mu však nebylo věnováno příliš pozornosti.

CÍL: Cílem studie bylo stanovit, zda se vyskytují rozdíly mezi adolescenty se získaným tělesným postižením (AMD) a adolescenty bez AMD, co se týče subjektivního vnímání těla, a zda tyto rozdíly ovlivňuje pohybová aktivita.

METODY: Této studie se zúčastnilo padesát osm adolescentů ve věku mezi 16 a 18 lety. Polovina účastníků měla některou z forem AMD, zatímco druhá polovina byla zdravá. Subjektivní vnímání těla bylo hodnoceno pomocí dotazníku subjektivního hodnocení vlastního těla (Multidimensional Body Self Relations Questionnaire, MBSRQ) na počátku a konci 6týdenního kurzu hry v šipky. K analýze výsledků byla použita analýza rozptylu (ANOVA).

VÝSLEDKY: Na konci studie zdraví adolescenti bodovali výrazně výše než skupina s AMD, pokud jde o měřítka vnímání tělesné kondice, orientace a vnímání celkové úrovně zdraví. U žádných měřítek MBSRQ nebyla zaznamenána žádná interakce mezi postižením a cvičením.

ZÁVĚRY: Výsledky této studie ukazují, že lidé s AMD hodnotí své zdraví a tělesnou kondici jako nižší než je tomu u zdravých adolescentů a že se o svou tělesnou kondici zajímají méně než v případě zdravých adolescentů. Šest týdnů hraní v šipky jako pohybové aktivity nemělo žádný účinek na zlepšení subjektivního vnímání u skupiny s AMD.

Klíčová slova: životní styl, pohybová aktivita, adolescent, šipky, MBSRQ.

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