A Focus on Healthy Living Between Natural Supports and College Students with Intellectual

Meredith Morrison
Ryan Rockey
Derek R. Becker
Kelly R. Kelley
Western Carolina University

Abstract

College students with and without intellectual disability (ID) are challenged with maintaining healthy lifestyles since it may be their first time living away from home. Natural supports (or peer mentors) can work together to promote healthier options on college campuses. This article shares how one college program promoted healthier lifestyles across three areas (i.e., nutritional understanding, dietary intake, physical activity). Dietary intake and physical activity were monitored across a 6-month period. Preliminary findings indicated 9 of 10 students with ID increased nutritional knowledge, 10 of 10 increased servings of fruits and vegetables consumed, and 6 of 10 increased cardiovascular endurance.

Keywords: college students; exercise; healthy lifestyle; intellectual disability; MyPlate

Plain Language Summary

- It is hard to eat right in college and live healthy. Peer mentors or natural supports can help make healthier choices.
- **What we did in this study**: This article shares how a college program worked together to learn more about how to exercise, what to eat, and how to eat to feel better.
- **Conclusion:** Over a 6-month period of working together on healthy living, college students with intellectual disability and college students that were helping with healthy living improved their eating and exercise habits.

Since the Higher Education Opportunity Act was reauthorized in 2008 to provide federal funding to Transition Programs for Students with Intellectual Disabilities (TPSIDs), there are now 340 inclusive postsecondary education programs (IPSEs) across the United States (Think College, 2024). This provides many opportunities for everyone to learn together. Along with many Americans, college students with intellectual disability (ID) also have increased health risks such as diabetes, hypertension, high cholesterol, and obesity (Eden & Randle-Phillips, 2017; Havercamp & Scott, 2015; Martin et al., 2021; Pett et al., 2013; Ptomey et al., 2020; Rimmer et al., 2010; Salomon et al., 2023; Wilhite et al., 2012; Yamaki, 2005). This may be due to factors such as a lack of awareness

regarding healthy food choices and/or lack of participation in the same levels of exercise, due to potential environmental, social, attitudinal, and psychological barriers (Mahy et al., 2010; Phillips & Holland, 2011), in comparison to the general population. Some college students with ID also have lower activity levels, which places them at higher risk for more serious health conditions (Koritsas & Iacono, 2016).

There are several reasons for poor eating habits, including inadequate intake of vegetables (Eden & Randle-Phillips, 2017). With minimal guidance or knowledge of healthy lifestyles, individuals with ID often choose foods high in fat and sugars on a daily basis without recognizing or balancing food groups from the food pyramid (sometimes referenced as MyPlate). Regarding beverages, sugary soft drinks available all over college campuses are often more tempting than drinking water (Jobling & Cuskelly, 2006). Along with these chronic health and poor eating habits, individuals with ID often report being frustrated or annoyed with being told what to eat when given suggestions for a healthier dieting condition (Martin et al., 2021). Evidence demonstrates that college students with ID do not regularly engage in health promoting activities (Roberts et al., 2018). In relation to exercise, individuals with ID have indicated a lack of opportunities to participate in group exercises compared with their peers without disabilities. Several individuals with ID have also reported limited options for being physically active or expressed a preference for inactivity (Frey et al., 2005). This is similar to the lack of awareness with healthy weight management across much of the general college student population (Lowry et al., 2000). A recent systematic review centered around behavioral changes for adults with ID suggests that when included in health programming, participants with ID reported not feeling like they do not have the same opportunities for exercise activities as young adults without disabilities (Scott & Havercamp, 2016). Furthermore, for individuals with limited reading skills, inaccessible health training materials and difficulty gaining health literacy can impede healthier lifestyle choices (Scott & Havercamp, 2016).

Despite the various barriers, encouraging college students with and without ID to take more control of their own health can lead to more cost-effective and improved health maintenance over time (Wilhite et al., 2012). However, there are little to no existing interventions focused on healthy lifestyles for college students with ID. Most interventions, such as exercise or healthy cooking instruction, have been conducted in homes with caregivers, special education schools, and/or in nonprofit agency settings. This can hinder self-determination when individuals with ID become more independent and are making their own decisions, and when limited food or activity erode their empowerment to make healthy choices (Maïano et al., 2014). There is a need for promotion of healthier lifestyles among college students living and learning together that can be influential in promoting greater accountability, self-determination, and overall more long-term lifestyle changes for individuals with ID (Pett et al., 2013).

The Centers for Disease Control (2020) suggests that inclusion, self-determination, and the promotion or accountability of healthy lifestyles are central factors that help address the barriers and chronic health needs for individuals with ID (Migliorini et al., 2019; O'Leary et al., 2017). To date, only one study conducted in Scandinavia by Roll (2017) has directly asked college students with ID about their health education or exercise

preferences, which can influence overall motivation. While a few studies or interventions have focused on teaching about healthy living more explicitly, many have left out the autonomy and self-determination that may be required for individuals with ID to feel more empowered in their daily choices. What is evident across all the studies is that there needs to be greater emphasis placed on improving healthy behaviors of college students with and without disabilities (Rimmer et al., 2010). To avoid so many of the well-known chronic health conditions noted above, it is evident that greater emphasis needs to be placed on teaching healthy habits at a younger age.

One way to help with developing healthier habits could be involving "natural supports" (also called peer supports or mentors) to help with accountability and modeling healthy habits and lifestyles (Boland et al. 2008; Roberts et al., 2018; Stanish & Temple, 2012; Tucker et al., 2022; Wilhite et al., 2012). The concept of "natural supports" was developed in the 1980s and helped to integrate individuals with ID into community work environments with less reliance on professional rehabilitation workers (Nisbet & Hagner, 1988). Peer supports, peer mentors, or natural supports (who could be paid or unpaid depending on their roles) are terms used interchangeably, but simply refer to individual(s) that are typically present in a shared environment participating or providing support as needed or requested. A natural support can be a peer mentor, academic or educational coach, and/or job coach as well (Kelley & Westling, 2019). In the present context, we refer to natural supports as a college student without a disability who offers direction and assistance as needed or when requested by the college student with ID.

Peers that serve as natural supports to college students with ID can influence behavior change, particularly within IPSE. As IPSE programs continue to evolve, with 128 of the 340 programs offering housing options, college students with and without ID are living together for the first time away from their families. Peers can play a pivotal role in helping teach important skills beyond academics, employment, social interactions, and healthy lifestyles. Peer-mediated interventions can help build relationships and promote important life skills as they learn together (Kelley & Westling, 2019; McAllister et al., 2018; Roberts et al., 2018; Stanish & Temple, 2012; Tucker et al., 2022; Wilhite et al., 2012). Peer-mediated support is linked to outcomes that have impacted life skills where peers have modeled behavior themselves (Boland et al. 2008) while nurturing personal development, self-awareness, confidence, and self-determination within IPSEs and beyond.

Natural supports (peers) can use a variety of strategies to teach healthy lifestyles and accountability. One of these strategies is photo journaling (Nabors et al., 2023; Ptomey et al., 2015). This strategy has also been paired with assistive technologies to teach functional skills (Mechling, 2004; Morash-MacNeil et al., 2018; Randall et al., 2021), and to give explicit instruction regarding healthy food choices and physical exercise (Cardell, 2015; Jobling & Cuskelly, 2006; Koritsas & Iacono, 2016). Each of these strategies was used in combination with natural supports to help college students with ID with healthy living. Individuals who are changing certain behaviors or working towards healthier lifestyles can see progress when journaling or documenting daily behavioral change and/or recording specific information such as food intake (Nabors et al., 2023; Ptomey et al., 2015). When progress is visually seen and recorded daily, individuals are

more motivated to continue making progress over longer periods of time. This is no different for students with ID. However, the use of visuals and assistive technology needs to be explicitly taught for more effective recording and accountability for everyone. Taking photos of meals to upload and/or the use of exercise recording devices for activities, such as accelerometers, can promote healthier lifestyles and behavior changes over time (Morash-MacNeil et al., 2018; Ptomey et al., 2017; Randall et al., 2021).

Another strategy is the use of multisensory and explicit instruction that gives additional hands-on and interactive instruction (Cardell, 2015; Koritsas & Iacono, 2016). This instruction allows multiple and guided practice opportunities to teach more complex personal development skills and daily habits that result in healthier lifestyles (Boland et al., 2008). A few studies have been conducted with young adults with ID, but many have been conducted outside of a college setting using multi-week explicit instruction interventions to teach physical exercise and/or healthy lifestyles to individuals with intellectual and developmental disabilities (Martin et al., 2021; Ptomey et al., 2017; Tucker et al., 2022; Wilhite, 2012). Explicit instruction about health-related lifestyles in younger years link to future long-term independent living success (Jobling & Cuskelly, 2006). Martin et al (2021) is a more recent intervention study that used an eight-week topical module including multi-sensory approaches (e.g., roleplaying, videos, reflections, discussions, visuals from YouTube, kinesthetics, workbooks, or guided notes) to teach lifestyle choices and caring for one's body to help understand causal decisions. Tucker and colleagues have also conducted two studies within an IPSE on a college campus on healthy lifestyles (Tucker et al., 2020, 2022). All studies noted improvements with healthy lifestyles related to exercise, strength training, and/or healthy food choices using these strategies.

However, it is important to note that Roberts and colleagues (2018) found a significant opportunity for additional research related specifically to healthy lifestyles within IPSEs. Given that most studies focused on promoting healthy lifestyles with young adults with ID are not conducted on college campuses, the purpose of this study is to provide findings based on content adapted from a traditional university health course with embedded explicit, multisensory strategies taught by natural supports to college students with ID within a residential IPSE. Results include 6-month outcomes for the following research questions. The first two research questions will assess if post-intervention, participants have a better understanding of nutrition and show higher consumption of nutritious foods (e.g., fruits and vegetables). The third research question will assess if post-intervention, the average caloric intake for participants is lower. Research question four will assess if cardiovascular endurance improves over the 6-month intervention period.

Method

Setting

All health education sessions and meals took place at various locations on a rural, public, accredited university campus in the southeastern United States. The campus is situated on approximately 600 acres and houses more than 12,000 students. Out of this

enrollment, more than 400 students (3.3%) had reported and requested accommodations through the Office of Accessibility Resources. The campus included 13 residence halls, 14 classroom buildings, seven performing arts buildings, 12 recreational buildings and fields, three dining and food courts, and 10 administrative support buildings.

Most of the instructional content sessions were delivered within a quiet and less distracting location, such as classrooms or common rooms within the residence halls. Dining facilities at this university included two self-serve buffets with multiple food stations that require a one-time entry payment for an "all you can eat" meal option, one food truck that moves to different campus locations each day of the week, nine fast food or meal entree/combination options, five coffee shops, three Provisions on Demand (P.O.D.) markets, and one sit-down commercial chain restaurant, all included in the university's unlimited meal plan options.

The IPSE program is a two-year inclusive residential program that facilitates successful transitions and person-centered planning from secondary school to adult life with education, employment, and independent living. The IPSE also focuses on five areas, including: personal development, vocational preparation, social participation and learning, community participation, and academic access. All students live on campus and are supported by 200 natural supports and 2.5 full-time equivalent office staff and faculty. The program was funded as a previous TPSID, but is now sustained and supported by the university.

Participants

Participants included 10 young adults with ID between the ages of 18 and 25 attending an IPSE designed for individuals who had completed a high school certificate of attendance, or a career-focused diploma track. All participants had full access and participation in all college opportunities at the university, including the dining and residence hall kitchen facilities. Participants were required to live on campus, attend college activities, audit courses with their peers, complete paid and unpaid job internships, and work on goals towards their certificate of accomplishment. Once IRB approval was obtained by the university, participants were informed and recruited with the help of the program coordinator. Participants met the following inclusion criteria: (a) they were between the ages of 18 and 25, (b) they provided student consent if age 18 or older and declared their own guardian or parental consent and student assent if they were not their own guardian, (c) they had a documented intellectual and/or developmental disability based on a psychological or medical assessment within the last five years, and (d) they had willingness and interest to learn more about healthy lifestyles (see Table 2).

Table 1

Participant Demographics (n = 10)

Participants	Age	Race	Diagnosis	FSIQ	Adaptive Range
Amy	23	White	ID, ADHD	59	Low
Christine	21	White	ID, Down syndrome, ADHD	52	Moderately Low
Sammy	23	White	ID, ADHD, psychological disorder	64	Low
Kayla	22	White	ID, Multiple disabilities	57	Extremely Low
Elaine	19	White	ID, Gene deletion, social anxiety disorder	61	Extremely Low
Stanley	21	White	ID, Down syndrome	53	Moderately Low
Eric	22	White	ID, Down syndrome	No Score	Moderately Low
Joseph	21	Pacific Islander	ID, ADHD	56	Low
Nathan	25	White	ID, Down syndrome	59	Low
Emmaline	20	White	ID, Cerebral Palsy, ADHD	59	Moderately Low

Note. FSIQ= Full Scale Intelligence Quotient; Adaptive Behavior ranges are based on Vineland Adaptive Behavior Scales with score averages reported within Below, Low, Average, and Above Average scores for each participant

Procedures

Overview of the Healthy Lifestyles Program

The focus on healthy lifestyles among the students with ID included the following: a weekly health education class, a meal together in the dining facilities and/or cooked together in the residence hall kitchens, and a physical activity chosen by the student with ID participants at the beginning of each week. The intervention included two weekly face-to-face sessions with natural supports that lasted 3.5 hours on Sundays and one 1-hour session on Wednesdays for a group exercise opportunity led by a peer employed through the Campus Recreation Center. Instruction of the health education content began in mid-November and ended early December during winter break. It began again in mid-January and was completed in April 2023. All content was delivered in person. The same natural supports led and taught the weekly health education class and were at all the group meals and physical activities. One lead natural support had taken several undergraduate health classes, served as a natural support for over two years, and was completing their senior year of undergraduate coursework in Communication Sciences and Disorders. The second lead natural support completed their bachelor's degree in communication sciences and disorders and was in their last year of their master's degree in special education/adapted curriculum while also working part-time with the IPSE. Other natural supports that joined at meals and exercise times were juniors and seniors across a variety of majors who had also taken the traditional university health courses and had been working with the IPSE for at least a year. Pre- and post-assessment results were collected by the first and second authors of this study through in-person observations at meal and exercise times. Fact- based assessments were collected online through Kahoot (Wang & Tahier, 2020) and Nearpod (Sanmugam et al., 2019). Both Kahoot and Nearpod were used to keep participants interested in completing pre- and post-assessments. All assessments were taken together in a group and read aloud to accommodate the academic needs of participants.

Establishing Goals. As part of the health education component, goals were established the first week of the intervention. Lead (natural) supports and participants worked together to help with healthy lifestyle choices when establishing goals. Goals were focused on healthy eating and exercise. Healthy eating goals were observable (e.g., healthy portions and use of MyPlate knowledge) to help the participants and natural supports monitor and reflect with each other after taking meal images. The curriculum taught in the Health and Wellness course included MyPlate, which was discussed each week in the weekly lessons (for a review, see Chrisman & Rios, 2019). As part of the health education and goal-setting, goals were established together to try to limit all meals to one plate (i.e., not going back for seconds), include 16 fluid ounces of water with each meal, and include a fruit or vegetable with each meal. As the health education content progressed each week, participants were encouraged to have half of their food sources come from whole foods, have a minimum of two 16 fluid ounce servings of water outside of meals, and include a variety of colorful foods during meals (e.g., 2 servings of fruits and vegetables with lunch and dinner). All participants' goals were individualized.

For physical activity accountability goals, participants were encouraged to practice resistance training (e.g., light weights, body weight exercises) 2 to 3 times a week, complete at least 30 minutes of intentional cardio (e.g., jogging, biking, jumping rope) 3 to 4 times a week, and include at least 30 minutes of mild to moderate cardio (e.g., walking, playing sports) daily. Each week, on average, participants worked out for a total of 4 hours. Each exercise goal was developed by the participant and logged in an exercise log. The participants' logs were self-regulated by the participants and accountability exercise partners (i.e., lead natural supports that met weekly).

Group Meals. Group meals occurred weekly and included both participants with ID (N = 10) and natural supports (N = 5). Group meals focused on implementing and generalizing the content learned during the health education class within the dining hall setting. Participants were reminded by natural supports before meals to utilize the knowledge from the week's health education component (e.g., a reminder to utilize MyPlate when selecting from the buffet). During both the fall and spring semester, group meals once a week consisted of eating in the campus dining hall for a total of 11 times and cooking healthy meals together in a campus residence hall kitchen four times. In both settings, natural supports modeled selecting a well-balanced meal, and they collected pictures of their meals together. Natural supports that led the healthy eating content recorded all foods selected by the participants and noted foods consumed and not consumed. After dinner, participants compared their meals or photographs sent to MyPlate, reflected on how the meal made them feel, and reflected on how to improve in future meals.

In addition to eating meals in the dining hall, participants practiced meal planning and preparation skills while cooking four meals together with the lead natural supports. The participants were prompted to use the MyPlate chart to help plan a well-balanced meal.

Encouragement via Cellular Devices. Given the nature of the IPSE, outside of once-a-week group meals, the 10 participants were eating other meals in various locations at different times throughout the week. The natural supports that taught the healthy living sessions each week encouraged the participants to send images of their meals via their cellular devices when they were not eating together for increased accountability. Sending images allowed them to further encourage healthy choices during mealtimes when they could not be present. The images of meals helped the lead natural supports monitor progress and challenges that the participants encountered.

Physical Activity. The physical activity component consisted of two parts, joining an on-campus group exercise class and a recreational exercise portion (e.g., exercise of their choice such as kickball or basketball) while doing exercise together. Both parts of the physical activity component lasted for one hour each and both occurred weekly on Sundays and Wednesdays during the goal to focus on healthy living in the fall and spring semesters.

Weekly Group Exercise Classes. The group exercise class occurred in the university's campus recreational facility. All 10 participants signed up for a resistance

training and cardiovascular exercise class that was 45 minutes. The 10 participants were accompanied by active natural supports to help with accountability, encouragement, and support. During each session, the participants were monitored by both IPSE natural supports and the exercise facilities staff member leading the group to make sure they were doing the exercises or using equipment correctly.

Recreational Exercise. The recreational exercise portion spanned the fall and spring semesters for 1-hour sessions as a part of the 3.5-hour weekly session. Each week, recreation activities included a wide variety of options (e.g., kickball, basketball, flag football, ultimate frisbee, walking/running). During this portion, participants had mild to moderate cardiovascular exercises. Participants also voted to decide on weekly activities and worked on team-building and activity-planning skills with the natural supports.

Measures

Data Collection

Health Education Content. The first area of growth (nutritional assessment) was assessed by giving the participants two pre- and post-assessments via Kahoot (Wang & Tahier, 2020) and Nearpod (Sanmugam et al., 2019), and averaging pre- and post-test scores, respectively. Twenty-one pre- and post-assessment questions were developed by the two lead natural supports and reflected knowledge of nutritional topics including macronutrients, exercise, daily dietary recommendations, reading nutrition labels, and stress management. The pre-assessment was given in mid-November, prior to the start of the health education sessions, and the post-assessment was given in mid-April after the participants completed the health education sessions.

The health education content was adapted from the university's Health and Wellness curriculum. Two lead natural supports led the health education component and had previously completed the university's Health and Wellness courses. The lead natural supports did not have previous experience teaching the Health and Wellness content but were supervised by faculty mentors. The curriculum was adapted to better suit the individualized learning needs by including improved readability with more interactive and engaging lessons, visuals, explicit instruction, guided notes, practice opportunities, and time extensions. Weekly lesson topics for the 15-weeks are included in Table 1. As can be seen in Table 1, lesson topics changed approximately every two weeks.

Table 2

Healthy Lifestyle Topics

Weekly Focus	Descriptions of Topics	Agenda for Each	Product Outcome
Pre-Assessment (first week) Post Assessment (last week)	Participants take assessment	Give assessment Discuss goals	N/A
Macronutrients (2 weeks)	Macro content included: carbs, proteins, fats	Pre-assessment Discuss topic Complete activity Post-assessment	Mapped out meals
Reading Nutrition Labels (2 weeks)	Reading and comparing nutrition labels	Pre-assessment Discuss topic Complete activity Post-assessment	Reading and Labeling Nutrition Labels
Exercising (2 weeks)	Resistance training, cardio, training myths, using the machines	Pre-assessment Discuss topic Complete activity Post-assessment	Individualized Workout Plans
Stress Management	Defined stress and how to reduce and manage it	Pre-assessment Discuss topic Complete activity Post-assessment	Mapping out strategies to use when stressed
MyPlate (2 weeks)	MyPlate five groups	Pre-assessment Discuss topic Complete activity Post-assessment	Comparing meals to MyPlate
Physiology (carbohydrates)	Physiology behind carbohydrates	Pre-assessment Discuss topic Complete activity Post-assessment	Mapping out meals that have carbs in them
Planning Meals	Discussed balanced meals in the dining hall following MyPlate	Pre-assessment Discuss topic Complete activity Post-assessment	Made photo options and notes of healthy choices in the dining hall
Review (2 weeks)	Review all topics and any areas that participants want to discuss in more detail	Review game Questions?	N/A

Calorie, Fruit, and Vegetable Data. As many of the participants faced challenges with regulating appropriate portion sizes, caloric content consumed during meals was recorded across a 6-month period. These findings are included in the second column of Table 3, with fruits and vegetables in the third column. Over the 6-month period, the health education natural supports recorded more than 350 meals from the participants. The participants' meals were recorded by natural supports on combined meal shifts and were also sent in by the participants via cellular devices periodically throughout the week. To ensure the greatest accuracy, only the meals consumed with participants and natural supports eating together each week were included (see Table 3).

Table 3

Participant Data (n = 10)

Participants	Nutritional Assessment	Calories per Meal	Fruits & Vegetables	Pacer Level
	Pre / Post	Pre /Mid/ Post	Pre /Mid/ Post	Pre / Post
	(accuracy percentage)	(calories per meal)	(servings per meal)	(pacer level)
Amy (F)	50 / 47	848 /703 / 660	0.42 / 0.55 / 1.22	2.0 / 1.6
Christine (S)	17 / 40	853 /848/ 759	0.22 / 1.17 / 1.77	N/A / 2.0
Sammy (F)	50 / 73	1,202 / 977/ 505	0.66 / 1.30 / 2.13	1.2 / N/A
Kayla (S)	33 / 60	514 /763/ 540	0.33 / 0.50 / 1.20	5.4 / 3.6
Elaine (F)	67 / 80	636 /725/ 635	0.20 / 0.88 / 1.33	2.5 / 2.8
Stanley (S)	40 / 73	923 /714/ 588	0.17 / 1.63 / 1.28	2.0 / 2.2
Eric (F)	40 / 67	1,201 /756/ 719	0.29 / 0.74 / 0.90	2.2 / 3.0
Joseph (S)	33 / 53	975 /683/ 575	0.09 / 0.63 / 1.17	4.6 / 6.2
Nathan (F)	50 / 60	1,194 /982/ 693	0.23 / 1.05 / 1.67	1.5 / 2.1
Emmaline (F)	50 / 80	577 /650/ 654	0.00 / 0.50 / 1.33	3.2 / 3.6

Note. Nutritional assessment accuracy percentage is out of 100%. (F) = first year student, (S) = second year student. Nutritional Assessment were average across all the Kahoot and Nearpod pre/post assessments per new topic with combined scores included each week. Meal data calculated at pre/mid/post with lead natural supports. Pacer calculated at pre/post and recorded by researchers.

Caloric intake was calculated by logging each student's meals, calculating calories with nutrition menus, and subtracting uneaten food. The findings reported were derived from the month of November, prior to the focus on healthy living, and the post findings reported were derived from the last three weeks of April, after completing the healthy living content with weekly meetings.

Aecrobic Fitness. Aerobic fitness was assessed once in both the fall and spring with the multistage 20-meter shuttle run test (20mSRT). The 20mSRT requires participants to run between cones set at a distance of 20 meters. The initial running speed at the first stage of the assessment is 8.0 km/h and increases to 0.5 km/h every minute. The assessment is stopped once the participant is unable to follow the pace or ceases running due to exhaustion. All participants were tested individually and accompanied by a natural support to monitor and keep the pace on the 20mSRT. The pacer test was administered as a tool to assess any changes in cardiovascular endurance. The data from the two pacer tests can be found in the last column of Table 3. Due to scheduling conflicts, two of the participants were unable to attend both pacer tests.

Results

Results are represented in Table 3 with participants' growth over four areas (i.e., understanding of nutrition, the average caloric intake during each meal, the average servings of fruits and vegetables consumed during each meal, aerobic fitness) over the 6-month period. The pre-assessments for nutritional understanding and cardiovascular endurance were given prior to the health education sessions and starting the campus group exercise class.

Nutritional Understanding

The first research question assessed if there were observable differences in nutritional understanding following the intervention. Overall group mean scores increased between time one (M = 43) and time two (M = 63.3). Individual scores on the Kahoot assessment can be found in Table 3. As can be seen in Table 3, nine of the 10 participants' scores on the assessments increased after the healthy living sessions. On average, participants' later scores were 20.3% higher than their initial scores. Out of 21 questions, the participants displayed growth on 18.

Consumption of Fruits and Vegetables

The second research question assessed if consumption of fruits and vegetables would increase at post intervention. Consistent with results for nutritional understanding, overall group mean scores increased between time one (M = .26) and time three (M = 1.4). Individual scores on the Kahoot assessment can be found in Table 3. As shown in Table 3, the participants increased their average servings of fruits and vegetables included in each meal. Prior to the focus on healthy living each week, the participants consumed an average of 0.75 servings of fruit and vegetables each day. After the health education content was delivered weekly, the participants were consuming an average of

4.5 servings of fruits and vegetables each day. All 10 participants increased the servings of fruits and vegetables consumed after the 6-month period.

Meal Data

Research question three assessed if post-intervention, caloric intake would decrease. As shown in Table 3, a majority of participants had a decrease in calories consumed daily. Prior to the focus on healthy living content in November, the participants consumed an average of 2,906 calories each day. After the weekly meetings ended in April, the participants consumed an average of 2,009 calories each day.

Aerobic Fitness

Research question four assessed if cardiovascular endurance improved over the 6-month intervention period. Overall mean scores for cardiovascular endurance increased between time 1 ($N = 9$, $M = 2.73$) and 2 ($N = 8$, $M = 3.11$). Individual scores on the pacer can be found in Table 3. Taken together, the above results provide descriptive support that the intervention helped promote regular healthy practices and accountability in participants (e.g., more appropriately-sized meals, higher consumption of fruits and vegetables, higher cardiovascular endurance).

Discussion

The purpose of this initial focus on healthy living was to provide college students living on a college campus with a potential resource they could use that included explicit multisensory instruction, visuals, and more ways to implement healthy lifestyles that compared nutritional knowledge, caloric intake, fruits and vegetables, and cardiovascular endurance at different points in time.

As discussed by Scott and Havercamp (2016) in their systematic review of health promotion programs focused on behavioral changes for people with ID, more research needs to be conducted to determine the most effective reinforcement strategies to help future interventions balance their individuals' right to choose and their right to a healthy lifestyle. Social support (Kelley & Westling, 2019), modeling (Roberts et al., 2018; Stanish & Temple, 2012; Tucker et al., 2020, 2022; Wilhite et al., 2012), explicit instruction (Cardell, 2015; Jobling & Cuskelly, 2006; Koritsas & Iacono, 2016), and electronic recording (Nabors et al., 2023; Ptomey et al., 2015) have been successful support or accountability strategies used to promote healthy behavior changes, which also aligns to the findings here. Due to adults with ID having more limited access to exercise activities with peers noted by Scott and Havercamp (2016) and acquired preference for inactivity noted by Frey and colleagues (2005), future iterations of weekly sessions together with natural supports should try to record more extensive measures of physical ability (e.g., fitness tests and body mass index/BMI). The use of accelerometers and other assistive technologies could be used in greater frequency to promote healthier lifestyles and behavior changes over time (Morash-MacNeil et al., 2018; Ptomey et al., 2017; Randall et al., 2021). The use of greater measures and recordings of physical ability will help better

understand and monitor the participants' progress and needs. While this is a start to helping foster healthier lifestyles on college campuses with individuals with ID, there are several considerations or possible limitations that should be noted for others wishing to continue the focus on healthy lifestyles.

Limitations and Future Directions for Research

First, this study is limited due to the overall sample size and also due to not having a comparison group. Future research should include both. Second, regarding the healthy choices, data and consistency were limited since this was an IPSE program where students had free choice and multiple natural supports to eat with at each mealtime. Therefore, we were not able to collect more consistent measures on every meal that the participants consumed. Even with some reminders, the participants did not always send meals from their cellular devices to the lead natural supports they met with weekly. This could have been due to lack of motivation to eat healthy or because they may have wanted to have more "cheat meals" without photographing them. A third consideration to keep in mind was the possibility of natural supports providing negative models of their own food choices at times. It was hard for the participants to make a healthy meal choice when the natural supports they ate meals with were not consistently modeling the same desired behaviors. A fourth and true limitation here is that the participants were not asked to document their BMI/weight before beginning the study. This was due to the participants not wanting to provide this information, which was respected. A fifth limitation was that social validity data were not gathered from everyone involved about the healthy living sessions. And finally, future studies will need to find ways to include additional data on the fidelity of implementation and interobserver agreement percentages.

The exercise portion also raised some considerations to keep in mind moving forward. First, some participants had previous exercise experience and were more active than others. In this select group, around 20% of the participants had previous involvement in regular cardiovascular training (e.g., cross-country, sports), while other participants did not have any previous experience with exercise or activities. Since all the participants came in with different levels of previous physical activity, this led to one participant having significantly higher pacer data than the other participants at the beginning of the intervention. Second, during the pacer post-assessment, one participant was sick, causing the data to be somewhat skewed. And finally, another participant was asked to stop during the pacer post-assessment due to a wardrobe malfunction that needed to be repaired before they could continue physical movements. For future data on pre- and post-assessments, more data should be collected to account for unpredictable situations.

Future Implications for Practice

Since this was an initial attempt at addressing healthier lifestyles on college campuses, there are several implications for practice to keep in mind. First, it is important to consider how much a participant and natural supports tend to rely on others to remain motivated with healthy lifestyles. Training should be provided, and perhaps use of a consistent group of students for meal and exercise times would help with more consistency and reinforcement. Future focus should be on fading support and having a

system of positive reinforcement that fades as participants gain healthier habits. The natural system will help increase the participants' healthy choices during the health education sessions each week, and then fading over time. The use of more predictable technology could also help participants to self-regulate their healthy lifestyle choices after college.

Many fields related to nutrition and dietetics are centered around mathematics and abstract concepts. This can impose challenges for many adults with ID. Initially, the focus was around mathematics and abstract concepts with food calculations, but adaptations were made to better suit participants' learning styles. Using visuals helped improve participants' understanding and engagement, similar to three previous studies (Morash-MacNeil et al., 2018; Ptomey et al., 2017; Randall et al., 2021). The use of visual aids during lessons, visual activities, and visual goals increased the participants' generalization of content. This is important to keep in mind moving forward.

Empowering the participants by giving them the role of planning meals and activities during the study was successful and preferred by the majority of participants. Since all participants had unlimited meal plans, actual money was not needed for meals in the dining halls. When meals were cooked together, the purchase of all needed supplies and ingredient costs needed to be split among the participants and natural supports. Unfortunately, many participants did not regularly cost-share for the group meals, making them too expensive for this to be offered more frequently. Future attempts at cooking together in the residence hall kitchens would benefit from small grants, funding, and/or partnerships with nutrition programs to allow for more group cooking sessions.

Many college campuses have limited healthy dining options. Constantly having meals in all-you-can-eat buffet-style dining halls can be challenging for all college students and often allows for larger portions to be consumed at each meal. Establishing and supporting healthy relationships with food and supported decision making should be a priority. Understanding stress management strategies is also crucial to helping participants avoid regularly over-consuming food.

Conclusion

Based on these findings, requiring college students with ID take a health education course and providing more explicit instruction for natural supports can help expand their knowledge of nutrition, physiology, and dietetics. When students with ID gain further knowledge of nutrition and have positive peer support to practice healthy eating, they can make significant dietary improvements (e.g., increasing consumption of vegetables and fruits, consuming appropriate portions, increased water intake). Supporting college students with ID while making observable meal goals helps an individual understand appropriate meals and provides greater motivation and accountability. Encouragement of weekly cardiovascular exercise (e.g., group exercise classes, recreational activities) and weekly focus on these areas can improve the healthy lifestyle balance of everyone involved. In addition to the positive feedback given by participants and natural supports informally during the healthy living meetings, they also expressed the desire to continue

this support for their personal development goals in future semesters and also when they live in their inclusive communities beyond college.

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