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Availability of physical activity resources in the environment for adults with intellectual disabilities

Erin K. Howie, B.S.[a,*], **Timothy L. Barnes, B.S., M.P.H.**[b], **Suzanne McDermott, Ph.D.**[c], **Joshua R. Mann, M.D., M.P.H.**[c], **John Clarkson, B.S.**[c], and **Rebecca A. Meriwether, M.D.**[c]

[a]Department of Exercise Science, Arnold School of Public Health, University of South Carolina, Columbia, SC

[b]Department of Epidemiology and Biostatistics, Arnold School of Public Health, University of South Carolina, Columbia, SC

[c]Department of Family and Preventive Medicine, University of South Carolina School of Medicine, Columbia, SC

Abstract

Background—Adults with intellectual disabilities (ID) have high rates of physical inactivity, yet little is known about the prevalence of facilitators and barriers in the built environment contributing to these high rates.

Objective—To describe the physical activity resources available to adults with ID in both the home and day programs outside of the home.

Methods—Demographic information was collected on a sample of adults with ID. A survey checklist of the physical activity environment at the participants' home and the facility or workplace where the participant spent his/her weekdays was collected by trained research staff. Differences in the prevalence of environmental resources between those living in group homes and those living alone or with family were tested using χ^2 tests.

Results—A total of 103 participants had complete demographic and environmental data. Of these, only 37.9% had exercise equipment available, 39.8% had sports equipment, and 15.5% had a bicycle in the home environment. At the facility where the individual attended a day program or where the individual was employed, 55.4 had sports equipment, 50.5% had an outdoor recreation area, 41.8% had an indoor recreation area, and 41.8 had organized physical activities. Those who lived in group homes were more likely to have access to basketball hoops, sports fields, and recreation centers than those who lived alone or with family ($p < .01$).

Conclusions—Adults with ID have few physical activity environmental resources and opportunities available to them, especially those not living in group homes. Future interventions are needed to increase physical activity opportunities in this underserved population.

Keywords

Physical activity; Environment; Intellectual disabilities

Physical inactivity and other risk factors for cardiovascular disease are highly prevalent in the U.S. population including individuals with intellectual disabilities (IDs) [1–8]. Adults

*Corresponding author: 921 Assembly St. Suite 212, Columbia, SC 29208. howieek@email.sc.edu (E.K. Howie).

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with mild and moderate ID have been found to be 4 times more likely to be obese than adults without ID [6] and have high physical inactivity levels [7,8]. Less than one third of adults with ID reached the current guidelines of 150 minutes of moderate to vigorous physical activity (MVPA) per week in a review by Temple et al. [7]. While insufficient evidence exists to compare physical activity levels of adults with ID to the whole adult population [7], one study with a small sample of objectively measured physical activity found adults with ID averaged 20 minutes of MVPA per day compared to 56 minutes in active adults without ID [9]. The activity level of adults with ID in the previous study was equivalent to sedentary adults without ID. Given that levels of physical activity in adults with ID appear to be significantly below recommended levels, it is important for researchers and public health professionals to identify the correlates and determinants of these low physical activity levels.

There are many barriers and facilitators to physical activity for all populations including personal and environmental factors. The availability of physical activity resources has been shown to be associated with physical activity levels in adults [10] and adolescents [11]. The presence of recreational resources such as facilities and structured sports and exercise programming has also shown to be associated with physical activity levels in adults [12]. A study of more than 11,000 adults in 11 countries found resources including the presence of sidewalks, bicycling facilities, and low-cost recreation facilities to influence physical activity levels [13]. A recent review by Wendel-Vos [10] found availability of exercise equipment and facilities to be associated with MVPA in adults. Similar to all adults, adults with ID cite comparable barriers including lack of sidewalks, time, finances, transportation, safety, and poor weather as well as unique barriers including lack of guidance, and limited leisure time choices [14,15]. Few studies have examined the physical activity environments for adults with ID and little is known on the prevalence of these physical activity promoting environmental characteristics and other physical activity resources to adults with ID.

Objective

The purpose of this study was to describe the physical activity resources available to adults with IDs in both the home and day programs outside of the home. Availability for this study is defined as the presence of a resource within the defined environment [16].

Methods

This research was approved by the University of South Carolina Institutional Review Board. Participants for this research were recruited through community disability and special needs (DSN) boards and equivalent local disability providers in South Carolina, North Carolina, and Georgia over the time period of January 2007 to August 2009. DSN boards provide residential, day services, and family support services to individuals with IDs and their families. Services and supports are provided based on individual preferences and availability of a continuum of options for type of residence, day programs, and family assistance. Some of the participants lived in group settings or supervised apartments managed by the DSN board, others attended day programs or workshops or received supported employment services, and others received only semiannual assistance with service coordinator. Demographic characteristics and an assessment of the physical activity environment were collected for all study participants. To be eligible, participants had to be 18 to 65 years of age, have staff reported mild to moderate ID, not have physical disabilities or other serious medical conditions limiting physical activity, be able to communicate verbally, and be able to give informed consent. The staff knew which eligible individuals had legal guardians and all legal guardians were asked to participate in the consent process. If the individual did not have a legal guardian they were able to sign the informed consent, however family members

and staff who were active in the individual's circle of support were notified that the individual chose to participate in the study.

Research staff was trained on use of the written instruments. The training included reading, individual discussion about challenges and solutions, hands-on experience using paid actors with IDs, and supervised field training. Environmental assessments were completed in duplicate, discrepancies were discussed and training sessions continued until interrater reliability reached at least 80%.

Trained research staff obtained demographic information from local agency staff and verified information with participants. All questionnaires were administered verbally to the participants to limit literacy limitations or misinterpretations. Potential participants' ability to understand simple concepts was assessed using the Short Portable Mental Status Questionnaire (SPMSQ). The SPMSQ was developed to be a brief, field-administered, clinically useful tool to assess cognitive function and consists of 10 questions that assess the individual's orientation, memory and cognitive function [17]. Those scoring in the severely impaired range (more than 7 incorrect answers out of 10 questions) were excluded, as they are likely incapable of adequate understanding.

A total of 602 individuals were screened and 140 (23.3%) were not eligible. Seven errors were selected based on Pfeiffer's original development of the questionnaire [17] as the cutoff identifying those with severe mental impairment. Studies with dementia patients have used more conservative criteria of 6 errors. We used a cutoff that allowed us to capture the majority of people who live in group homes for adults with IDs. During pretesting we determined the dementia standard would eliminate adults with IDs who were verbal and able to learn through demonstration and repetition. We found 3 correct responses was a more specific criteria for our target group. The SPMSQ has a test-retest reliability of (0.82) at 4 weeks [17].

The environmental assessment for physical activity consisted of a dichotomous checklist indicating whether environmental characteristics were present or not present in the participant's typical environments, specifically, the DSN board environment and the home, neighborhood, and community. No similar questionnaire has been developed for this population. Due to limited cognitive abilities compared to typical adult populations, a checklist based on adolescent populations was selected. The assessment was based on the work of Erwin [18] who verified the reliability for this type of assessment measure in a youth population with test-retest kappa values ranging from 0.41 to 1.00 and intraclass coefficients of 0.63 to 0.95. Our assessment consisted of an abbreviated assessment, selecting only the availability of relevant attributes used in the original assessment; items not appropriate for this population such as school playgrounds and trampolines were removed. DSN board related attributes included items such as recreation areas, exercise equipment, and scheduled physical activity. The home, neighborhood, and community environment included items such as the presence of a yard, basketball court, park(s), and street characteristics. While the original tool was designed to be totally self-administered, our assessment included a mixed approach. Research staff individually interviewed each participant. Following the interview, additional input qualifying participant answers was sought from staff. In addition, for each participant, a research staff member visited the participant's home and corresponding DSN board to directly evaluate environmental items. Inconsistencies from the self-report were verified and the final assessment was a combination of self-report, board staff, and direct staff observation. When a discrepancy was noted between the individual, DSN staff, or research staff, multiple investigators decided which response was accurate. (The environmental assessment instrument is available in the Appendix.) For the purposes of this study, any resource categorized as accessible on the

assessment checklist (even beyond walking distance) was included as available to the participant.

Analysis

General descriptive statistics including means and percentages were used to describe demographic variables. Differences in demographics by group home status were made using *t*-tests and χ^2 tests. The χ^2 comparisons were made to compare the prevalence of environmental characteristics and resources by group home status. All statistical analyses were performed using SAS 9.2 (Cary, NC).

Results

Home environment assessments were completed for 103 participants from 12 DSN boards. Demographics by group home status can be seen in Table 1. Participants living in group homes were slightly older and had a larger percentage of non-Hispanic whites. Forty percent of the boards (5 of 12) were located in predominantly rural counties, with the other 60% in counties containing or adjacent to a metropolitan area. Based on the Rural-Urban Continuum codes from the Economic Research Service from the USDA [19], 5 counties had urban populations of 2500 to 19,999, adjacent to a metropolitan area. Six boards were in counties in metropolitan areas with a population of 250,000 to 1 million and one board was in a county in a metropolitan area with a population of over 1 million.

In the home environment, 37.9% of participants had exercise equipment, 39.8% had sports equipment, and 15.5% had a bicycle. Slightly more than half of participants had availability of a sports field (53.4%), public park (60.2%), and/or recreation center (58.3%). Sidewalks and streetlights were found in 42.7% and 61.2% of residences, respectively. At the Community DSN Boards, half had an outdoor recreation area (50.5%) and 55.4% had sports equipment available as seen in Figure 1. Less than half had scheduled physical activities (41.8%), organized sports (10.7%), and an indoor recreation area (46.6%); slightly more than half had exercise equipment (55.3%).

The analysis comparing group homes to those not living in group homes can be seen in Figure 2. Those in group homes were more likely to have sports equipment (49.2% vs 20.6%), a basketball hoop or court (60.9% vs 23.5%), sports field (68.1% vs 23.5%), recreation center (69.6% vs 35.3%), and have sidewalks (53.6% vs 20.6%) and streetlights (72.5% vs 38.2%).

Discussion

This study found a paucity of physical activity resources for adults with IDs, particularly participants living independently or with family as opposed to group homes. Approximately half of all participants did not have availability of indoor and/or outdoor recreation facilities, scheduled physical activity or sports or exercise equipment at their DSN board. Only 29% had opportunities for scheduled physical activities, while 39% of adults in Baltimore had access to team sports alone, not including other fitness activities [12]. Most of these individuals spend a large proportion of their days at the DSN board, making it a potential resource for physical activity. Even fewer of the participants had access to physical activity equipment at their homes and individuals in group homes had greater availability. While those in group homes had recreation centers available comparable to the total population [13], those not in group homes had a much lower availability.

The lack of opportunities may partially explain why adults with IDs participate in low levels of organized physical activity [9]. There are numerous diverse barriers and facilitators to

physical activity including activity history, social support, and psychological variables [20]. With these many correlates, the sole presence of physical activity resources and environmental resources may be insufficient for increasing physical activity levels [21]; yet, availability may enhance the likelihood of physical activity as a first step toward reaching recommended levels [22]. Future interventions should help make physical activity resources available and accessible, such as scheduling organized physical activity and providing exercise equipment, particularly to adults with ID living with their family or independently and not in a group home.

In addition to availability, resources must be accessible and the population must have the knowledge and self-efficacy needed to utilize these opportunities. A study of adults with ID reported that accessibility to physical activity opportunities was the largest barrier for the lowest active adults [15]. In addition, Temple [23] found that it was important to show adults with ID how to do physical activities. When examining environmental factors affecting community participation including involvement in leisure activities, Verdonschot [24] found that autonomy, decision making, and social support were some of the factors increasing participation, while lack of transportation was a large barrier. Adults with ID are usually less autonomous than their age peers and many participants were not allowed to recreate outside without supervision. Future studies should examine the accessibility and use of physical activity resources and the factors associated with continued use of these resources by adults with IDs. In addition, interventions to increase physical activity in adults with ID should target population-specific barriers such as requiring accompaniment when walking for transportation and safety concerns [25]. Future studies are needed to examine the presence of these additional barriers and facilitators in adults with ID.

The availability of physical activity resources has been shown to be related to physical activity levels [10,13]. We were unable to determine if the lack of physical activity resources are associated with lower physical activity levels. We did attempt to collect objectively measured physical activity data using accelerometry. Due to low compliance, however, complete environmental and accelerometer data was obtained for only 28 participants. There were no significant differences in physical activity by environmental characteristics in the subsample with which accelerometry and environmental assessments were available. With such a small sample, we are unable to conclude whether variation in physical activity resources is associated with different levels of physical activity. In order to obtain larger samples for objectively measured physical activity in adults with ID, increased resources for larger recruitment are needed.

Limitations of this study included a small sample size, particularly for those outside of group homes and the lack of a validated, population specific environmental assessment tool. A checklist or questionnaire to be completed by staff or trained observers should be developed and validated for future research in this population. Self-report is a difficult measure, particularly with adults with IDs. To help ensure accurate responses, we used the SPMSQ to exclude participants that would not be able to answer the questions. The inclusion criteria of answering at least 3 of 10 questions correctly on the SPMSQ allowed us to include adults with limited verbal and cognitive skills who could learn from demonstration and repetition. In order to compensate for participants with low cognition, we used multiple sources of information (self-report, staff report, and evaluator's observation) on our questionnaire to be sure the truth was recorded. When discrepancies were noted, we used the evaluator report; however, we thought it was important to include the participant as a reporter to honor his or her autonomy. With this mixed-method approach, we did not record when the participant responses were used or when staff and/or evaluator reports were used. This limits the ability to select a single method of survey for future studies.

To make progress toward reducing the health disparities in physical inactivity in adults with IDs, more opportunities and resources should be provided, particularly to those not living in group homes. While creating physical activity promoting environments alone is not sufficient for increasing physical activity levels, providing equal opportunities and resources may lay the foundation for building momentum toward meeting national physical activity recommendations among all populations.

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Appendix. STYH Environmental Access to Physical Activity Questionnaire

Please indicate the items that best describes the participant's daily environment by checking (√) the corresponding space. Items marked with an asterisk (*) will be determined by the evaluator's observations, otherwise items will be answered by questioning the participant and staff/caregiver.

Subject # _____

Board, Workshop, and/or Work

√ Check Yes	No	
		Indoor Recreation Area, Gym, or Commons Room*
		Outdoor Recreation Area (basketball court, picnic area, etc)*
		Gym or exercise equipment (treadmill, weights, bike, etc)*
		Sports or other recreation equipment (basketball, football, baseball equipment, etc)*
		Scheduled physical activity (exercise instructor or other activity)
		If Yes, how often?
		More than once a week Once a week Once a month Occasionally Never
		Organized sports or physical activity (baseball or softball team, etc)
		Walking trail and/or running track*
		Other: _____

Home, Neighborhood, and Community

√ Check Yes	No		Home	√ Check Within Walking Distance	†Accessible (Not Walkable)
		Yard (Front or Back)*			
		Exercise equipment			
		Sports or recreation equipment			
		Bicycle			
		Dog			
		Basketball hoop or court	_____	_____	_____
		Beach, lake, or creek	_____	_____	_____
		Bike lane or trails	_____	_____	_____
		Sports or playing field (soccer, football, softball, etc)	_____	_____	_____
		Public park	_____	_____	_____
		Public recreation center	_____	_____	_____
		Running track	_____	_____	_____
		Skate rink (skateboard, roller, ice, etc)	_____	_____	_____
		Swimming pool	_____	_____	_____
		Tennis court	_____	_____	_____
		Other: _____	_____	_____	_____
		Heavy traffic*			
		Sidewalks*			
		Street lights*			
		Frequent people walking / exercising			
		Friends			
		Crime: Low High			

†Accessible to participant via transportation other than walking i.e. family vehicle, public transport, etc.

Do you feel safe walking in your neighborhood during the day?

Yes No Don't Know

Do you feel safe walking in your neighborhood at night?

Yes No Don't Know

Adapted from: Erwin HE. Test-Retest reliability of a Preadolescent Environmental Access to Physical activity Questionnaire. J Phys Act Health 2008; 5 (Suppl 1):S62-S72.

Housing Descriptors

Indicate type of building or unit.

_____ House
_____ Townhouse
_____ Apartment or Condo
_____ Mobile home
_____ Other: _____

# of Units in Structure: _____

Does the participant live close to other occupied homes (within 100 to 200 yards)?

Yes No

Does the participant live relatively close to occupied commercial properties (within a mile) such as a gas station, grocery store, or post office?

Yes No

Does the participant live in "walking distance" to occupied commercial properties such as a gas station, grocery store, or post office?

Yes No

Transportation

Please, indicate which of the following items describes the participant's daily mode(s) of transportation. More than one type of transportation can be marked.

_____ DSN Transport
_____ Public Transportation (Bus, etc)
_____ Automobile (Family or caregiver)
_____ Walking
_____ Bicycle
_____ Other: _____

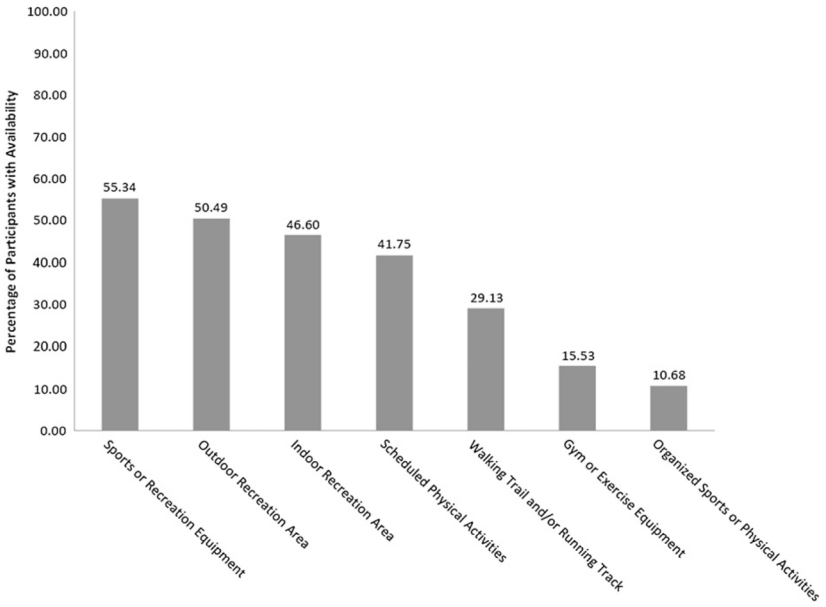

Figure 1.
Prevalence of environmental physical activity opportunities and resources at boards or workshops.

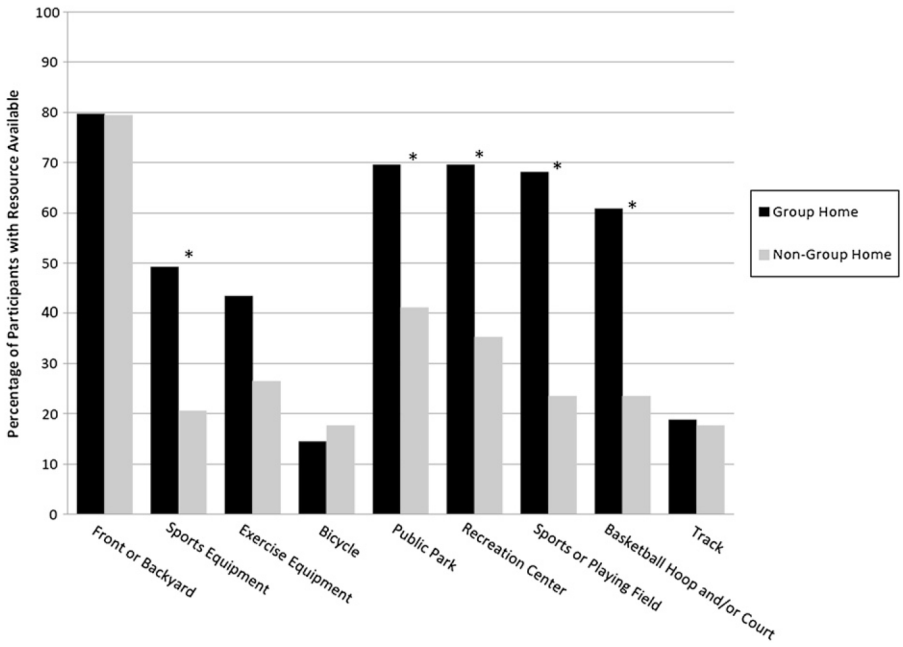

Figure 2.
Prevalence of environmental resources in the home, neighborhood, and community by group home status.

Table 1

Demographics by housing type

	All (N = 103)	Group home (N = 69)	Non-group home (N = 34)
Variable	**Mean (SD) or Percent**	**Mean (SD) or Percent**	**Mean (SD) or Percent**
Age* (y)	37.59 (11.72)	39.7 (11.81)	33.32 (10.43)
Body mass index (kg/m^2)	32.48 (8.94)	31.79 (7.6)	33.9 (11.17)
Sex			
Male	44.66	49.28	35.29
Female	55.34	50.72	64.71
Race†			
Non-Hispanic white	55.34	66.67	32.35
Non-Hispanic black	43.69	31.88	67.65
Hispanic	0.97	1.45	
Age category† (y)			
18–24	12.62	7.25	23.53
25–34	34.95	31.88	41.18
35–44	23.3	24.64	20.59
45–54	18.45	23.19	8.82
55+	10.68	13.04	5.88
Housing			
Group home	66.99		
Live with family	28.16		
Live in own apartment	1.94		
Live in supervised apartment	2.91		

*Age significantly differ by housing ($p < .01$, t-test).

†Age category and race differ by housing ($p < .01$, χ^2).