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Barriers and Facilitators for Adherence to Physical Activity Recommendations among Adults and Children in a Multi-Site Cross-Sectional Study

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Abstract: Qualitative research on barriers and facilitators to meeting the physical activity recommendations (PAR) among adults and children are limited. Most studies focused on correlates of children's physical activity and sedentary behavior. The goal of this research was to examine the barriers and facilitators to following federal PAR among adults and children enrolled in a multi-site study. Adult's reported barriers included lack of motivation (interest), time, and competing life demands. Although financial constraints were a reported barrier, the predominant barrier was chaotic life events that limited time available to adhere to the PAR. Children reported competing activities, health and psychological limitations as barriers to meeting the PAR. Adults perceived health benefits as a facilitator to being physically active. And children reported peer support and ways to be physically active as facilitators. Barriers and facilitators to following PAR reported by adults and children should be taken into consideration when designing interventions.

Keywords: Physical activity/Exercise; Recommendations for physical activity; Barriers; Facilitators; Adults; Children

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Introduction

Physical activity is a component of the energy balance equation. The current recommendation is that children and adolescents up to age 17 get

at least 60 minutes of moderate-to-vigorous physical activity every day [1,2]. Adults ages 18-65 should get at least 150 minutes per week of moderate-intensity physical activity on five days of the week [1,2]. Only 21.6% of 6 to 19-year-old children and adolescents in the United



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States attained 60 or more minutes of moderate-to-vigorous physical activity on at least 5 days per week [3-5]. As children age, their physical activity levels tend to decline [6,7]. Further, children who are physically fit are much less likely to be obese later in life [8]. More than 50% of US adults do not get enough physical activity to provide health benefits, and 33% are not active at all in their leisure time [9].

The causes of obesity are poorly understood. Decreased physical activity or increased sedentary behavior have been shown to be adversely associated with weight in children [10] and adults [11]. Intervention research has shown positive fitness changes associated with school-based physical activity programs [12-14] with recent focus on family-based interventions [15]. However, they have not been adequately successful in changing physical activity [16,17]. Many studies have been conducted focusing on correlates of children's and adolescents physical activity and sedentary behavior [18-20]. Despite these studies, there is minimal qualitative research on barriers and facilitators to meeting the PAR among adults and children. The goal of this qualitative research was to examine the barriers to and facilitators of following government PAR among adults and children in a multi-site study.

Methods

Participants were part of the Healthy Eating and Lifestyle for Total Health (HEALTH) study. HEALTH was a multi-site collaboration of five Agricultural Research Service (ARS) Human Nutrition Research Centers (HNRC) and the ARS Delta Obesity Prevention Research Unit. The five ARS-HNRC sites included: Western Human Nutrition Research Center; Children's Nutrition Research Center; Human Nutrition Research Center on Aging; Beltsville Human Nutrition Research Center; and, Grand Forks Human Nutrition Research Center. Only two of

the sites collected data on physical activity; therefore, data from those sites only are reported here. The study was conducted from March 2010 to July 2012. The goal of HEALTH was to identify barriers and facilitators to following the 2005 Dietary Guidelines for Americans (DGA) [2] which included physical activity, in a national sample of fifth grade children and their adult caregivers. Methods are consistent with the protocols of the study as described in previous publications [21-24]. Written informed consent was received from the adults and verbal and written assent from the children were obtained before participation. The Institutional Review Board at each site approved the study.

Sample/Recruitment

At each study site, fifth-grade children and their adult caregivers were eligible to participate based on self-identification of three major racial/ethnic groups: African American, Hispanic American, or European American. Adult caregivers were defined as "the person responsible for food preparation most days of the week." A purposive sample was recruited through fifth-grade teachers who identified adults and children deemed knowledgeable and able to substantively address the issues as key informants. Teachers were asked to identify individuals they believed would be able to speak in clear and effective language and would be willing to interact with investigators during the data collection sessions. Participants were recruited from a local public school district at each of the six sites. Examples of the recruitment strategies included sending a recruitment packet home with the children; presenting information about the project to fifth-grade children and at Parent-Teacher Organization meetings; and active involvement of parent liaisons, teachers, and school administrators in the recruitment efforts. All study materials were available in, and study



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sessions were conducted in, Spanish and English.

Nominal Group Technique (NGT) Methodology

The NGT method [25] combines aspects of qualitative (free generation of responses by individuals) and quantitative (structured multistep systematic ranking of responses) data collection. The stages involved in conducting the NGT method have been published in addition to a number of advantages of using the NGT method over other group processes [26]. The highly structured NGT process minimizes the information loss that can sometimes occur with focus groups, particularly when there are real or perceived power differentials among group members. Because the NGT is effective in promoting even rates of participation, and equally weighted input from all group members, the responses generated were assumed to provide valid and interpretable ordinal data that reflect implicit prioritized views held by a representative group [27]. This technique is therefore an ideal method to identify and prioritize salient barriers and facilitators to PAR adherence expressed by adults and children.

Question and Preamble Development

Before the group sessions, one-on-one cognitive interviews were conducted at each site with both adult and child participants and each ethnicity to ensure the understanding of the questions to be used in the groups [28]. During cognitive interviews, participants reviewed questions for clarity, comprehension, and appropriateness. The preamble, which provided participants in NGT sessions with a cognitive referent for considering PAR barriers (or facilitators), was also previewed in the cognitive interviews. The preamble was an introductory slide show that started each NGT session and provided both verbal and visual

descriptions of the specific PAR addressed in that meeting. This study was conducted when the 2005 DGA [2] were being promoted and MyPyramid was the consumer education tool designed for teaching the public on the 2005 DGA; thus, the MyPyramid recommendation for physical activity was used in the design of the preamble. At each site conducting NGTs, the questions and the preamble were translated into Spanish by Spanish-speaking researchers who had extensive experience with the targeted population and later back-translated to English to ensure equivalence.

NGT Sessions for Development of a PAR Adherence Survey

Qualitative Phase. Separate adult and child NGT sessions were conducted with participants participating in either the barriers or the facilitators group for physical activity (total of eight sessions). Each session was conducted by two trained facilitators, and included six to 10 participants. All facilitators followed the same detailed written script. All adults completed a detailed demographic questionnaire and gender and ethnicity were obtained from the children before the NGT sessions.

After the preamble was presented, participants were given a worksheet and asked to silently record, as concisely as possible, their responses to the question: "What sorts of things make it hard (barriers) or easy (facilitators) for people to follow the MyPyramid recommendation for physical activity?" A round-robin response nomination process was employed to have participants, one at a time, read aloud a single idea from their worksheets. As each response was read, a facilitator recorded it verbatim on a Post-it note and posted it in plain view of the participants. Response nominations continued until all responses were exhausted. This process helped ensure that all participants had similar opportunities to contribute their ideas and to produce a high volume of varied responses. A



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brief clarification process followed. In most cases, 24 to 36 responses were generated per session. Next, of the responses generated, participants silently chose and recorded five of the responses they personally considered most salient with respect to a selection criterion (e.g., most helpful and least helpful) on index cards which were passed to the facilitators. The two facilitators summed the rankings for each response and shared the rankings with the group. From the rankings, a list of the top ten responses were recorded on a new Post-it note. Finally, participants individually ranked this list of top responses from 0 to 10 according to how important/influential each was to them personally. All participants were asked at the beginning of the session if they had heard of MyPyramid. Standardized scripts, protocols, procedures, and worksheets were used by both sites to ensure consistent implementation. An NGT expert trained all group facilitators.

The response distillation used to develop inclusive lists of perceived PAR barriers and facilitators involved compiling and aggregating the prioritized, substantively similar responses across racial/ethnic groups. Any nonredundant responses endorsed by any group were included in generating 4 master response lists: 1) caregiver-perceived PAR barriers, 2) caregiver-perceived PAR facilitators, 3) child-perceived PAR barriers, and 4) child perceived PAR facilitators. The items distilled from the NGT sessions for the subsequent survey were subjected to in-depth cognitive interviews to finalize items representing adult caregiver and child barriers and facilitators to meeting the PAR. Cognitive interviews were conducted within each racial/ethnic group to assess the meaning and cultural sensitivity of survey items with the use of a standardized protocol. The purpose of cognitive interviewing was to ensure that item concepts and wording were comparable across different racial/ ethnic groups. After all the cognitive interviews were conducted, the measurement team examined the

feedback to make adjustments so that items would be understood similarly. The survey items selected for the barriers and facilitators survey were based on the most likely endorsed barriers and facilitators to meeting the specific recommendations for physical activity [29]. A detailed description of the methodology used to determine the barriers and facilitators for consumer adherence to the PAR has been published previously [21].

Quantitative Phase. Four surveys were finalized for adult caregiver barriers; adult caregiver facilitators; child barriers; and child facilitators. All items on each scale were assessed with a 4-point Likert scale, which was anchored at each end by the terms “strongly disagree” and “strongly agree.” The 1-to-4 score was assigned to each physical activity survey item for the barrier and facilitator question items for both the caregiver and child versions of the barriers and facilitators survey. Each numeric score was assigned as follows: 1 for strongly disagree, 2 for disagree, 3 for agree, and 4 for strongly agree. For each of the barriers and facilitators surveys, item scores were summed to provide an overall barriers or facilitators score for physical activity. A higher score indicated that either more barriers or more facilitators were reported for meeting the PAR.

Data Analysis

The qualitative and quantitative phases of the study generated for the caregiver 20 barriers and 21 facilitators survey items and for the child 22 barriers and 21 facilitators survey items used in the data analysis. The analysis of data from the NGT and reporting of results was carried out using a combination of both qualitative and quantitative methods. The qualitative component was specifically used to generate ideas from the whole group using accepted methods [27,30,31]. These ideas were then used in the quantitative analyses.



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The quantitative analysis of data resulted from the scoring and ranking methods used to identify group priorities. Following the system described by Delbecq and Van de Ven [25,32], scoring occurred in two stages. The first stage involved rating the importance of the entire list of responses, from five (most important) to one (least important), and sum the assigned rating for each rated item (all items did not receive a rating). In the second stage, from among the

ranking of the items on the previous list, a new list with the top-10 items (or fewer) was derived. From the new list, now considered most important to the group, a new ranking took place by writing in any number between 0 and 10 for each item, a lower number indicated an item not believed to be a big problem, whereas a higher number represented an item believed to be a big problem. The rankings were based on the average.

Results

Participants Demographic Characteristics

A total of 35 adult caregivers (37% African-American, 34% European-American, and 29% Hispanic-American; 11% males and 89% females; mean age 40 ± 8.1 years) and 38 fifth-grade children (32% African American, 37% European American, and 32% Hispanic American; 50% males and 50% females) participated in one of the eight NGT sessions specific to the PAR (four NGT for barriers and four NGT for facilitators) (Table 1). Sixty-seven percent of adults were married, 51% had a college degree, 83% were employed, and 67% had two or fewer children younger than age 18 years living in the household.

Table 1

	Total		Barrier			Facilitator		
Children (N=38)	n	%	Sample	n	%	Sample	n	%
Gender			19			19		
Male	19	50		10	52.63		9	47.37
Female	19	50		9	47.37		10	52.63
Race/ Ethnicity			19			19		
African American (AA)	12	31.58		5	26.32		7	36.84
European American (EA)	14	36.84		8	42.11		6	31.58
Hispanic American (HA)	12	31.58		6	31.58		6	31.58
Adults (N=35)	n	%		n	%		n	%
Gender			17			18		
Male	4	11.43		3	17.65		1	5.56
Female	31	88.57		14	82.35		17	94.44
Race/ Ethnicity			17			18		
African American (AA)	13	37.14		6	35.29		7	38.89
European American (EA)	12	34.29		6	35.29		6	33.33
Hispanic American (HA)	10	28.57		5	29.41		5	27.78
Marital Status			17			18		
Married	21	60		8	47.06		13	72.22
Divorced	4	11.43		2	11.76		2	11.11

Never Married	8	22.86		7	41.18		1	5.56
Other	2	5.71		0	0		2	11.11
Employment			17			18		
Yes	29	82.86		15	88.24		14	77.78
No	6	17.14		2	11.76		4	22.22
Education			17			18		
High School or less	5	14.29		2	11.76		3	16.67
Some College/Tech	12	34.29		9	52.94		3	16.67
College and more	18	51.43		6	35.29		12	66.67
No. people living in Household			17			18		
<=2	2	5.71		1	5.88		1	5.56
3	9	25.71		2	11.76		7	38.89
4	10	28.57		6	35.29		4	22.22
5	9	25.71		5	29.41		4	22.22
6+	6	14.29		3	17.65		2	11.11
No. Children under 18yrs who live with you			16			17		
<=2	22	66.67		9	56.25		13	76.47
3	7	21.21		4	25.00		3	17.65
4	3	9.09		2	12.50		1	5.88
5+	1	3.03		1	6.25			
	Mean	SD		Mean	SD		Mean	SD
Age (yrs)	40.32	8.11	16	36.13	7.01		44.06	7.27

Reported Barriers to Adherence to the Physical Activity Recommendation (Table 2).

Adults. Three overarching themes were reported by adults as barriers to adherence to the PAR: 1) time constraints and management; 2) lack of motivation; and, 3) life events and demands. Examples included lack of time, other things to do, and no set schedule. For lack of motivation, examples included no self-discipline, or postponing exercise till later, and lack of motivation. For life events and demands, examples included work, demands of home life, running kids to different activities/busy kids schedule, and no childcare. Other isolated barriers included lack of money, tired from a long day/work, and medical issues.

Children. Two overarching themes were reported by the children as barriers to adherence

to the PAR: 1) health and psychological limitations, and, 2) competing activities. Majority of the responses were related to health and psychological limitations which included health issues such as asthma, heart problems, cancer, poisoned, or too weak and not enough sleep. Other limitations were being in a wheel chair and being mentally challenged. Competing activities included being too busy with other chores/things, watching TV, or video games. Other isolated comments included no money to join the gym, physical education is too short and people are not used to running.

Reported Facilitators to Adherence to the Physical Activity Recommendation (Table 3).

Adults. Three overarching themes were reported by adults as facilitators to adherence to the PAR: 1) health and psychological



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wellbeing, 2) family cohesion and peer support, and, 3) ways to be physically active. For health and psychological wellbeing, majority of the responses reflected the benefits of being physically active which included improving self-esteem, having more energy, improving health and living longer and prevention of disease and obesity. For family cohesion and peer support, responses reflected the importance of family participation and support as well as finding a friend/partner to feel more motivated. Some of the ways to be physically active included dedicating time to do physical activity, setting a goal, making exercise fun, and walking/biking rather than driving the car.

Children. Two overarching themes were reported by the children as facilitators to adherence to the PAR: 1) ways to be physically active, and 2) peer support. Majority of the responses reflected ways to be physically active and included joining a health program, join a sports team or playing a sport that you liked, and other activities like basketball, swimming, walking, recess at school, and going to the park. Other isolated comments included getting enough sleep so you can have energy, drinking a lot of water, and having a proper understanding of the activity.

Table 2

Response barriers by adult caregivers	Ave rage	Min- Max	Response barriers by children.	Ave rage	Min- Max
Time Constraints and Management			Health and Psychological Limitations		
Lack of time	8.00	5-10	If you have asthma	9.50	9-10
No time	6.40	2-10	If they are in a wheel chair	9.33	8-10
Other things to do	5.60	3-8	If they are mentally challenged	9.17	5-10
Not a set schedule	5.33	0-10	People could have heart problems	8.50	1-10
			People could have cancer	8.50	5-10
			If you are poisoned	7.83	0-10
			You don't have enough energy	7.83	5-10
			Too old	5.40	2-10
			Too weak	5.40	0-10
			People have heart problems	4.60	0-10
			Don't get enough sleep	4.00	0-10
Lack of Motivation			Competing Activities		
No self-discipline	7.00	3-10	Too busy with other things	7.40	3-10
Postpone exercise; start later	5.60	0-9	Watching TV	7.13	0-10
Lack of motivation - don't feel like working out	5.33	2-10	Like if too busy, going somewhere	6.50	3-9
Lack of discipline	4.67	0-10	Get distracted by video games	6.20	0-10
			Chores	4.50	0-8



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Life Events and Demands			Other Isolated Comments		
Work - job	7.67	0-10	People might only want to do what they want, selfish	6.17	0-10
Demands of home life, keeping house, cleaning, keeping repairs etc.	7.33	2-9	No money to join the gym	6.00	1-10
House chores	5.20	2-10	Physical education is too short	5.67	0-10
Running kids to different activities	5.00	1-8	People are not used to running	4.83	0-10
Two jobs	4.80	0-10			
Busy kids schedule	4.67	0-9			
Small children at home	4.67	0-10			
No childcare	4.50	0-9			
Other Isolated Comments					
Lack of funds/ money	5.33	0-8			
Sleep-tired from long day	5.33	0-10			
Medical issues	5.17	0-10			
Tired from work	4.80	0-9			
Ranked votes for physical activity (PA) barriers by adult caregivers and children to adherence to the physical activity recommendations.					

Table 3

Response facilitators by adult caregivers	Average	Min-Max	Response facilitators by children.	Average	Min-Max
Health and Psychological Wellbeing			Ways to be Physically Active		
Improve self esteem	10.00	10-10	Join a health program	9.33	7-10
To feel better about oneself (don't feel guilty for not exercising)	9.80	9-10	Try different types of exercise	9.33	7-10
Have more energy	9.40	8-10	Basketball	9.17	8-10
Improve health	9.00	7-10	Stop using the car and walk more	9.17	5-10
To live a long healthy life	9.00	6-10	Recess at school	8.83	6-10

Disease prevention	8.80	7-10	Go to the park	8.33	6-10
Maintain a set weight	8.20	7-10	Playing a sport that you love	7.83	3-10
Preventing childhood obesity in general	7.20	5-10	You can do walks for medical reasons like the breast cancer walks	7.00	1-10
			Discover new things to do	7.00	0-10
			You can go swimming & kick your legs for the exercise	6.71	2-10
			Join a sports team that practices every day	6.67	2-10
			Gym class	6.33	0-8
			Doing exercise from a tv show	6.33	0-10
Ranked votes for physical activity (PA) facilitators by adult caregivers and children to adherence to the physical activity recommendations.					

Discussion

This study investigated the barriers and facilitators for adherence to PAR among adults and children. Such information is important in designing effective interventions that will help adults and children get closer to meeting the quantifiable recommendations for physical activity that are science-based and endorsed by several authorities [1,2]. There is a major fundamental difference between this study and others reporting on barriers and facilitators to physical activity. This study examined the barriers and facilitators to following the prescriptive recommendations for physical activity as opposed to being physically active in a more generalized context. In this study, the participants were informed as to what the current recommendations were for physical activity with the use of the preambles that were discussed prior to the NGT's. The results from this study not only confirm previous qualitative

findings [33-37] but provide new insights on barriers and facilitators to meeting the physical activity recommendations. Moreover, the results suggest a contrast in the reported results among adults and children from a multi-ethnic sample; yet, the sample was a small convenience sample and not a nationally representative sample. Thus, more research is needed to confirm these findings and to better understand why Americans are not meeting the physical activity recommendations [1,2].

Consistent with other studies [36,38,39], the barriers reported by adults to meeting the PAR included lack of motivation (lack of interest), lack of time, and competing life events and demands. Although financial constraints were a reported barrier, the predominant barrier among adults to meeting the PAR was the chaotic life events and demands which limited their time to adhere to the PAR. Competing activities were reported by the children as a barrier to meeting the PAR. This is consistent with other studies



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[19,40,41], but as to be expected, the children's competing activities were very different than those reported by adults.

Of particular importance is that the children reported health and psychological limitations as a barrier to meeting the physical activity recommendation. However, the adults perceived health benefits as a facilitator to being physically active. This is not surprising given that healthy children often do not perceive that physical activity will improve their health. The perceived barriers reported by the children reflect health and psychological limitations that are barriers to being physically active among their peers/friends or family members but not for themselves, per se. As for the adults, health and psychological wellbeing was perceived as a facilitator to being physically active. This makes sense in that adults are at an age whereby they may be experiencing health problems or are looking for ways to improve quality of life and prevent the occurrence of chronic disease. Peer support was a facilitator for both adults and children which has been reported in other studies [19,36,38-41]. Important information was reported on "ways" both adults and children can be physically active. Although the "ways" to be physically active varied among adults and children, the reported facilitators can be used to design interventions that are more likely to be effective; e.g. tailored specifically to facilitators reported by adults and children.

Strengths and Limitations [42-44]

Qualitative research has several strengths when properly conducted. A research topic can be examined in detail and in depth. The interviews are not restricted to specific questions because there is the flexibility of guiding/redirecting the responses by the researcher for clarification in real time. Subtleties and complexities about a research topic can be discovered that are often missed by more quantitative methods. The

advantage of the approach used in this study was the combination of both qualitative and quantitative methods. As with any study, there are inherent limitations. Given the small sample size, generalizability to a national sample is limited. However, these results do generate future hypotheses that can be tested in a larger study with objective assessment of physical activity.

Conclusion

Although the "ways" to be physically active varied among adults and children, the reported facilitators and barriers can be used to design interventions that are more likely to be effective with adults and children.

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Author's contributions

TN conceived the overall design and execution of the study. DT assisted with input on the analytical approach, interpretation of the results, and editing of the manuscript. YL was responsible for the analyses. All authors read and approved the final manuscript. All authors declare no conflict of interest.

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