

A descriptive pilot study of health behaviors and attitude towards change among children with disabilities

Author Information (exclude in blind manuscript)

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Article Type (select one): Original Research

ABSTRACT

Purpose: The purpose of this pilot study was to describe health behaviors such as physical activity (PA), healthy eating, and body composition along with perceptions of eating healthy and attitude towards change among children with disabilities following a Camp for Health & Motor skill Promotion (CHAMP). **Methods:** Sixteen children with autism and other disabilities ($n = 16$), aged 5 to 12 years, participated in the current study. Children completed a healthy behaviors survey at the beginning of CHAMP with the help of a counselor. After CHAMP, children completed an attitude towards change survey. Body Mass Index (BMI) was calculated with height and weight measurements. Descriptive data were analyzed through case-wise comparisons and describing the children who participated in the study. **Results:** 11 children had more unhealthy eating behaviors compared to healthy eating behaviors and 4 children ate more healthy foods. None of the children engaged in the recommended level of PA (everyday) and half were considered overweight/obese. Most of the children learned about health behaviors and indicated a desire to change their habits. **Conclusion:** The study data supports the need for an increase in PA opportunities and healthy eating behaviors among children with disabilities.

Keywords: Physical Activity, Autism Spectrum Disorder, Nutrition

1. INTRODUCTION

Healthy eating behaviors, engaging in physical activity (PA), and obesity status are key factors related to overall health. The US Department of Health and Human Services (HHS) and US Department of Agriculture (USDA) recommends that people aged 2 years older follow a healthy eating pattern that includes a variety of fruits and vegetables, whole grains, fat-free and low-fat dairy, a variety of protein foods, and oils (USDA, 2015). However, children, and specifically those with autism spectrum disorder (ASD) may not be meeting these recommendations. Children with ASD have been found to eat less healthy foods (i.e., fruits, vegetables) compared to their typically developing (TD) peers (Schreck et al., 2004). Additionally, children with ASD may lack proper nutritional knowledge on which foods are healthy and the food groups (Liu et al., 2019). Consumption of more unhealthy foods and lack of understanding of healthy foods may lead to undesirable health outcomes among children with ASD.

The Center for Disease Control and Prevention (CDC, 2022) recommends children engage in 60 minutes or more of PA each day. Children with ASD may not be engaging in the recommended levels of PA (Liang et al., 2020; McCoy & Morgan, 2020). McCoy and Morgan (2020) examined parent-reported data of health behaviors among children with ASD compared to those TD. Parents selected how many days their child engaged in 60 minutes of PA during the past week. Findings revealed children with ASD engaged in less PA, less participation in sports, and were more likely to be underweight, or overweight/obese, than TD children. Accelerometer assessed PA levels have revealed similar results where only 42% of children with ASD met the CDC recommended levels of PA (Liang et al., 2020). Findings reveal children with ASD experience a limited level of PA which is not meeting the recommendations for healthy living.

Obesity rates among children with ASD may be impacted by the limited level of PA and consumption of unhealthy foods. USDA (2015) monitors childhood obesity in order to determine groups of concern (i.e., those with higher rates of obesity) in order to support healthy weight status. Children with ASD may be a primary group of concern due to higher levels of obesity compared to those who are TD (Corbett et al., 2021; Healy et al., 2019). Healy et al. (2019) found children with ASD had higher odds of being overweight or obese compared to TD peers. Likewise, children with more severe ASD had even higher odds of obesity. One key factor found that may increase obesity in children with disabilities is the obesogenic environment created by the limited levels of PA and healthy eating behaviors (Bandini et al., 2015). Weight status among children with ASD is a prime concern as this contributes to overall health. There is a need to decrease this obesogenic environment with more participation in PA and healthier eating habits.

Changing health behaviors such as eating behaviors and PA may be challenging for children with ASD since they have an innate desire for sameness (American Psychiatric Association, 2013). According to the American Academy of Pediatrics, certain traits of ASD, such as sensory sensitivity may encourage restrictive dietary issues (Buie et al., 2010). For example, Rogers et al. (2012) interviewed 11 mothers of children with ASD to determine feeding challenges. Results revealed children had a need for sameness and had a lack of flexibility to eat different foods. The children would only eat a small variety of foods and refused to try new foods.

Changing PA level among children with ASD may also be challenging. Healy and Marchand (2020) assessed PA levels among children with ASD ($n = 13$) the week before and the week after a four-week intervention through a questionnaire. Following the intervention, the majority of the participants slightly increased in PA, but there were no significant differences in PA levels between pretest to post-test ($p = .664$). Results suggest interventions may be helpful to increase PA among ASD, however it is challenging to alter their prolonged engagement in PA.

Previous research has identified low rates of healthy eating behaviors (Schreck et al., 2004), PA, and sports participation (McCoy & Morgan, 2020) and had higher rates of obesity (Corbett et al., 2021) in children with ASD. However, few studies have identified several health behaviors along with attitudes towards change among children with ASD. The purpose of this study was to describe health behaviors such as healthy eating, physical activity, and body composition along with perceptions of eating healthy and attitude towards change among a pilot sample of children with disabilities.

2. METHODS

In order to provide a safe environment for children with disabilities, the Authors university hosted a four-day summer camp for children with autism, mild intellectual, language, learning, and/or physical disabilities titled Camp for Health & Motor skill Promotion (CHAMP). CHAMP was designed to support PA, healthy-living skills, and motor skills among children with disabilities. Daily activities included learning about food groups, healthy vs. unhealthy sorting, dance and rhythm movements, team and cooperation relays, and tasks to support fundamental motor skills. CHAMP was led by college students enrolled in an adapted physical education course and faculty. All participants were recruited through CHAMP. Institutional Review Board (IRB) approval was obtained prior to all data collection. Upon parent consent and minor ascent, participants were included into the study.

Pilot participants included sixteen children with disabilities (females $n = 4$; males $n = 12$), aged 5 to 12 years ($M = 8.81$, $SD = 2.40$). Participant diagnosis included multiple conditions including autism, neurocognitive

disorder, attention deficit hyperactivity disorder, oppositional defiant disorder, down syndrome, speech delay, and physical disability.

A healthy behaviors and an attitude towards change survey were created based on the works of Nabors et al. (2013) in order to collect food consumption and physical activity along with perceptions of eating healthy and attitude towards change among the participants. Surveys were designed to be kid-friendly with simple wording and pictures of food choices (i.e., fruits, cookies, juices boxes, etc) and activities (i.e., soccer ball, dance, swimming, etc). See Figure 1 for an example question from the healthy behaviors survey.

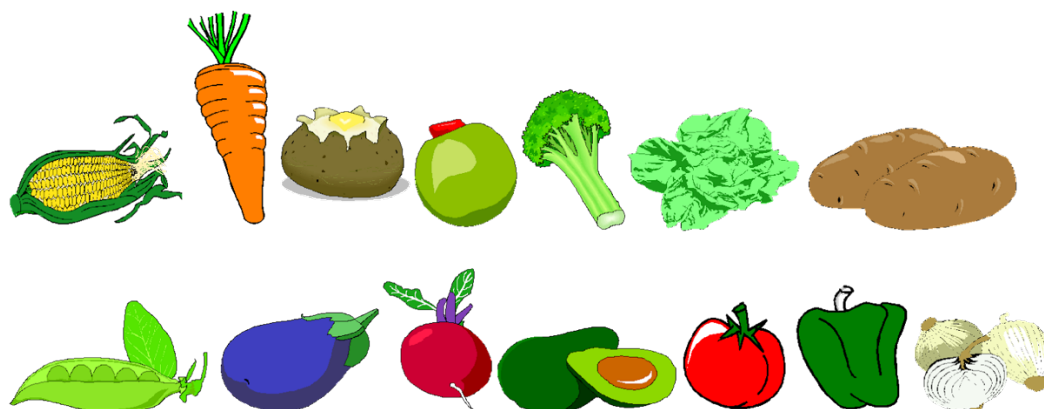
Figure 1

Example Question from the Healthy Behaviors Survey

Yesterday, did you eat any vegetables?

Vegetables are salads; boiled, baked and mashed potatoes; and all cooked and uncooked vegetables.

Do not count French fries or chips.



- a. No, I didn't eat any vegetables yesterday.
- b. Yes, I ate vegetables **1 time** yesterday.
- c. Yes, I ate vegetables **2 times** yesterday.
- d. Yes, I ate vegetables **3 or more times** yesterday.

The first day of CHAMP, participants completed the healthy behaviors survey with the help of a counselor. The survey collected consumption of fruits, vegetables, sugar, soda, juice, and beans yesterday (*none, one, two, three or more*), number of days engaged in PA the past 7 days (*0 to 7*), participation in sport teams during the past year (*none, one, two, three or more*), perceptions of food currently eating are healthy (*all of the time,*

sometimes, no), and preference on trying new foods (*almost always or always, sometimes, almost never or never*).

The final day of CHAMP, participants completed the attitude towards change survey that identified how much they learned about health and their desire to change health behaviors. The attitude towards change survey included 5 questions related to CHAMP helping them think about healthy behaviors and wanting to change on a 5-point Likert-type scale (*no, A little, some, pretty much, very much*). Body Mass Index (BMI) was calculated with height and weight measurements collected during CHAMP with a scale. BMI analysis was completed using the BMI tables for children and teens from the CDC based on age and gender (2022). Descriptive data were analyzed through case-wise comparisons and describing the children who participated in the study.

3. RESULTS

The healthy behaviors survey revealed eleven children had more unhealthy eating behaviors compared to healthy eating behaviors and four children ate more healthy foods compared to unhealthy. Healthy choices included consumption of vegetables, beans, and fruit. Unhealthy choices included consumption of sweets, fruit juice, fries, and chips. Eleven children believed they ate healthy while six proclaimed to “*sometimes*” like to try new foods and six “*never*” like to try new foods. See Table 1 ($n = 15$) for food consumption responses.

Table 1

Food Consumption of Children in One Day

	Fruit (<i>n</i>)	Vegetables (<i>n</i>)	Beans (<i>n</i>)	Fries/ Chips (<i>n</i>)	Juice (<i>n</i>)	Sweets (<i>n</i>)
<i>None</i>	5	6	10	6	5	3
<i>1</i>	8	6	3	6	7	4
<i>2</i>	1	2	0	0	2	7
<i>3 or more</i>	1	1	1	2	1	1

One child did not engage in any PA, eight children engaged in PA 1 to 3 days, four children engaged in PA 4 to 5 days, and no children engaged in the recommended level of PA 7 days a week (CDC, 2022). Six of the children participated in organized sport teams during the past 12 months and six were participating in sports during data collection. See Table 2 ($n = 15$) for PA and sports participation.

Table 2

Physical Activity and Sport Participation of a Child Over One Year

	Participated in physical activity yesterday (<i>n</i>)	Current member of organized physical activities (<i>n</i>)
<i>No</i>	3	9
<i>yes</i>	12	6
	Days exercised for at least 20 minutes within 7 days (<i>n</i>)	Number of sport teams participated on over 12 months (<i>n</i>)
<i>None</i>	1	6
<i>1</i>	6	5
<i>2</i>	2	0
<i>3</i>	2	1
<i>4</i>	1	0
<i>5</i>	3	0
<i>6</i>	0	0
<i>7</i>	0	0

Results from the BMI calculations (CDC, 2022) revealed eight children were overweight/obese (i.e., equal to or greater than the 85th percentile), two children were underweight (i.e., less than the 5th percentile), and six were healthy weight (i.e., 5th percentile to less than the 85th percentile).

The attitude towards change survey revealed the children highly thought about the importance of changing their eating habits and PA behaviors. Most of the children learned about health behaviors at CHAMP and indicated a desire to change their habits. Missing data are due to participants not attending CHAMP on the final day and children who were non-verbal did not select or point to an answer to all of the questions. See Table 3 ($n = 12$) for attitudes towards change responses.

Table 3

Children’s Attitudes Towards Physical and Nutritional Change

	Think about why changing my eating habits is important (<i>n</i>)	Think about why exercising is important (<i>n</i>)	My teacher listened to me (<i>n</i>)	I learned new things (<i>n</i>)	I want to change my eating and exercise (<i>n</i>)
<i>No</i>	1	1	0	2	2
<i>A little</i>	1	2	1	1	0
<i>Some</i>	1	3	1	0	1
<i>Pretty much</i>	1	0	2	0	1
<i>Very much</i>	8	6	8	9	8

4. DISCUSSION

The purpose of this preliminary study was to describe health behaviors such as healthy eating, PA, and body composition along with perceptions of eating healthy and attitude towards change among children with disabilities. Participants in the current study ate more unhealthy foods compared to healthy foods. For example, the participants ate several fries, chips, and sweets while very few ate beans, fruits, and vegetables. This is consistent with previous research where children with ASD ate less of a variety of foods and desired more calorically dense foods, such as fries (Ahearn et al., 2001; Bandini et al., 2017; Schreck et al., 2004).

Children with ASDs' eating behaviors may also be different than TD children. Evans et al. (2012) found children with ASD eat unhealthier (i.e., sugary beverages, snack foods, and less fruit/vegetables), along with food aversion based on the texture, color, smell, and temperature, compared to TD children. Likewise, Kazek et al. (2021) found feeding difficulties (i.e., fussing, use of utensils, food selectivity) among children with ASD compared to TD children. However, both children with and without ASD reported favoring similar taste (i.e., sweet, salty), but the children with ASD fussed at meal time when presented with unfavorable taste. Findings suggest that children with ASD and TD enjoy similar foods, but children with ASD have a more difficult time accepting foods that are outside their limited scope.

The limited food preferences and unhealthy eating behaviors could potentially explain the weight challenges (i.e., underweight, overweight, obesity) in children with ASD (McCoy & Morgan, 2020). Food aversions and preferences may be supported through options provided by caregivers. Parents, family, and caregiver's nutritional, physical activity, and weight knowledge has been associated with weight status and health behaviors in children with disabilities. Oppositely, caregivers with lack of nutritional knowledge may lead to overfeeding children with ASD (Bandini et al., 2015). These findings suggest the need for additional support in understanding food preferences for children with ASD, as the knowledge can assist caregivers in the food introduction and preparation process.

None of the children in the current study engaged in daily PA, which is the recommended level of PA (CDC, 2022), and few engaged in organized sport teams. Findings are similar to previous studies where children with ASD engaged in low levels of PA and sports (Bandini et al., 2012; McCoy et al., 2016; McCoy & Morgan, 2020; Pan et al., 2016; Stanish et al., 2017). Pan and colleagues (2016) collected accelerometer-measured PA among children with ($n = 35$) and without ($n = 35$) ASD for a week and found children with ASD engaged in significantly less PA than TD children and were less likely to accumulate 60 minutes of daily PA. Results show children with ASD may engage in less movement on a weekly basis compared to TD children.

Children with ASD may engage in low levels of physical activity because of perceived barriers (Lee et al., 2022; Must et al., 2015; Stanish et al., 2015). For example, Must et al. (2015) found parents of children with ASD reported barriers to PA such as supervision of their child, inclusion skills of the PA facilitator, small circle of friends, and other children excluding their child. Such barriers were inversely related to time engaged in PA. Findings show when barriers occur, children engage in less PA and are more inactive. Similarly, Stanish et al. (2015) found children with ASD reported barriers to PA such as fear of getting injured, weather, and that sports and exercises are too difficult. Likewise, these children were less likely to engage in PA in their free time compared to TD children. Recently, COVID concerns by

parents may also limit PA behaviors (Lee et al., 2022). Findings suggest there are barriers that hinder children with ASD's participation in PA. There is a need to decrease barriers to support PA opportunities for children with ASD.

The American Academy of Pediatrics suggests that sports and PA programs for kids with disabilities should be properly developed to focus on cardiovascular endurance, flexibility, balance, agility, and muscular strength as well as accessibility, safety, and enjoyment. Before participating, strategies should be put into place to reduce the possibility of illness or injuries during sporting events (Murphy et al., 2008). Increasing PA among children with ASD should be a focus of attention due to the positive impacts PA has on one's overall health, such as obesity.

The majority of the participants in the current study were either underweight or overweight/obese according to BMI. Results are comparable to Healy et al. (2019), Pham et al. (2020), and McCoy and Morgan (2020) which found higher rates of overweight and obesity in children with ASD compared to TD children. Corvey et al. (2016) suggests children with ASD have a greater number of obesogenic risk factors than their TD peers including medication that promote weight gain and risk metabolic syndrome, increased sedentary behavior, feeding difficulties, and sleep problems. Due to the potential for developing adverse health conditions, it is essential to design weight management programs that address unique needs of children with ASD. Programs should consider the unique needs of children with ASD, such as their innate resistance to changing behaviors.

Participants in the current study reported positive attitudes toward changing their health behaviors, however, there was no follow up to determine behaviors of change. Hinckson et al. (2013) completed a 12-week intervention focusing on dietary habits, PA, and overall health in children ($n = 22$) with ASD. Participants completed a change survey the final day of the intervention and a follow-up (24 weeks). Participants' improved health behaviors with a decreased consumption of sugary foods and increased levels of PA. Results suggest interventions may foster health behaviors among children with ASD. In a review of literature by Bandini et al. (2017), improvements in health behaviors are unknown following short-term interventions. However, family-based lifestyle interventions have been shown to improve health behaviors and obesity status. Results are unclear how interventions and programs, such as CHAMP, improve long-term health behaviors in children with ASD, however, exposure through camp may be a helpful step towards change.

5. CONCLUSIONS

CHAMP helped children think about their healthy eating behaviors and PA through games, activities, and group discussions. However, the study

data supports the need for an increase in PA opportunities and healthy eating behaviors among children with disabilities. Such opportunities should consider proper training for caregivers on healthy eating behaviors, safety, and modified physical activities.

Limitations in the current pilot study include the small sample size. Larger sample sizes would be beneficial to evaluate the relationship between PA, obesity status, and healthy eating behaviors. Additionally, three participants were non-verbal which presented some limitations among data collection. Non-verbal participants pointed at their answers on the survey. However, not all questions were answered which left gaps in the survey responses. Future research should use talking devices (i.e., iPads, picture exchange cards) for participants who are non-verbal to respond.

The current study found participants would like to change their health behaviors, however, there was no retention test completed by participants following CHAMP to determine if there was any change in health behaviors. Future research should consider a preliminary test and retention test(s) to determine if children with ASD change health behaviors following a program promoting healthy behaviors. Research should consider parent responses on PA opportunities and healthy eating behaviors. In conclusion, children with autism and other disabilities may not be meeting the recommendations for PA, eating behaviors, and weight status. This leads to a plethora of other negative health outcomes. Therefore, there is a need for interventions, camps, and knowledge on supporting health and PA behaviors among children with disabilities.

6. ACKNOWLEDGEMENTS

6.1 Disclosure of Funding Sources

None

6.2 Conflict of Interest

The authors declare no conflicts of interest.

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