



Examination of Body Composition, Flexibility, Balance, and Concentration Related to Dance Exercise

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Abstract

In this study was to examine the body composition, flexibility, balance and concentration characteristics of dance exercise. Total of 268 university students whose average age was 20.59 ± 1.59 years were included. Height measurements, body weight measurements, flexibility measurements, balance test, concentration test of the students who had dance courses (the experimental group) and those who did not have dance courses (the control group) were provided twice, at the beginning of and at the end of the study as pre-test and post-test. Frequency analyses, descriptive statistics, and paired t-test were used. There were significant differences between pre-test and post-test scores of body weight, BMI, flexibility, balance, concentration among the students doing dance exercises (the experimental group). There were no significant differences between pre-test and post-test scores of body weight, BMI, concentration among the students not doing dance exercises (the control group) but there were significant differences in flexibility and balance scores.

Keywords: Dance, Body composition, Flexibility, Balance, Concentration.

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1. Introduction

Dance, being a special expression of human beings' motor behaviors (Hugel *et al.*, 1999) is the art of reflecting inner world to outside, self-explanation and self-expression through movements (Cantekin, 2011). Dance, containing sports, science, and art in itself- is the expression of a feeling presented with a moving body through a physiological process (Esen, 2012). Thanks to dance, individuals have the opportunity to do more exercise (Lin, 2005). To support individuals emotionally, mentally, socially and physically and to understand the correlation between body and mind; the psycho-therapeutic dimension of movements should be used (Strassel *et al.*, 2011). In addition to the use of dance as a tool that will help individuals explain themselves; benefits of dance in the human body as a sportive tool have been investigated by many studies (Adame *et al.*, 1991; Hui *et al.*, 2009). Dance, a multidimensional experience, involving emotional, physical, spiritual and social elements (Murciaa *et al.*, 2010) can raise perceived levels of physical and mental well-being and social contact (Kierr, 2011) including among those diagnosed with depression and anxiety (Payne and Stott, 2010). Dance has such physical restrictions as muscle mass, joint structure, size, weight, flexibility and place (Stevens *et al.*, 2000). Being the most aesthetic and rhythmic way of movement, dance is a technical and complex activity that contains exercises that strengthen the skeleton-muscle system as well as improves coordination by enabling the body to move freely in space/time. Thanks to images used, dance brings a new dimension to body awareness and improves imagination (Temel and Temel, 2016). In sport psychology, concentration or the ability to focus mental effort on the task at hand while ignoring distractions (Schmid and Peper, 1998) is defined as one's willing mental effort for the most important thing at that moment (Moran, 2004). Concentration in sports and exercise is composed of four parts: concentration on environmental clues (selective attention), attaining concentration focus during that moment, being aware of the situation and performance errors and changing concentration focus when necessary. Concentration is the ability to focus on relevant environmental clues. When the environment changes quickly, concentration focus should be quickly changed, too. Reflecting on the past or the future creates irrelevant clues; which leads to performance errors (Weinberg and Gould, 2015). In concentration, the person continues focusing until movement progress ends (Jackson *et al.*, 2001). Flexibility is one of the basic motoric features and means performing movements in the widest scale and in the freest way (Dündar, 2012; Zorba and Saygin, 2013). Balance is a reflex realized by central nervous system and means fulfilling the tasks by the organism's movement system in static and dynamic harmony. The system that provides balance determines the place, position and direction of the body in space and decides whether or not body should be moving or standing firm (Horak and Macpherson, 2011). Balance is the ability to keep and to maintain the center of gravity within balance points (Deliagina *et al.*, 2007). Thanks to dance; people can have a fit and aesthetic posture and attain balance, personal discipline, concentration, flexibility, endurance, speed and strength (Gökce, 2006). The essential physical qualifications for the dance are strength, flexibility, special endurance, balance, and body coordination (Hugel *et al.*, 1999). Dancing could be seen as a medium for increasing leisure-time physical and social activity. A great body of literature reveals the importance of engaging in regular physical exercise for the prevention of several chronic diseases as well as for improving psychological well-being and overall quality of life (Warburton *et al.*, 2006; Haskell *et al.*, 2007). Adilogullari (2014) found that dance training reduces social physique anxiety. Because dancing provides individuals opportunity to share emotions, express themselves without any word, socialize, people may find the chance to move away from anxiety and stress of everyday life while dancing.

Dance is considered as a sport due to its movement-related skills and motor skills and as art due to visual and aesthetic aspects, is a practical activity that combines different disciplines. Today, positive physiological and psychological effects of dancing upon the human body and its contributions to motor growth have been investigated through scientific methods. Dance is thought to be important because unlike sportive activities, freedom of movement is offered by dancing to those who move away from physical activities and perform passive activities due to the effects of advanced technology and because their physical and psychological well-being is protected. In light of that background, the current study aimed at assessing body composition, flexibility, balance and concentration values among dancing individuals.

2. Methods

Participants and Procedures A total of 268 university students whose average age is 20.59 ± 1.59 years were recruited for the study (175 male students vs. 93 female students). In the study, university students received 3-hour Latin dance courses (salsa, bachata) once a week for 12 weeks. The university students in the control group did not receive any dance courses. Height measurements, body weight measurements, flexibility measurements, balance test, concentration test of the students who had dance courses (the experimental group) and those who did not have dance courses (the control group) were provided twice at the beginning of and at the end of the study as pre-test and post-test. In order to determine concentration characteristics of the subjects, "Letter Cancellation Task" developed by Kumar and Telles (2009) was employed. Dances based on our research are Salsa, Zumba, Modern Dance. The most common dance of Latin American dances is Salsa. Salsa, a freestyle dance, is a type of dance that is improvised without adhering to routine movements (Craine and Mackrell, 2000). Zumba is a dance which combines Aerobic with music, figures of Oriental and Latin (merengue, salsa, bachata, reggaeton) dances (Micallef, 2014). Modern dance does not have specific special terms because it is shaped according to the personal creativity, the characteristics of the dancer and the creator's desire. In general, knowing dance terms is sufficient for modern dance (Cantekin, 2011). The experimental group was applied 30-70 min dance exercises (Salsa, Zumba, Modern Dance) for one day in a week throughout 14 weeks.

3. Measurements

Body weight and height: The weight was measured by an electronic balance with 0.1kg sensitivity while the height was measured via digital height meter device with 0.01cm sensitivity. **Body composition:** To determine body composition, body mass index (BMI) was calculated via weight/height^2 (kg/m²) formula (WHO, 2012). **Balance (Flamingo Balance Test-FDT):** In order to explore the static balance of the participants, Flamingo

Balance Test was used. The reliability coefficient of static balance was 0.87 (Johnson *et al.*, 1987). According to the test, the study group stood on a stabilometry platform of 50 cm in length, 4 cm. in height and 3 cm. in width with the dominant/preferred foot and tried to achieve their balance. Other free leg was bent backward from knee, pulled up to hips and gripped with the hand on the same side and time started when the participants achieved his/her balance on one foot and tried to keep his/her balance for one minute. When the balance was lost (giving up gripping the foot, falling off the platform, touching any part of the body, etc.), time was stopped. When the participant achieved his/her balance on the platform again, time was resumed. The test continued for one minute. When time was up, the number of the balance lost was counted, and the number was written down as participants' balance score at the end of the test. Flexibility: Sit-reach test measures first knee hamstrings and second flexibility of lower back, hip, and calves. Specifically, it measures biceps, femur, semi tendons, semi membranes, erector spinae, gluteus maximus, medius and gastrocnemius muscles, tendons. Sit-reach test flexibility box was of 35 cm length, 45 cm width, 32 cm height and upper part of the box was 55 cm length, 45 cm widths. The upper part protruded 15 cm outward and was marked between 0 and 50 cm on the top. The participant placed the bottom of the foot against the side of the box without bending knees, stretched hands as far as possible, flexed his/body without bending knees and pushed the 30 cm ruler on the box as far as possible and stopped for a few seconds at the furthest point on the box. The test was twice repeated, and the best result was recorded as the flexibility result of the test (Zorba and Saygin, 2013).

Concentration: Letter cancellation task as used by Kumar and Telles (2009) was used to measure the level of concentration in participants. The task consisted of a block of randomly placed letters in 14 columns and 22 rows with six assigned letters listed at the top of the page which participants were required to cancel within the block in 90 seconds. Scores of concentration on the Letter Cancellation Task were calculated by counting the number of correctly canceled letters within the grid. This score represented the speed and accuracy of the participants' completion, and therefore their concentration level (Kumar and Telles, 2009).

Data process and analysis Collected data were processed with SPSS 22.0 program. For the analyses of the data; frequency analyses, descriptive statistics, and the paired t-test was used.

4. Results

Average age, height, body weight, BMI, flexibility, balance and concentration values of the students who took dance courses (the experimental group) and those who did not (the control group) were shown in Table 1. It was found that the participants' average age was 20.59 ± 1.59 years, average height was 1.70 ± 0.08 cm., average body weight was 67.2 ± 11.3 in the pre-test and 67.5 ± 11.2 kg in the post-test, average BMI was 23.1 ± 2.9 in the pre-test and 23.2 ± 2.9 in the post-test, average flexibility was 22.09 ± 11.5 cm. in the pre-test and 24.4 ± 10.4 cm. in post-test, average balance score was 4.1 ± 3.8 in the pre-test, and 2.6 ± 2.8 in the post-test and average concentration score was 43.3 ± 11.1 in the pre-test and 48.6 ± 12.3 in the post-test.

Table-1. The participant students of the experimental and the control groups in terms of pre-test and post-test results

Variables	Experimental - Control group	Min.	Max.	M	SD	Median
Age (years)		17	31	20.59	1.94	20
Height (cm)		1.50	1.97	1.70	0.08	1.70
Body weight (kg)	Pre-test	42	99	67.2	11.3	68
	Post-test	42	99	67.5	11.2	68
BMI (kg / cm ²)	Pre-test	16.8	31.1	23.1	2.9	22.8
	Post-test	17.2	31.2	23.2	2.9	22.8
Flexibility (cm)	Pre-test	4	58	22.09	11.5	19
	Post-test	3	57	24.04	10.4	23
Balance (number of fault)	Pre-test	0	26	4.1	3.8	3
	Post-test	0	18	2.6	2.8	2
Concentration	Pre-test	10	70	43.3	11.1	44
	Post-test	14	75	48.6	12.3	49

M: Mean; SD: Standard deviation; Min.: Minimum; Max.: Maximum

Table-2. Comparison of pre-test and post-test results related to body weight, BMI, flexibility, balance, and concentration among the students who did dance exercises (the experimental group) and those who did not (the control group)

Variables	Groups		n	M	SD	t	p
Body weight	Experimental group	Pre-test	129	68.46	11.41	-2.68	0.01**
		Post-test	129	68.82	11.21		
	Control group	Pre-test	139	66.11	11.11	-1.26	0.21
		Post-test	139	66.32	11.15		
BMI (kg/cm ²)	Experimental group	Pre-test	129	23.3	2.75	-2.90	0.004**
		Post-test	129	23.5	2.76		
	Control group	Pre-test	139	22.8	3.03	-1.26	0.21
		Post-test	139	22.9	3.06		
Flexibility (cm)	Experimental group	Pre-test	129	25.07	12.23	-2.25	0.03*
		Post-test	129	27.10	10.96		
	Control group	Pre-test	139	19.32	10.19	-2.69	0.01**
		Post-test	139	21.21	9.07		
Balance (number of fault)	Experimental group	Pre-test	129	4.21	3.49	9.94	0.000***
		Post-test	129	1.67	0.16		
	Control group	Pre-test	139	4.12	4.13	2.27	0.03*
		Post-test	139	3.47	3.36		
Concentration	Experimental group	Pre-test	129	42.16	11.46	11.63	0.000***
		Post-test	129	52.89	11.63		
	Control group	Pre-test	139	44.41	10.76	-0.46	0.65
		t-test	9	74	72		

*p<0.05, **p<0.01, ***p<0.001

As seen in [Table 2](#), it was identified that there was a significant difference among the students who did dance exercises (the experimental group) regarding pre-test and post-test values concerning body weight, BMI, flexibility, balance, and concentration ($p < 0.05$). Average body weight was 68.46 ± 11.41 kg in the pre-test and 68.82 ± 11.21 kg in the post-test, average BMI was 23.3 ± 2.75 in the pre-test and 23.5 ± 2.76 in the post-test, average flexibility was 25.07 ± 12.23 cm in the pre-test and 27.10 ± 10.96 cm in the post-test, average balance score was 4.21 ± 3.49 in the pre-test, and 1.67 ± 1.82 in the post-test and average concentration score was 42.16 ± 11.46 in the pre-test and 52.89 ± 11.63 in the post-test. It was found that body weight and BMI pre-test and post-test values of the students who did dance exercises were similar while their flexibility, balance and concentration pre-test and post-test values improved.

As for the students who did not do dance exercises (the control group); no significant difference was seen regarding pre-test and post-test body concerning weight, BMI and concentration values ($p > 0.05$); however, their flexibility and balance scores differed considerably ($p < 0.05$). It was identified that average body weight was 66.11 ± 11.11 in the pre-test and 66.32 ± 11.15 in the post-test, average BMI was 22.8 ± 3.03 in the pre-test and 22.9 ± 3.06 in the post-test, average concentration score was 44.41 ± 10.76 in the pre-test and 44.74 ± 11.72 in the post-test. When the significant difference in flexibility and balance values of the students who did not do dance exercises was examined; it was seen that the average flexibility and average balance scores decreased with an average flexibility score being 19.32 ± 10.19 in the pre-test and 9.07 ± 0.76 in the post-test and average balance score being 4.12 ± 4.13 in the pre-test and 3.47 ± 3.36 in the post-test ([Table 2](#)).

5. Discussion

In the study of body composition, flexibility, balance, and concentration related to dance exercise; average age, height, body weight, BMI, flexibility, balance and concentration values of the participant students of the experimental and control groups were presented. It was noted that the participants' average age was (20.59 ± 1.59) years, average height was (1.70 ± 0.08 cm.), average body weight was (67.2 ± 11.3) in the pre-test and (67.5 ± 11.2) in the post-test, average BMI was (23.1 ± 2.9) in the pre-test and (23.2 ± 2.9). In the post-test, average flexibility was (22.09 ± 11.5) cm. in the pre-test and (24.4 ± 10.4) cm. in post-test, average balance score was (4.1 ± 3.8) in the pre-test and (2.6 ± 2.8) in the post-test and average concentration score was (43.3 ± 11.1) in the pre-test and (48.6 ± 12.3) in the post-test ([Table 1](#)). Dance development can be multidimensional among individuals and brings about positive improvements when individuals dance as a sportive activity or physical activity. Numerous studies emphasize physiological and psychological benefits of dancing ([Hackney and Earhart, 2010](#); [Hanna, 2010](#); [Huddy and Stevens, 2011](#); [Zitomer and Reid, 2011](#)). It was found that hopelessness levels of the university students who danced decreased ([Bastug and Demir, 2010](#)). [Minton \(2003\)](#) reported that students who received dancing classes had more abstract and creative thinking skills compared to those who did not receive dancing courses. [Fonseca et al. \(2014\)](#) observed that ballroom dancing brought perceptual benefits for those who practiced it. [Krampe \(2013\)](#) found that dance-based therapy was mildly or moderately effective in several components of balance and mobility. It was identified that motivation, self-confidence, body language, dancing related self-sufficiency and dance performances improved positively ([Tokinan and Bilen, 2011](#)). In a study on concentration, it was observed that concentration levels and feeling-states improved significantly over sessions of both yoga and aerobic exercise sessions equally. Aerobic exercise and yoga both produce positive changes in concentration, stress, energy, and well-being while only yoga produces improvements in mood and self-satisfaction ([Dolde, 2011](#)). Dancing, playing games, painting, and singing by the children support growth as well as play a key role in brain's learning skills and improve all of the senses ([Bradley et al., 2013](#)). It was identified that university students who participated in dancing activities had positive perceptions about social, physical anxiety levels and higher satisfaction with body image ([Cepikkurt and Coşkun, 2010](#)). [Akandere et al. \(2010\)](#) found that the problem-solving skills of the subjects participated in research differed at the beginning and the end of dance exercise.

It was detected that there was a significant difference between pre-test and post-test values of the students who did dancing exercises (the experimental group) and those who did not regarding body weight, BMI, flexibility, balance and concentration scores. The average values were as follows: pre-test body weight (68.46 ± 11.41 kg) and post-test body weight (68.82 ± 11.21 kg), pre-test BMI (23.3 ± 2.75) and post-test BMI (23.5 ± 2.76), pre-test flexibility (25.07 ± 12.23) and post-test flexibility (27.10 ± 10.96), pre-test balance (4.21 ± 3.49) and post-test balance (1.67 ± 1.82), pre-test concentration (42.16 ± 11.46) and post-test concentration (52.89 ± 11.63). Among the students who did dancing exercises, body weight and BMI pre-test and post-test values were similar to each other, but their flexibility, balance and concentration pre-test and post-test values improved. As for the students who did not do dancing exercises (the control group); there was not a significant difference between pre-test and post-test values in terms of body weight, BMI, and concentration. However, their flexibility and balance values were different. The average values were as follows: pre-test body weight (66.11 ± 11.11) and post-test body weight (66.32 ± 11.15), pre-test BMI (22.8 ± 3.03) and post-test BMI (22.9 ± 3.06), pre-test concentration (44.41 ± 10.76) and post-test concentration (44.74 ± 11.72). When the significance in flexibility and balance values of the students who did not do dancing exercises was examined, it was observed that there were decreases from (19.32 ± 10.19) (pre-test) to (9.07 ± 0.76) (post-test) in flexibility and from (4.12 ± 4.13) (pre-test) to (3.47 ± 3.36) (post-test) in balance ([Table 2](#)). In the study of [Gardner et al. \(2009\)](#) it was pointed out that dance encourages physical activity and contributes to wish to live healthily to a great extent. Results obtained with the sit-reach test in the stretching exercise showed an increase in flexibility values ([Nelson et al., 2005](#)). The results of present investigation demonstrated that international level dance sport dancers of different styles have relatively high aerobic capacity values compared to the other dance styles (ballet, modern dance, flamenco and folk dance) and the aerobic capacity values of the three dance styles are rather similar. No significant relationship was found in the current study between the international ranking and aerobic capacity values ([Liiv et al., 2014](#)). In a study of dance and imagery, it has been determined that imagination develops the technical skill ([Muir and Munroe-Chandler, 2017](#)). In dance courses, participants did turning, crawling, rolling, swinging, tumbling, stretching and jumping as exercises. In the study, it was seen that students who joined dance exercises demonstrated a higher level of concentration ([Spielmann, 2013](#)). It was remarked that dance, based on movements, increased individuals' quality

of life and physical activities produced positive effects upon learning skills (Demirel and Temel, 2016). Bastug *et al.* (2016) found that an apparent difference was found between body weight and BMI pre-test and post-test values of women who were applied mixed exercise program (Cross Fit, Pilates, Zumba). A decrease was observed in both body weight and average means of BMI of women. A significant difference was not found between body weight, BMI and body areas satisfaction pre-test and post-test values of women in control group. It was concluded that Cross Fit, Pilates, Zumba exercises affected body weight, BMI, and content with body areas positively. Dancing has potentially positive benefits on well-being in several aspects. In particular, beneficial effects were found related to the emotional dimension, as well as physical, social and spiritual dimensions. Also, the positive benefits were also linked to self-esteem and coping strategies (Murciaa *et al.*, 2010). Babayigit *et al.* (2014) indicate that weight loss program with a step dance and aerobic dance are as useful tools as the other sports which enable to decrease body fat percentage, in improving weight for university students. The Zumba fitness program was designed to improve the cardiovascular risk factors of the Zumba fitness program for overweight non-exercise women in the study of health benefits (Domene *et al.*, 2016).

6. Recommendations for future Research

It is expected that the results of these studies will contribute to the work done in the field of dance. Dance instructors and students are recommended to perform flexibility, balance, concentration studies. It is also suggested to examine the attention and mental endurance characteristics of dance exercises.

7. Conclusions

In conclusion, the body composition, flexibility, balance and concentration characteristics of dance exercise were examined. An apparent difference was found between pre-test and post-test values among students who did dancing exercises (the experimental group) in terms of body weight, BMI, flexibility, balance, and concentration. Body weight and BMI pre-test-post-test average values were similar to each other among the students who did dancing exercises, and their flexibility, balance, and concentration pre-test-post-test average values improved positively. As for the students who did not dancing exercises (the control group), no significant difference was found between pre-test and post-test values regarding body weight, BMI and concentration values but their flexibility and balance values differed significantly. When the apparent difference of flexibility and balance values among students who did not do dancing exercises was investigated, it was remarkable that there was a decrease between pre-test and post-test average values. Balance and flexibility values of the students who did not do dancing exercises reduced; which indicated that balance and flexibility negatively changed. As proved by the scientific findings in the current article, there was a direct and important difference between dancing exercises and body composition, flexibility, balance, concentration. We can suggest that dance makes positive contributions to people's physical, motoric and psychological growth.

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