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Could sport specialization influence fitness and health of adults with mental retardation?

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ABSTRACT

Although several studies showed the positive effects of exercise and physical activity on health and well-being for individuals with ID, there is a lack of information about the influence of sport specialization on fitness and health components. Therefore, the aims of this study were to assess: (a) physical fitness of athletes with intellectual disability (ID) compared with individuals included in recreational and leisure activity programs (non-athletic people); (b) contribution of sport specialization on athletes' fitness; and c) correlation of each fitness variable with subjects' ID levels. Twenty-two track and field, 19 basketball, and 23 non-athletic adults were recruited. Before and after a 9-month period, all participants performed fitness tests assessing body composition, flexibility (SR), arm muscular strength (HG), lower and upper-body muscular strength and endurance (SUP and PUP), explosive leg power (SLJ), cardiovascular endurance (ST), balance ability (FT), motor coordination (TUGT). The results showed that participants' weight, BMI and FT were significantly affected by time; SLJ by activity; ST, HG, PUP, SUP, and TUGT by both time and activity. Only track and field athletes increased significantly ST. All athletes improved significantly HG, PUP and SUP, instead non-athletic people decreased significantly SUP ($p < 0.01$). TUGT improved significantly in track and field athletes ($p < 0.05$), and decreased significantly in non-athletic people. ID level was positively correlated to TUGT. Findings of this study showed that physical activity improved fitness in adult athletes with ID, decreasing health risks. Athletes with lower ID obtained higher performance scores in motor coordination test.

1. Introduction

Many studies reported that individuals with intellectual disability (ID) demonstrated poor levels on standard fitness tests, in particular on measures of cardiovascular endurance, body composition, muscular endurance and strength, and motor coordination (Carmeli, Bar-Yossef, Ariav, Levy, & Liebermann, 2008; Chanias, Reid, & Hoover, 1998; Frey, Stanish, & Temple, 2008; Graham & Reid, 2000; Van de Vliet et al., 2006). The low levels on fitness tests could be attributed to: (a) sedentary life and fewer opportunities for participation in structured physical activity programs; (b) physical characteristics such as short stature; (c) lack of coordination and efficiency; (d) infrequent opportunities to practice test items; and (e) lack of motivation during testing and tendency to stop when uncomfortable (Graham & Reid, 2000). Therefore, improved fitness should promote an active lifestyle, decrease health risks, and increase work capacity, which may further decrease the need for

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premature institutionalization (Chanias et al., 1998; Frey et al., 2008). Determinants that define health-related physical fitness are body composition, cardiovascular endurance, flexibility, muscular endurance, and muscular strength (Chanias et al., 1998). There is a general perception that the prevalence of overweight status/obesity is greater among people with ID than those without disability. Inactivity and inappropriate eating habits may be the major causes of the high obesity rates of individuals with ID (Podgosrki, Kessler, Cacia, Peterson, & Henderson, 2004). Therefore, people with ID generally demonstrate improved health-related physical fitness parameters when exposed to structured exercise regimes (Chanias et al., 1998).

Many facets such as working, maintaining a household, cooking, self-caring, and recreation require the individual to possess a certain degree of physical stamina. People with ID need an adequate amount of fitness to contribute to work-related tasks and enjoy and to benefit from participation in recreational and leisure activities (Graham & Reid, 2000). Unfortunately, several barriers, as segregated environments, have been noted to inhibit successful promotion of skill development and programming (Whorton et al., 1994).

Therefore, sport can help people with ID to increase their self-esteem and it can be fundamental for socialization and cooperation with other people who lives the same disease (Guidetti, Franciosi, Emerenziani, Gallotta, & Baldari, 2009). Team sports, such as basketball, can be a popular way for individuals with ID to get involved in physical activity. Basketball is a common activity for people with ID, because it incorporates both motor skills (e.g. running, jumping, shooting) and social aspects (Baldari et al., 2009). The practice of adapted basketball training might improve the social relationships, because problems of interpersonal interaction are common in adults with ID (Guidetti et al., 2009). This is in close relationship with the nature of the basketball performance in which person–environment interaction, high decision-making processes, and comprehension of game situations are very important (Wang, Chen, LiIDoongreungrat, & Change, 2005). Moreover, sport through a standard training and competition could be useful for testing personal limits and pursuing athletic dreams and goals (Van de Vliet et al., 2006). Track and field, for example, has become one of the most popular individual sports for people with ID, both for recreational reasons and for motor skills and fitness development.

Although several studies showed the positive effects of exercise and physical activity on health and well-being for individuals with ID (Frey et al., 2008; Van de Vliet et al., 2006), there is a paucity of information about the influence of sport specialization on fitness and health components. Therefore, the aims of this study were to assess: (a) the physical fitness profile of athletes with ID in comparison to individuals with ID included in recreational and leisure activity programs (non-athletic people); (b) the contribution of sport specialization on athletes' fitness; and (c) the correlation of each fitness variable with subjects' ID levels.

2. Methods

2.1. Participants

Sixty-four subjects with ID aged 18–45 years volunteered to participate in this study. The sample was composed by 22 track and field athletes, 19 basketball players, and 23 non-athletic people.

The track and field athletes' height, weight and BMI were 164.7 ± 9.8 cm, 74.9 ± 14.9 kg, 27.6 ± 4.9 kg/m^2, respectively. The basketball players' height, weight and BMI were 164.9 ± 8.2 cm, 78.9 ± 12.9 kg, 29.1 ± 5.1 kg/m^2, respectively. The non-athletic people's height, weight and BMI were 160.9 ± 7.6 cm, 68.5 ± 13.6 kg, 26.9 ± 6.0 kg/m^2, respectively.

All subjects lived at home or in group settings, and none was institutionalized. They were classified as having mild (38%), moderate (22%), severe (38%) and profound (3%) ID. The eligibility criteria included: (a) a diagnosis of MR; (b) age range 18–45 years; and (c) an athletic eligibility. The study was approved by the Institutional Review Board for Human Subjects of University of Rome "Foro Italico", and written informed consent was obtained from all participants and from their parents or their legal guardians (if indicated) after a detailed description of the procedures was provided.

2.2. Experimental protocols

The experimental protocol was conducted in three different periods. In the first period, all subjects passed a compulsory medical-psychiatric examination conducted by a mental health staff to assess athletes' ID level and a physical examination performed by a specialist in sports medicine for athletic eligibility. Moreover, all subjects were assessed before (Pre) the specific intervention period through fitness and coordinative tests.

In the second period, track and field athletes participated in a 9 months specific training program of 3 h per week. The training was composed in two phases, as follows: (I) all athletes performed exercises to improve muscular strength, aerobic power, speed, flexibility, and coordinative skills; and (II) each athlete performed a specific training according to the selected competitions they would participate to. Basketball players participated in a 9 months specific training program of 3 h per week. Basketball training was divided in four phases and it could be altered following the coaches' aim during the training session. Each phase required a different type of weight training and conditioning program for players to follow and it was designed to prepare players for the rigours of training and game play (Baldari et al., 2009). Non-athletic people participated in 9 months recreational and leisure activity program.

In the third period, all subjects were assessed after (Post) the specific intervention period through fitness and coordinative tests.