

The Feasibility of University Adapted Physical Activity and Nutrition Education for Young Adults with Intellectual Disabilities

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ABSTRACT

Purpose: A high prevalence of chronic conditions is well documented in individuals with intellectual disabilities (ID). The purpose of this study was to explore the feasibility of a university adapted physical activity (APA) program with nutrition-focused health education for college students with ID. **Methods:** Nine students with ID and three activity partners participated in a 50-min session of the APA and another 50-min session of nutrition education each week for 12 weeks. Measures of behavioral outcomes were tested before and after the program. Evaluation notes were gained after the program. **Learning Outcomes:** Students reported more positive attitudes and beliefs about exercise after the program due to learning new sports skills, training, and making new friends. It is also important, however, to note the limitations imposed by the COVID-19 pandemic on opportunities for physical activity and food preparation. Thus, more perceived barriers and no changes in exercise self-efficacy were noted. **Conclusion:** This study provides a sample protocol and curriculum within a university setting, particularly since preliminary outcomes showed positive attitudes and beliefs as reported by the participants. This study also provides possible steps that educators can take to plan and implement their own programs for adults with ID.

Keywords: Adapted Physical Education, Physical Literacy, Health Literacy, Attitude

1. INTRODUCTION

Intellectual disability (ID), the most common genetic disorder, is characterized by significant limitations both in intellectual functioning (e.g., learning, problem-solving, judgment) and adaptive behavior (e.g., activities of daily living) (American Psychiatric Association, 2013). There are approximately 6.5 million people who have some form of ID in the United States (National Institute of Child and Human Development, 2017). A high prevalence of chronic diseases (e.g., diabetes, metabolic syndrome) has been reported in adults with ID (De Winter et al., 2012; Tyger et al., 2020). Further, people with ID are more likely to face health disparities compared to their aged-matched typical peers (Graham, 2005) since people with ID are less likely to perform recommended amounts of physical activity and practice healthy eating (i.e., consume less fat, sugar, and salt and more fruits and vegetables) (Bode et al., 2012; Dario et al., 2016). Alonso-Sardana et al. (2019) reported many barriers that prevented those with ID from becoming physically and health literate. One major obstacle was that people with ID tend to be less knowledgeable and receive less social support. As such, there is a need to develop a feasible healthy lifestyle intervention program for people with ID, particularly since they have more difficulties than general populations in accessing physical activities and health education knowledge (Bergström et al., 2014).

Emerging adulthood, between the ages of 18 and 25, has been proposed as a new life stage between adolescence and young adulthood. During this period, the educational and training opportunities beyond secondary schools become important avenues for young people to explore different possibilities, to be receptive to advices, and to adopt enduring lifestyle choices (e.g., physical activity) for a successful transition to their next life stage. Today, a growing number of adults with ID have opportunities to pursue education in institutions of higher education (ThinkCollege, n.d.). Since past literate indicated a health-enhancing education program that could improve health behaviors as well as health knowledge among people with ID (Bazzano et al., 2009; Ewing et al., 2004), promoting physical and health literacy in college students with ID, therefore, is warranted. To the best of our knowledge, studies on emerging adulthood in ID are scarce, suggesting that physical and health literacy among college students with ID is also a relatively new area of research.

To address the gap in the literature, a 1-credit hour course titled "Adapted Physical Activity" was developed. This study aimed to explore the feasibility of a 12-week university APA program and nutrition-focused health education for young adults with ID enrolled in a post-secondary transition program. Physical activity skills, health information, and nutrition knowledge were

integrated into the weekly activities. Activity partners and social media were provided as additional support. Further, to evaluate the feasibility of this type of curriculum design, the attitudes, and beliefs associated with exercise and nutrition of young adults with ID were also recorded. It was first assumed that students would exhibit more positive attitudes and beliefs and lower levels of barriers to exercising and eating fruits and vegetables after the program. Second, it was predicted that students with ID would increase their self-efficacy to exercise after the program. Lastly, students' perceptions of this course were explored.

2. METHODS

2.1 Participants

Participants in this study were nine students with ID (7 males and 2 females) who registered in the APA program during the Spring semester of 2021. The mean age of participants with ID was 21.33 with a standard deviation of 4.44 years. All participants with ID had been medically diagnosed with a mild to moderate level of intellectual disability and enrolled in a university post-secondary transition program in the southeastern part of the United States. Table 1 displays the demographic information of the students with ID. These students also had basic living and self-advocacy skills to live independently on campus and participated in college-level courses. Hence, students with ID were considered to have the capabilities to comprehend the instructions and express their feeling and concerns during the activities. In addition, three typically developing college students (3 females) participated in the APA program as activity partners. The mean age of participants without ID was 21.27 with a standard deviation of 0.29 years. Exclusion criteria to participate in the study included any documented contraindications to exercise. All participants with and without ID had no additional physical disabilities, such as limited mobility, sensory loss, or speech impediments that may exacerbate their physical and learning performance. Before the program, parental permission forms and informed consent forms from students with ID were collected. The study protocol was approved by the Human Subjects Institutional Review Board of the University.

Table 1

Participants	Sex	Age	Diagnose	Degree of ID	Physical Mobility
Donavan	Male	19	DS	Moderate	No walking aid
David	Male	12	ID + VI	Moderate	No walking aid
Johnathan	Male	21	ID + OHI	Mild	No walking aid
Andre	Female	21	ID + Trisomy X syndrome	Mild	No walking aid
Timothy	Male	24	ID + Autism	Mild	No walking aid
Charlie	Female	21	10q deletion syndrome	Mild	No walking aid
Bill	Male	28	ID	Mild	No walking aid
Teddy	Male	25	ID	Mild	No walking aid
Scott	Male	21	ID + Autism + ADHD	Moderate	No walking aid

*Note. ID= Intellectual Disability; DS = Down syndrome; OHI = Other Health Impairment; VI = Visual impairment.

2.2. Study Intervention

To support this program for it to positively improve physical and health literacy, the course materials and questionnaires were adopted from Health Matters, which is specifically the exercise and nutrition health education curriculum for people with intellectual and developmental disabilities (Marks et al., 2010).

The APA program included 24 sessions, 50 min each, held twice a week. As indicated in Table 2, each week the classroom lessons focused on a range of physical activity and health concepts, as well as nutrition knowledge. During one of the weeks of this adapted activity course, the activity targeted gross motor skills was introduced to promote cardiorespiratory and muscular functions. This portion of the program was led by a certified course leader

who had experience with people with ID. Further, customized nutrition-focused health activities tailored to the needs of people with ID were implemented on the other days of the week. Students with ID were also requested to finish weekly assignments, such as performing stretching exercises in their dorms or calculating their targeted heart rate for exercise intensity determination. Each assignment was finished by grouping students with ID and activity partners for a brief discussion. In total, the attendance rate of the class was about 87%. The most common reason for not participating was sickness and quarantine. At the end of the program, students with ID received \$10 in cash as a motivational reward.

Table 2

Component	Time Commitment	Topics	Resources Required
Physical Activity	12-week program consisting of the following: <ul style="list-style-type: none"> One face-to-face physical activity 50 min session per week Plus one Canvas or GroupMe prompts for health/Physical activity/Nutrition assignment. GroupMe Prompts were made either directly to the participant or to their smart phones. 	<ul style="list-style-type: none"> Physical activity: Soccer, floor hockey, yoga, walking/jogging My goal for PE Let’s do some stretching Do you exercise enough Physical activity guidelines Am I meeting my goal How am I doing 	<ul style="list-style-type: none"> Agility ladder Cones Soccer balls Plastic hockey sticks, pucks and balls Yoga matt Computer Internet
Nutrition		<ul style="list-style-type: none"> MyPlate I MyPlate II Six basic nutrients affect your body Eating in the restaurant 	

In addition to in-person class meetings, regular virtual contact was encouraged by using GroupMe, a free group messaging app. Students with ID could post to the class GroupMe to chat their questions or the specific content they had learned. The instructor and activity partners would review the posts to assist students who appeared to face challenges during the classes. In sum, our instructional approach leveraged a balance of physical activity, health education instruction, social support (i.e., activity partners), and prompts or reminders directly to students’ smartphones.

2.3 Data Collection

To evaluate the feasibility of this APA program, data were collected through two sources: (i) *Behavioral outcomes* from questionnaires, which included attitudes and beliefs about exercise (12 items, score range 12-36); barriers to exercise (17 items, score range 17 to 51); exercise self-efficacy (5 items, score range 5 to 15); attitudes and beliefs about eating fruits and vegetables (10 items, score range 10 to 30); and barriers to eating fruits and vegetables (12 items, score range 12 to 36). Questionnaires were conducted before and after the program, and each item was scored on a 3-point (1 to 3) Likert scale. (ii) *Evaluation notes* from course evaluation, in which students with ID were asked about their opinions about the program. Each item was scored on a 5-point (1 to 5) Likert scale. At the end of the evaluation, they were also asked what they liked most about the course, what they found to be most difficult, and what they wanted to do more in classes. Data were collected between January 2021 and April 2021.

2.4. Data Analysis

This study was a pre-post design. The behavioral outcomes were first analyzed via the paired student's t-test, which was used for comparing each self-reported behavioral outcome (i.e., attitudes and beliefs toward exercise, perceived barriers to exercise, exercise self-efficacy, attitudes, and beliefs about eating vegetables and fruits, and perceived barriers to eating vegetables and fruits) before and after the program. The significance level was set at $p \leq .05$. As for the evaluation notes, the mean score was calculated for each item compared to the "official" average rating of 3.0 on the 1 to 5 scale.

3. LEARNING OUTCOMES

Table 3 reveals changes in each behavioral outcome as a result of the university APA program as an educational module for young adults with ID. Partially supporting the first hypothesis, an approaching significant level was noted in the difference between the scores in the attitudes and beliefs about exercise before ($M = 29.44$, $SD = 2.92$) and after ($M = 31.56$, $SD = 1.67$) the APA program; $t(16) = -1.884$, $p = .078$. Participants also responded with an average mean score of 4.8, above the average rating of 3.0, to the item that asked whether the instructor made the class interesting. From the collected data, it can be assumed that students with ID expressed increased positive attitudes and beliefs about exercise. As shown in Table 4, students with ID responded with an average mean score of 4.7, above the average

rating of 3.0, to the item that I learned a great deal in this class and commented that what they liked most in the APA program was learning new sports skills and making new friends. Some even commented they enjoyed playing sports with others. Physical exercises can significantly affect social interactions (Di Bartolomeo & Papa, 2019). Social functions are built through practicing an activity with partners and classmates. These factors might explain why participants developed more positive attitudes and beliefs.

Table 3

Measures	Pretest	Posttest	t	<i>p</i>
Attitudes and beliefs toward exercise	29.44±2.92	31.56±1.67	-1.884	.078
Barriers to exercise	23.22±3.23	26.89±4.76	-.1913	0.74
Exercise self-efficacy	13.78±1.72	12.22±2.11	1.717	.105
Attitudes and beliefs toward eating fruits and vegetables	26.89±3.30	27.56±3.75	-.401	.694
Barriers to eating fruits and vegetables	13.67±2.96	15.33±2.92	-1.204	.246

*Note. $p \leq .05$

Contrary to a previous study (Jo et al., 2019) and the second hypothesis, self-efficacy related to physical activity participation did not significantly improve after the program. It was possible that some types of physical activity or exercises, such as soccer and yoga, may have been new to students with ID. Three students with ID specifically commented in their evaluation notes that they felt soccer or yoga activities were difficult. In addition, one participant particularly noted that too many running activities had been added to the class. The course leader incorporated different types of running-specific strength training exercises throughout the semester to help students with ID build up their strength, agility, and explosiveness. However, this may have been challenging for those who may have had minor physical limitations. This result demonstrated that participants' knowledge and skills in new or unfamiliar exercises were not as strong as they believed. In the future, more practice feedback and physical demonstrations can be added to the information provided to the students, which may further support the development of self-efficacy beliefs (Tschannen-Moran & McMaster, 2009).

Table 4

Course Evaluation	Scores
The instructor made the class interesting	4.8/5
The instructor was accessible outside of class time to respond to my questions or concerns	4.4/5
I learned a great deal in this class	4.7/5
The presentation of course content (lectures, web materials, and/or discussions, etc.) helped me learn in this class	4.4/5
The activity partner provided assistance when needed	4.5/5

Open Comments:

What you like the most this semester?
The teacher made it fun and we were really active
The exercises and getting handout with friends
I like that we do different activities after time
The things we learned this semester is exercising helps me be more active
What you think the most difficult this semester?
Doing the homework assignment
I think being coordinated when playing soccer
Running

Surprisingly, participants reported an increase in barriers to exercise from before ($M = 23.22$, $SD = 3.23$) to after ($M = 26.89$, $SD = 4.76$) the APA program; however, this increase was not statistically significant, $t(16) = -1.913$, $p = .074$. Students with ID also reported more barriers to eat fruits and vegetables after the program. This may have been due to the fact that this program was held during the COVID-19 pandemic. The outbreak of the COVID-19 virus also may have resulted in less opportunities for physical activity and grocery shopping for students with ID. For example, all facilities in the university recreation center were no longer open access and needed to be reserved for use. Moreover, the university replaced many face-to-face teaching classes with online formats. It was not easy for students with ID to adjust to a sudden transition to an online format. Therefore, students with ID felt more barriers to participating in physical activities and eating fruits and vegetables. Thus, this could have also led to lower levels of self-efficacy in participants' health-related behaviors. Furthermore, the activity leader and partners might not have been able to provide sufficient encouragement

and support for students with ID to engage in an active lifestyle and healthy diet while they stayed in the dorms during quarantine.

Although the findings demonstrated some beneficial effects of the APA program and nutrition education, the small sample size of this study is a limitation. Additionally, a comparison group of typically developing college students should be included as a way to understand group differences during the period of the APA course in order to generalize the study's findings to a large population. Finally, future programs should include objective measurements of nutrition behavior and physical activity performed in order to further learn about the program's outcomes in addition to changes in participant attitudes and beliefs.

4. CONCLUSIONS

This study presented the feasibility of using the APA program and nutrition education for young adults with ID. Providing physical activity and nutrition education not only for positive knowledge and belief development but also for developing increased social skills can be a very effective option for providing a therapeutic opportunity. Future efforts may consider providing activities that meet students' interests and that could increase their confidence in physical and health literacy. Further, additional social support may be included to help those students who are not able to attend the classes overcome the barriers and adopt healthy lifestyles.

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5.1 Disclosure of Funding Sources

There is no funding resource.

5.2 Conflict of Interest

The authors declare no conflicts of interest.

5.3 Contribution of Authors

CCC: study design, class leader, data analysis, manuscript preparation and editing.

AAW: activity partner, data collection

KAC: activity partner, data collection

HH: activity partner, data collection

LS: study design, Yoga activity instructor

PHK: study design, manuscript preparation and editing

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