

Original Article

The effect of a traditional dance training program on dancing skills, rhythm and orientation abilities and on intrinsic motivation of individuals with hearing loss

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Published online: September 30, 2013

(Accepted for publication September 20, 2013)

DOI:10.7752/jpes.2013.03070;

Abstract:

The aim of this study was to examine whether exercise training with Greek traditional dances improves rhythm and orientation abilities and dancing skills in individuals with hearing loss and increase intrinsic motivation for participation. Eight individuals (5 female and 3 male) with hearing loss > 70dB, aged 22.4±1.9 years volunteered to participate in an 8-month study. The exercise training program consisted of two sessions of Greek traditional dancing weekly. Each session lasted 60 minutes. At the entry and the end of the study, all participants' underwent simple exercise tests to estimate the rhythm and orientation abilities and dancing skills with the implementation of special activities designed to evaluate these abilities. The Intrinsic Motivation Inventory (IMI) was also used to assess participants' subjective experience. Rhythm was evaluated in three pattern rhythms with increasing difficulty; while the assessment of the performance in dancing skills was done in 5 levels (1-5). A descriptive analysis of the results showed that the participants improved: a. their dancing skills as two individuals reached level 3-4, three individuals reached level 4-5, and lastly 3 individuals level 5, b. their rhythm ability, as four individuals (50%) performed all the rhythmic skills and the rest four (50%) performed the easiest two rhythmic patterns. Also, IMI total score was increased by 30% ($p<0.05$) after the 8 months training. The results indicated that exercise training with Greek traditional dances in individuals with hearing loss is feasible and able to improve their rhythm ability and dancing skills and increase intrinsic motivation for participation.

Key words: deafness, motor skills, intervention, physical activity

Introduction

Hearing loss is the third common chronic condition that brings major serious health implications and stressor for the individual and the family (Quittner, Cruz, Snell, Grimley & Botteri, 2010; Rajendran, Roy & Jeevanantham, 2012). According to studies, about 440 million children worldwide have hearing loss above 85 decibels, and unfortunately this increases to about 800 million when the threshold is reduced to 50 decibels (Newton, Macharia, Mugwe, Ototo & Kan, 2001; Smith, Hatcher, Mackenzie, Thompson, Bal, Macharia, Mugwe, Okoth-Olende, Oburra & Wanjohi, 1996). Sensory systems play an important role in the control of locomotion (Surakka & Kivela, 2008). These systems include the proprioceptive, vestibular, visual and auditory systems (Patla, 1996; Shumway-Cook & Woollacott, 2001; Surakka et al., 2008). Hence, a hearing impairment can significantly affect an individual's physical and psychological health (Longmuir, 1998; Rine, Cornwall, Gan, LoCascio, O' Hara, Robinson & Rice, 2000). Many studies have revealed that individuals with hearing impairment and sensory deficit exhibit motor deficits in many areas (Crowe & Horak, 1988; Dummer, Haubenstricker & Stewart, 1996; Rine, Lindblad, Donovan, Vergara, Gostin & Mattson, 1996). Depending on the cause of hearing impairment, some individuals may experience dizziness, balance problems and disorientation (Longmuir, 1998). The control of orientation and navigation in space is a crucial function in humans and animals and is based on the fusion of visual, vestibular, and somato- sensorial inputs. Furthermore, a difficulty in understanding and feeling time and, as a result, rhythm is a common finding in individuals with hearing loss. Moreover, it has been found that individuals with deafness characterized with reduced ability of rhythm as far as rhythm perception is concerned compared to hearing individuals (Darrow, 1984; Ford, 1990; Klajman, Koldeg & Kowalska, 1982; Korduba, 1975).

Studies have suggested that the ability of rhythm is developed through the participation in physical activities and especially in dancing (Huff, 1972; Liemohn, 1983). Usually, individuals with hearing loss use their body, as dancers do, to communicate. In addition, it has been found that dancing exercise training improves the ability of rhythm and orientation of individuals with deafness (Hottendorf, 1989). Moreover, it has been

suggested that exercise with traditional dances improved physical fitness in adults with hearing loss (Tsimaras, Kyriazis, Christoulas, Fotiadou, Kokaridas & Angelopoulou, 2010).

It has been shown low levels of physical activity in individuals with hearing loss and as a result delayed motor skill development (Liemohn, 1983). The effectiveness of exercise programs depends on the motivation and adherence of participants. The lack of motivation possibly is the main reason for the low levels of physical activity of individuals with hearing loss. Moreover, it may be difficult to initiate and maintain the habit of regular exercise in healthy adults and more difficult in individuals with deafness.

To stimulate individuals with deafness to participate in exercise training programs enjoyable and pleasant forms of exercise training should be found. Dance is a form of exercise that has physiological and psychological benefits and can be performed without using any equipment (Judge, 2003). Dancing combines movement, social interaction and fun and may constitute a motive for individuals to participate in exercise training programs. Moreover, exercise training with dance can enhance balance, strength, flexibility and improve cardiovascular functioning, since utilizes interval training but it considered as an aerobic form of exercise (Belardinelli, Lacalaprice, Ventrella, Volpe & Faccenda, 2008). There are many forms of dancing such as social, modern, jazz, ballet and traditional. In this study Greek traditional dances were selected because they are pleasant and popular among Greeks as they have been part of their lives since childhood. There is a plethora of Greek traditional dances, which are constituted by different rhythm patterns. Also, it has been proposed that exercise with dance could be a motive for individuals in order to participate in an exercise training program.

Based on an alternative philosophy, which identifies deafness not as a disability but as a unique culture with its own language and beliefs (Martin & Ellerman, 2001), we hypothesized that if adults with hearing loss attend exercise training program with traditional dancing and improve their rhythm and orientation abilities and dancing skills, they will dance like hearing people (Bernari, 1995). Furthermore, dancing is a pleasant form of exercise; hence it may constitute a motive for participation. However, long-term studies have not been published yet to prove the contribution of traditional dancing in the improvement of the above skills in individuals with hearing loss. Hence, the aim of this study was the evaluation of the impact of exercise with traditional dancing to individuals with hearing loss on the abilities of rhythm, orientation and on their dancing skills and to examine if exercise training with dance could increase intrinsic motivation and participation.

Method

Experimental approach to the problem

At the beginning of the program all the participants underwent an assessment of rhythm and orientation abilities with the implementation of special activities designed to evaluate these abilities. The rhythm was evaluated in three basic rhythms with increasing difficulty. The assessment of the performance in dancing skills was done in 5 levels (1-5). After 8 months the evaluation was repeated with the same parameters. The classes lasted 8 months, with a frequency of two hours teaching per week (a total of 64 credit hours). Each class lasted 60 minutes and took place in the same room, in a gym with a wooden floor and mirrors on the walls. Teaching consisted not only of communication through signs, but also of the use of visual, tactile stimuli.

Participants

Eight individuals volunteered to participate in the study (5 female and 3 male) with hearing loss $>70\text{dB}$, aged 22.4 ± 1.9 years. All participants were informed about the purpose and the procedures of the study and gave written informed consent, according to the Ethical Committee of the Aristotle University of Thessaloniki. All the participants belonged to the same socioeconomic class (medium) and the same educational level (High School graduates). They referred that they did not have previous knowledge of traditional dancing. Also, they were asked to refrain from any other form of recreational activity during the study period and required to fulfill the 80% attendance during the training program.

Orientation and rhythm activities

The following orientation and rhythm activities were used (Roumpis, 1990):

a. Orientation activities: Throughout the duration of the orientation activities the instructor of traditional dancing was first in the circle and gave the participants the signal to start or stop. The participants walked towards the suggested direction until they understood it.

1. Direction of the dancers facing in the direction of the circle (direction to the right side). Participants were placed in a semicircle facing the direction of the circle.

2. Walking with their back in the direction of the circle. Participants were placed in a semicircle and walked their heads opposite the direction of the circle.

3. Direction facing the centre of the circle and walking towards the centre until the circle is closed completely and the shoulders of the subjects were joined. Continuing, participants walked backwards until the circle was open again.

4. Firstly, participants were placed in a semicircle facing the outer part of the circle; they walked until the circle was open and return with their back facing the centre of the circle until their shoulders were joined again.

b. Rhythm activities: The activities that developed rhythm constituted of:

1. Activity for the meter 2/4

1st step: right foot, 2nd step: left foot. The 1st was stronger than the 2nd and that is why a strong step was done in the 1st and a weak in the 2nd. The participants performed two rounds walking this way.

2. Activity for the meter 3/4

The exercise was completed in two threes, that means the participants counted twice 1, 2, 3. The 1st step was strong again here while the 2nd and the 3rd were weak. The first third was as follows: 1 with the right foot, 2 with the left foot, 3 again with the right. From the position that ended the first third the second started with the left foot as follows: 1 left foot, 2 right foot, 3 left foot. The first was always pointed with a strong step. The threes were performed continuously and towards the direction of the circle. The participants walked two circles this way.

3. Activity for the meter 4/4

The meter 4/4 constituted of four parts: 1st part twice strong, 2nd part weak, 3rd part strong, 4th part weak. The exercise was performed towards the direction of the circle. The participants stepped starting with the right foot (Belardinelli, et al., 2008). In the 1st more emphasis was given, less in the 3rd while in the 2nd and 4th no emphasis was given. The participants performed two circles this way.

It should be mentioned that at the beginning of the study, in order for the participants to start or stop each exercise, the instructor gave them visual stimuli. More specifically, the dance instructor was first in the circle, raised his right hand in the air so that everyone could see it, and when he put it down they started dancing. Later on, the instructor raised his hand again and counted the dancing step with his fingers. This action helped the participants get used to counting the steps alone during the preparatory exercises, in order to enable them later not to lose their steps during the dance classes. The instructor brought down his hand again to make them stop.

Intrinsic Motivation Inventory (IMI)

The Greek version of IMI was used to assess intrinsic motivation (Goudas et al., 2001). IMI is a multidimensional self-report questionnaire, which is used to assess motivational structures for targeted activities such as sports school, medical procedures and laboratory tasks (McAuley, Duncan, & Tammen, 1989; Ryan, 1982). There are total of 4 scales and 20 items that evaluated subjective experiences of Enjoyment/Interest, Effort/Importance, Perceived Competence and Pressure/Tension. The IMI was used in the current study with appropriate modifications so as to be more suitable for the specific context of the study. A composite score provides intrinsic motivation. Each item was answered on a 5-point scale ranging from 1 = strongly disagree to 5 = strongly agree. A composite score for intrinsic motivation was obtained by adding all the items, with those of the Pressure/Tension subscale being reverse-coded.

Dancing exercise program

Each training hour lasted 60 minutes. An average of six teaching hours was needed for participants to master each dance. During eight months, thus the participants were taught ten dances.

Teaching begun with learning the dances that consisted of easy steps and continued with dances that contained more complex steps. When the teaching of each dance was completed, the next dance taught to the participants contained common elements with the previous one. In this way, learning and understanding the dance was easier for the participants (Roumpis, 1990).

The method of teaching dancing was adapted to the particularities of individuals with hearing loss. To achieve learning of dances a combination of three modes (stages) of dance teaching was used, suggested by Raftis (1992). These stages, according to the turn they were used, were:

1. *Synthetic*. The participants were placed on a line one next to another and the instructor before them, with his back to them so as for everyone to see him (Roumpis, 1990). In addition, the participants were placed in front of a mirror to check their moves better. The participants were split to smaller groups in order to learn the dance, according to its difficulty. The instructor took each group separately and taught them as follows: after showing the steps the dance contained, the instructor showed each step separately one by one. When the instructor had presented and explained in detail each step, the participants performed.

2. *Progressive*. Participants hold each other in a circle, with the instructor first, and start performing the steps of the dance progressively. At first, they performed the dance's steps, simply walking and gradually the instructor changed the rhythm until they reached the rhythm of the dance. When they had achieved the rhythm of the dance they performed 2-3 circles to understand it. In addition, the stimuli, which made participants, start or stop was differentiated. It was not only visual but also tactile. In detail, the instructor, instead of raising his hand up for the dance to start or stop, he squeezed the hand of the person next to him. This stimulus was transferred

from participant to participant and when it reached the last student the dance started or stopped. Moreover, the instructor also changed his place instead of being first he was third in the circle.

3. *Final Stage*. The instructor worked separately with each participant and together they performed the dance's steps. Thus, the instructor analytically taught movements that were hard for the participant to perform, so as to make their execution easier. As the instructor dealt with one participant, the rest performed the dance's steps.

The traditional dances in the order that were taught to the participant: 1) Pogonisios, 2) Kalamatianos, 3) Xesyrtsos, 4) Macedonia Xakousti, 5) Pylaia, 6) Zagorisios, 7) Sfarlis, 8) Lytos, 9) Baidouska and 10) Rhodes' Pidihtos.

Improvement in the ability to perform traditional dancing was evaluated in a rank order scale of 5 categories (1-5) (DeVelli, 2003):

1. No improvement, when the participant indicates negativity.
2. Minimum improvement, when the participant performs only part of the dance.
3. Moderate improvement, when the participant performs the dance with the instructor.
4. Good improvement, when the participant performs the dance alone, after the dance has been demonstrated by the instructor.
5. Very good improvement, when the participant performs the dance alone without help.

Data collection and analysis / Statistical analysis

Data were analyzed with Statistical Package for Social Sciences (SPSS, Chicago, Illinois U.S.A.), version 20.0 software for windows. A two-sample t-test was conducted after checking all assumptions. Data are expressed as mean $\pm$ SD, with the significance level at $p < 0.05$. Furthermore, Pearson's correlation coefficient was used.

Results

1. Participant 1

According to the performance of the participant (table 1), in the exercises of the preparatory stage, before the beginning of the exercise program with Greek traditional dances, the participant did not face an orientation problem since he successfully performed all orientation exercises. However, the participant's performance in rhythmic exercises showed that he faced a problem with rhythm, due to his failure in executing them. More specifically: a) He found difficulty starting in time, b) During the performance of the movement he was unable to keep the rhythm, c) After completing the movement he continued the exercise when he had to stop. The ability of rhythm was improved up to 66% after completing the exercise program of traditional dancing, since, in the end of the study, he achieved in performing two out of three rhythm exercises (table 2).

Table 1. Pre-training results of orientation and rhythm activities

Orientation Activities	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7	Participant 8
1	+	+	+	+	+	+	+	+
2	+	+	+	+	+	+	+	+
3	+	+	+	+	+	+	+	+
4	+	+	+	+	+	+	+	+
Rhythm Activities								
1	-	+	+	+	-	-	+	-
2	-	-	+	+	-	-	-	-
3	-	-	-	-	-	-	-	-

Table 2. Post-training results of orientation and rhythm activities and the percentage (%) of improvement

Orientation Activities	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7	Participant 8
1	+	+	+	+	+	+	+	+
2	+	+	+	+	+	+	+	+
3	+	+	+	+	+	+	+	+
4	+	+	+	+	+	+	+	+
Rhythm Activities								
1	+	+	+	+	+	+	+	+
2	+	+	+	+	+	+	+	+
3	-	+	+	+	-	-	+	-
Improvement	66%	66%	33%	33%	66%	66%	66%	66%

Moreover, according to the rank order scale (1-5) the participant showed improvement from 3 to 5 in the placement scale (table 4 and table 5). Specifically: a) Moderate improvement in four dances (Zagorisios, Sfarlis, Baidouska, Rhodes' Pidihtos), that is he could perform them with the instructor, b) Good improvement, which means that the student could perform the steps of four dances alone, after demonstration from the professor (Pogonisios, Kalamatianos, Xesyrtos, Lytos), c) Very good improvement in two dances (Macedonia Xakousti, Pylaia), which he performed without help.

Table 4. Each number in the table represents the number of participants who presented the corresponding improvement.

Traditional dances	1 = No improvement	2 = Minimum improvement	3 = Moderate improvement	4 = Good improvement	5 = Very good improvement
1. Pogonisios				5	3
2. Kalamatianos			1	4	3
3. Xesyrtos				4	4
4. Macedonia Xakousti				1	7
5. Pylaia				1	7
6. Zagorisios		2		3	3
7. Sfarlis		2		3	3
8. Litos				3	5
9. Baidouska		2		3	3
10. Rhodes' Pidihtos		2		3	3

Table 5. Improvement according to placement scale of each participant in each dance after the 8 months of exercise training.

Traditional dances	1	2	3	4	5	6	7	8
1. Pogonisios	4			4		4	4	4
2. Kalamatianos	4			3		4	4	4
3. Xesyrtos	4			4		4	5	4
4. Macedonia Xakousti	5			4		5	5	5
5. Pylaia	5			4		5	5	5
6. Zagorisios	3			3		4	4	4
7. Sfarlis	3			3		4	4	4
8. Litos	4			4		5	5	4
9. Baidouska	3			3		4	4	4
10. Rhodes' Pidihtos	3			3		4	4	4
	3.8	5	5	3.5	5	4.3	4.4	4.2

2. Participant 2

Since the preparatory stage the participant showed she had no problem with orientation, because she succeeded in executing all orientation exercises. As far as rhythm was concerned, she fell short because she managed to execute only one out of three exercises of the preparatory stage (table 1). Improvement of the rhythm was achieved up to 66% with the completion of the research, because the student managed to execute all rhythm exercises. (table 2).

In the scale of grading execution of dances the participant succeeded in a very good execution of all ten dances of the program (5 in rank order scale) (table 4 and table 5), which means that she executed the steps of the dances alone without help.

3. Participant 3

The participant did not face an orientation problem. However, in the rhythm exercises she failed in one out of three (table 1). Her rhythm improved up to 33% with traditional dancing classes, since in the end of the exercise program she executes all exercises (table 2). In traditional dancing her improvement was very good (5 in rank order scale) (table 4 and table 5), which means that the participant executed all ten dances alone without help.

4. Participant 4

As far as orientation is concerned, before the beginning of the program of traditional dancing, the participant achieved the execution of all exercises; however her failure in all rhythm exercises was obvious

(table 1). With the completion of the study she improved the sense of rhythm 66% (table 2) executing two out of three rhythm exercises of the preparatory stage.

As far as her performance in executing the dances is concerned, the participant showed a good improvement in five dances (Pogonisios, Xesyrtos, Macedonia Xakousti, Pylaia, Lytos), and moderate improvement in five dances (Kalamatianos, Zagorisios, Sfarlis, Baidouska, Rhodes' Pidihtos) (from 3-4 in rank order scale) (table 4 and table 5).

5. Participant 5

Her performance in the exercises of the preparatory stage led to the conclusion that the participant did not face an orientation problem, executing all exercises. In addition, she did not execute exercise 3 of the rhythm exercises (table 1), whereas, with the completion of the exercise program the girl could execute all exercises (improvement 33%) (table 2). According to the placement scale of assessment the participant achieved a very good improvement of all ten dances (5 in rank order scale) (table 4 and table 5).

6. Participant 6

The participant executed correctly all orientation exercises, but did not execute any rhythm exercises (table 1). With the completion of the exercise program, she achieved in executing two out of three rhythm exercises (improvement 66%), while she also improved the execution of dances (4-5 in rank order scale). Specifically, she achieved a good improvement of seven dances (Pogonisios, Kalamatianos, Xesyrtos, Zagorisios, Sfarlis, Baidouska, Rhodes' Pidihtos), and a very good improvement of three dances (Macedonia Xakousti, Pylaia, Lytos) (table 4 and table 5).

7. Participant 7

The participant did not face any orientation problems. He executed all exercises, without being able to perform two out of three rhythm exercises, though (table 1), the dancing exercise program had a positive impact on his sense of rhythm (improvement 66%). In the end of the study, it appeared that he was able to perform all rhythm exercises (table 2).

As far as execution of dances is concerned, he achieved a good improvement in six dances (Pogonisios, Kalamatianos, Zagorisios, Sfarlis, Baidouska, Rhodes' Pidihtos), and a very good improvement in four dances (Xesyrtos, Macedonia Xakousti, Pylaia, Lytos) (4-5 in rank order scale) (table 4 and table 5).

8. Participant 8

The participant did not face orientation problems, in rhythm, though; he did not execute any exercises (table 1). Exercise with Greek traditional dances contributed in improving the participant's sense of rhythm (table 2), since he achieved in performing two out of three exercises (improvement 66%). In dance execution he showed a good improvement in eight dances (Pogonisios, Kalamatianos, Xesyrtos, Zagorisios, Sfarlis, Lytos, Rhodes' Pidihtos), and a very good improvement in two dances (Macedonia Xakousti, Pylaia) (4-5 in rank order scale) (table 4 and table 5).

Cronbach alpha showed good interval consistency for the IMI total score ($\alpha=0.856$) and subscales of interest/enjoyment ($\alpha=0.823$), effort/importance ($\alpha=0.737$), perceived competence ($\alpha=0.789$) and pressure/intension ($\alpha=0.843$). Means and standard deviations of intrinsic motivation variables are presented in table 3. Participants scored relatively high on the IMI total score, interest/enjoyment, effort/importance and perceived competence scales of IMI. At the end of the study, there were differences in all variables. Specifically, the subscale of enjoyment/interest was increased by 33.3% ($p<0.05$) at the end of the study and the effort/importance subscale by 36.6% ($p<0.05$). Also, the perceived competence subscale was significant increased by 42.8% ($p<0.05$) at the end of the study. Finally, the total score of IMI was increased by 30% ($p<0.05$), after the 8 months exercise with traditional dancing. Furthermore, the participants attended the 97% of the offered exercise sessions.

Table 3. Results of the intrinsic motivation inventory evaluation.

Variable	Baseline Mean $\pm$ SD	Follow up Mean $\pm$ SD	$p<0.05$
Interest/Enjoyment	3.0 $\pm$ 0.1	4.0 $\pm$ 0.2	$p<0.01^a$
Effort/Importance	3.0 $\pm$ 0.2	4.1 $\pm$ 0.1	$P<0.01^a$
Perceived Competence	2.8 $\pm$ 0.1	4.0 $\pm$ 0.1	$P<0.01^a$
Pressure/Intension	2.9 $\pm$ 0.1	2.9 $\pm$ 0.2	$P=0.34$
Total Score	3.0 $\pm$ 0.1	3.9 $\pm$ 0.1	$P<0.01^a$

^a $p<0.05$ Baseline versus Follow up scores

Following the 8 months dance program the improvement of in interest/enjoyment subscale was significantly correlated with the number of sessions attended ($r=0.602$, $p<0.05$).

Discussion

The findings of the present study demonstrated that a traditional dancing exercise program has favorable effects on rhythm abilities and dancing skills of individuals with hearing loss, indicating that traditional dances can be used as an alternative mode of exercise training in individuals with hearing impairments. Furthermore, exercise training with Greek traditional dances increased intrinsic motivation for participation in the dancing lessons.

In this study, the improvement of the participants in executing dances after the completion of the study was obvious. As we can see in tables 4 and 5, in the dances Pogonisos, Xesyrtos, Macedonia Xakousti and Pylaia all participants showed from good to very good improvement (4-5 in rank order scale). Specifically, they were able to execute each dance separately alone with or without the instructor's help. Moreover, in the dances Kalamatianos, Zagorisios, Sfarlis, Lytos, Baidouska and Rhodes' Pidihtos they showed from moderate to very good improvement (3-5 in rank order scale). These favorable results may be attributed to exercise training with Greek traditional dances, which contributed in improvements in motor skills of the participants.

It has been suggested that exercise intervention could be incorporated to address motor skills in hearing impaired individuals. Specifically, researchers (Lewis, Higham & Cherry, 1985) showed that the participation of hearing impaired children in a balance and body awareness program resulted in improved motor balance skills. Furthermore, Rine et al., (2004) found that children with hearing loss following an exercise program improved motor development and postural control. Also, an exercise training program in children with hearing loss significantly improved the length of time that the participants could stand on one leg (Effgen, 1981). However, there is limited number of studies to date that examines the effects of Greek traditional dances in individuals with hearing loss. Only one study evaluated the effect of a 12 week traditional dancing exercise training program on aerobic capacity and muscle strength of adults with deafness (Tsimaras et al., 2010). The authors concluded that traditional dancing is an effective method to improve aerobic capacity and muscle strength of adults with deafness. However, in patients with chronic diseases, it has been found that exercise with traditional dances improved functional capacity and psychological condition (Kaltsatou, Mameletzi, & Douka, 2011).

We cannot make conclusions as far as the impact of traditional dancing on the ability of orientation of the participants of the sample, given the fact that no one of the sample faced orientation problems before the beginning of the program. A possible explanation is that the ability of orientation develops up to the age of 9-11 (Serbezis & Goulmaris, 2001), but it would be useful to conduct similar studies in younger ages.

Before the beginning of dance classes (table 1), the performance of the participants of the sample in rhythm and orientation exercises showed that they faced rhythm problems in one or more of the exercises. More specifically, they had difficulty beginning or stopping in time and during execution of the movement they were unable to keep the rhythm. It has been postulated that the concurrent damage to the vestibular structures is the primary cause of motor skills deficits in hearing-impaired individuals (Rajendran et al., 2012; Rine et al., 1996). In addition, the participants of the sample were inexperienced in traditional dancing before the beginning of the program.

According to the findings of the study the improvement of participants in executing traditional dancing was accompanied by a parallel improvement in the ability of their rhythm. More specifically, after the end of the exercise program with traditional dances, four individuals of the sample executed all rhythm exercises of the preparatory stage, and the rest four individuals executed two out of three exercises (table 2). Overall, the improvement ranged from 33-66%. The results of this study show the positive impact of traditional dancing on cultivating rhythm of the specific sample of individuals with deafness.

The beneficial effect of traditional dancing in rhythm abilities of individuals with hearing loss, have not been examined in other studies. Rhythm constitutes characteristic of all movements that have splicing (Gallahue, 2002). In music, it has an identical meaning with time arrangement. The contribution of rhythm in movement is very important. All moves are considered successful, only when their structure is characterized by the correct rhythm. Moreover, the kinetic rhythm is an essential factor of motor coordination. Additionally, through motor coordination is achieved quality improvement and integration of the visual and auditory perception, of the sense of balance and kinesthetic perception and speech (Martin et al., 2001). The ability to be rhythmically accurate and to maintain a steady rhythm in movement execution can be considered as one of the basic abilities. Rhythm ability is considered an important factor in the development, execution and learning of motor skills (Thomas & Moon, 1976).

The results of this study revealed that individuals with hearing loss found exercise training with traditional dancing as an enjoyable, interesting and important for them activity. Also, the results demonstrated the importance of individuals' perceived competence for their intention to dance. The adherence to the protocol, which was calculated as the percentage of training sessions attended, was high which suggests that exercise training with traditional dancing increased intrinsic motivation. Furthermore, the fact that the interest/enjoyment

subscale was significantly correlated with the number of sessions attended, demonstrate that dancing enhance intrinsic motivation.

Conclusions

The results of this study showed that exercise training with traditional dancing in individuals with hearing loss is suggested as a feasible and effective exercise training program, leading in improving the ability of rhythm and dancing skills and increasing intrinsic motivation, urging people with hearing loss to become more sociable.

Practical applications

A long-term exercise training program with Greek traditional dances in individuals with hearing loss is feasible and should be used as an alternative form of exercise. Moreover, Greek traditional dancing is effective in improving dancing skills, rhythm abilities and enhances intrinsic motivation in individuals with hearing loss.

Acknowledgments

We are grateful to the group of young individuals with hearing loss for their participation in this study. Furthermore, we want to express our gratitude to the instructor for her cooperation and unfailing support during this research. We would also like to thank the entire laboratory staff for their hard work for the completion of this study. The authors disclose no conflicts of interest.

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