Effects of Exercise on the Adaptive Behaviors of Young Adults with Intellectual Disabilities

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Adaptive behavior is the collection of conceptual, practical, and social domains and 10 skill areas that have been learned and are executed in everyday life. Individuals with an intellectual disability exhibit impaired adaptive behavior. Exercise has been shown to increase the physical and cognitive functioning of individuals with an intellectual disability but it has not been analyzed with respect to adaptive behavior. The purpose of this study is to determine if adaptive behavior can be improved in individuals with intellectual disabilities through the implementation of an exercise intervention program. 27 students with intellectual disabilities, aged 18-22, participated in a one-hour exercise intervention for 12 sessions. The students’ teachers completed the Adaptive Behavior Assessment System Third Edition forms before and after the exercise intervention. Observations revealed that exercise did not influence a composite measure of adaptive behavior (p>0.05). However, subscales of the global measure were influenced by the exercise intervention, with increases in health and safety, social, and work skill areas and the social domain after the exercise intervention (p<0.05 uncorrected). Yet, after the correction for multiple comparisons, no significant differences were found between pre- and post-scores (p> 0.05 FDR corrected). These findings suggest that specific components of adaptive behavior of individuals with intellectual disabilities may be effected by an exercise intervention program, but a greater number of sessions over a longer period of time may be necessary to drive significant improvements in adaptive behavior.

INTRODUCTION

The population of individuals being diagnosed with an intellectual disability (ID) is rising. The percent of children with a disability has increased by 15.6% from 2001 to 2002 and 2010 to 2011. IDs are the most common type of developmental disabilities (Houtrow, Larson, Olson, Newacheck, & Halfon, 2014). Individuals with an ID are at a higher risk for the detrimental effects of a sedentary lifestyle than those that are typically developed individuals (TDI). The detrimental effects that are being accumulated by individuals with an ID include a higher rate of obesity, lower cardiorespiratory fitness, and lower muscular endurance. The effects of a sedentary lifestyle amalgamate to result in individuals with IDs being twice as likely to have chronic diseases and live half as long as TDIs (Barwick et al., 2012). Individuals with an ID also exhibit impaired adaptive behavior (AB). Aerobic and resistance exercise have been shown to improve the physical and cognitive health of individuals with IDs, but they have not been analyzed with respect to AB (Barwick et al., 2012; Pastula, Stopka, Delisle, & Hass, 2012).

The domains and skill areas of AB are learned and executed in everyday life (Schalock et al., 2010; Tasse et al., 2012). AB is evaluated based on an individual’s typical, present functioning and is than compared to the individual’s same-aged peers’ norm in the general population. AB varies across individuals and the severity of their disability. TDI display higher AB skills than those with an ID. Understanding AB and its constructions permits clinicians and practitioners in the field to identify IDs, and create goals for education, habilitation, and dimension of human functioning (Tasse et al., 2012). The goal of the current study was to determine whether exercise effects the AB of individuals with an ID. We hypothesized that an exercise intervention (EI) program would improve adaptive behaviors in young adults with an ID.

METHODS

Experimental Approach to the Problem

Adaptive behavior (AB) is the collection of conceptual, practical, and social domains and the 10 skill areas of community use, school living, health and safety, self-care, communication, functional academics, self-direction, leisure, social, and work (Harrison & Oakland, 2015). Each domain can be operationally defined. The practical domain is defined as personal care. Personal care includes activities of daily living such as health, safety, commerce, occupation, and transportation. The conceptual domain is defined by reading, writing, time, and numbers skills. The social domain is defined by the interpersonal skills, social responsibility, self-esteem, social awareness, and social
problem solving (Schalock et al, 2010). The domains operational definition is derived from the categorization of specific skill areas, as shown in Figure 1.

Over 6 weeks, there were a total of 12 one-hour sessions in the EI program. Participants were evaluated by their teachers with the Adaptive Behavior Assessment System Third Edition (ABAS-3) Teacher Form. ABAS-3 is designed for participants ages 5-21 (Harrison & Oakland, 2015). Teachers completed the forms before and after the EI program. Paired sample t-tests were used to evaluate differences between the scores on the forms.

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<thead>
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<th>General Adaptive Composite (GAC)</th>
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<tr>
<td><strong>Practical</strong></td>
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<td>• Community Use</td>
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<td>• School Living</td>
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<td><strong>Social</strong></td>
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<td>• Leisure</td>
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<td>• Social Skills</td>
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Figure 1. Adaptive Behavior: Note: the adaptive skill area of work is not included in the domains or GAC as not everyone evaluated is employed.

**Subjects**

Individuals from a school serving children with IDs in North Central Florida volunteered to participate in the study. Individuals attained approval to participate from their legal guardians, teachers, and physicians. A written informed consent to participate was signed by guardians in accordance with the university’s institutional review board. The total number of participants was 27. There were 6 females and 21 males. Participants’ ages ranged 18-22 years; the average was 19.83 years. All participants had mild to moderate ID and were considered employed.

**Procedures**

Individuals with IDs participated in the University of Florida’s Inclusive Fitness and Unified Sports (IFUS) program. IFUS is a community-based participatory research program that aims to increase the quality of life of participants with IDs. Peer aged volunteers worked with the participants as exercise buddies and participated in fitness and sport activities. Peer aged committee members instructed the participants and their exercise buddies.

Exercise buddies and committee members had two joint trainings, lasting one hour each, prior to interacting with participants. Training included sections on sports, fitness, goal setting, communication, situational circumstances, professionalism, coaching and program dynamics. Committee members received one additional training, lasting one hour, on sport and fitness instruction.

Participants were placed into a pod with four workout buddies. Committee members led the pods for either the sport or fitness section. Participants and their pods were divided into two teams: Orange Team and Blue Team. The program was divided into two sections each day. Each section lasted twenty-five minutes. As shown in Figure 2, in the first section of the program on Tuesdays, the Orange Team did fitness with their fitness committee member while the Blue Team did sports with their sports committee member. Teams would switch between sports and fitness for the second section. On Thursdays, the Orange Team did sports for the first section while the Blue Team did fitness for their first section. This was to ensure that participants were not pre-exhausted before each fitness or sport section.

Sport and fitness section activities were modified to fit the individuals’ ability level. Sport sections included football, baseball, kickball, soccer, Frisbee, basketball, volleyball, and relay races. Sports would either be a skill focused drill or a game. As shown in Figure 3, fitness sections included cardio, upper body resistance training, lower body resistance training, core resistance training, and balance-coordination exercises. Fitness resistance training was done using Black Mountain Resistance Bands. Level of resistance was adjusted to ability level. If the individual could do 12 repetitions with minimal exertion, resistance was added for the next set.

**Statistical Analysis**

Paired sample t-tests were used to evaluate differences between pre and post standardized scores of the general adaptive composite (GAC), the pre and post standardized scores of conceptual, practical, and social domains, and the pre and post raw scores of the 10 skill areas of community use, school living, health and safety, self-care, communication, functional academics, self-direction, leisure, social, and work (Figure 1). As shown in Figure 4, positive
increases were found between the pre and post scores of health and safety, social, and work skill areas and the social domain. The p-values were less than 0.05.

A correction for multiple comparisons was run to check the p-value found between the pre and post scores of health and safety, social, and work skill areas and the social domain. The correction revealed no significant differences between the pre and post scores. The false discovery rate (FDR) p-values were greater than 0.05.

RESULTS

Our observations revealed that exercise did not influence a composite measure of AB (p>0.05). However, subscales of the global measure were positively influenced by the EI, with increases in health and safety, social, and work skill areas and the social domain after the EI (p<0.05 uncorrected) (Figure 4). Individuals with IDs experienced improvements in some AB subscales but even with small improvements, scores are considered impaired when compared to that of a TDI (Harrison & Oakland, 2015). Furthermore, after the correction for multiple comparisons, no significant differences were found between pre and post scores (p> 0.05 FDR corrected). These findings suggest that specific components of AB of individuals with IDs may be effected by an EI program, but a greater number of sessions over a longer period of time may be necessary to drive significant improvements in AB.

Figure 4. A display of the results before FDR correction.

DISCUSSION

Young adults with an ID may experience increases in health and safety, social, and work skill areas and the social domain of AB after an EI program (Figure 4). Adults with an ID who exhibited higher levels of AB typically work and live more independently. They do not require as much community support as those with low AB. Acquisition and retention of AB skills promotes community integration as well as vocational and residential independence for individuals with disabilities.

Programs that foster AB are critical in achieving the goal of increased independence. AB skill deficits in individuals with an ID become more prevalent with an increase in age (Ditterline, Banner, Oakland, & Becton, 2008). Investing in an instructional curriculum that promotes independence for individuals with IDs is likely to be cost effective in that it will decrease dependence on assisted living providers as individuals age (S. Woolf, G. M. Woolf, & Oakland, 2010). Instructional curriculums are most effective when providers individualize the program to meet each person’s most functional and needed AB skill sets (Woolf, 2006). This requires a shift from AB as a whole to specific AB skills needed for an individual’s personal environment (Woolf et al., 2010). A longitudinal study with a larger sample size may better predict the effectiveness of an EI program on AB skill areas and domains.

ACKNOWLEDGMENTS

The authors thank Connie Lee, Patti Markock, Patti Markoeh, Abijah Bertrand, and Winston Church, Sidney Lanier Center, Alachua County, for their assistance in the completion of the ABAS-3 Forms; and IFUS, University of Florida, for facilitating the intervention program.

REFERENCES


