

PHYSICAL ACTIVITY LEVELS OF SCHOOL-AGED CHILDREN AND ADOLESCENTS IN ILE-IFE NIGERIA

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Abstract

Introduction: Adolescents and children like adults have been found not to meet up with the recommended levels of physical activity.

Objective: To assess physical activity levels of school-aged children and adolescents in Ile-Ife, Nigeria.

Methods: This cross-sectional study involved randomly selected participants between ages 8 and 19 years attending primary and secondary schools in Ile-Ife, Nigeria. The protocol for this study was approved by Obafemi Awolowo Teaching Hospital Complex Review Committee. Participants were informed about the procedure and assent was obtained on their behalf. The Physical Activity Questionnaires for children and adolescents were used to obtain information from participants. Data obtained were analyzed using descriptive and inferential statistics of *t*-test and Chi square at 0.05, α -level.

Results: One thousand five hundred copies of questionnaire were administered but only 1480 were amenable to statistical analyses giving above 90% response rate. The average age of participants was 12.0 ± 2.59 years. The majority of participants; 1162 (78.5%) reported moderate level of physical activity with significantly more number of children in the category; 600 (83.6%), 562 (73.8%) children and adolescents respectively. Male participants reported a significant, higher level of physical activity than female participants. Female adolescents were least active.

Conclusion: This study concluded that children were more physically active than adolescents; males were also more physically active than their female counterparts. Participation in physical activity should be encouraged from childhood and with increasing age.

Key words: physical activity level, increasing age, children, adolescents, gender

Introduction

Physical activity is an important and modifiable factor influencing people's health across all ages [1]. Several physical and psychosocial benefits leading to health enhancement are inherent in adopting a physically activity lifestyle which when adopted early in childhood and adolescence may result in lifelong behavioral pattern in adulthood [2-4].

Physical activity levels have been assessed among children and adolescents in different parts of the world. In a study by Sallis et al. [5], it was observed that physical activity levels declined through the teenage years at a rate of about 2.7% per year in males and 7.4% in females. Kin-Isler et al. [6] assessed the levels and patterns of physical activity in 11-14 year old Turkish adolescents and found that 11-year-old adolescents had higher physical activity levels than their 12-13 and 14-year-old counterparts.

Simons-Morton et al. [7] reported that children living in modern urban areas in the USA spend their free time engaging in various types of leisure activities including watching television and playing video games for a minimum of 24 hours per week. This is the same trend in Canada, where according to the 1998 Physical Activity Monitor [2000], over 60% of Canadian youth could not be considered active enough to support a habit of lifelong activity. Hardy et al. [8] observed that

most common sedentary behaviors among girls during early to middle adolescence were watching television, videos and playing video games. Voorhees et al. [9] also found that early adolescent girls self-reported more physical activity than older adolescent girls. A study by Craig et al. [10] reported, however, that low intensity, high volume of physical activity among South African children and adolescents.

The observation that physical activity in children and adolescents are not up to recommended levels has been traced to increasing sedentary lifestyles children tend to live while working on computers, playing video games and watching the television [11]. Regular participation in physical activity during childhood and adolescence may be of critical importance in the prevention of chronic disease later in life [12]. Physical activity and cardio respiratory fitness are also said to be associated with metabolic risk factors in children and adolescents [13]. Andersen et al. [14] examined physical activity and cardiovascular risk in 1,732 youth between the ages of 9 and 15 years and reported that increased physical activity decreases the risk of cardiovascular disease. Physical activity also improves flexibility, increases lubrication of joints surface, reduces potential of injury and limits the effects of degenerative arthritis [15]. Studies have also shown that physical activity helps in reducing the intensity of pain and pain-related disabilities [16,17].

Enhanced physical activity during childhood and adolescence can improve health and reduce the risk for chronic disease during adulthood [18]. Children and adolescents are however not meeting the recommended physical activity levels. Physical activity has been observed as lower in females than males reducing with increasing age as children tend to be more physically active than adolescents. This study therefore assessed levels of physical activity among adolescents in Ile-Ife Nigeria.

Methods

Participants were school-aged children and adolescents between the ages of 8 and 19 years recruited from primary and secondary schools in Ile-Ife. A total of 1500 respondents were recruited for the study but only 1480 copies of questionnaires were amenable to statistical analyses. This was a cross sectional study. Stratified and fish bowl simple random sampling techniques were used to select participants for this study. Participants were recruited until a total of 718 (48.5%) children and 762 (51.5%) adolescents completed the study.

Protocol of study

Ethical approval was obtained from the Ethics and Research Committee of Obafemi Awolowo University Teaching Hospital Complex (OAUTHC) Ile-Ife. Assent was obtained on behalf of each participant. Purpose of study was explained to participants and subsequently, the Physical Activity Questionnaires for Children and Adolescents (PAQ-C; PAQ-A respectively) were used in this study for collection of information. The PAQ-C and PAQ-A are self-administered, 7-day recall questionnaires that measure general moderate to vigorous physical activity levels of children and adolescents. Kowalski et al. [19] reported PAQ-C and PAQ-A as valid measures of physical activity. The PAQ-C was developed to assess general levels of physical activity throughout the elementary school year from grades 4 to 8 and approximately 8 to 14 years [19]. The PAQ-A was developed to assess general levels of physical activity for high schools students in grades 9 to 12 and approximately 14 to 19 years of age [19].

Participants were categorized in this study according to school grades. In Nigeria, children in grades 4 to 8 are approximately 9 to 13 years and grades 9-12 approximately 14-18 years. Hence participants in this study were categorized as children when between 8 to

13 years and adolescents 14 to 19 years. Crocker et al [20] studied 215 students ranging in age from 9 to 15 years and found the physical activity questionnaire for children acceptable with high internal consistency and test re-test reliability of $r = 0.75$; and $r = 0.82$ among males and females respectively. The validity of the PAQ-A was further reported by Kowalski et al. [21] as being as high as or greater than a 7-day recall interview.

Statistical analysis

Data obtained were analyzed using descriptive statistics of mean and standard deviation to describe the data and independent t-test to compare physical activity of children and adolescents. Chi-square was used to compare physical activity levels across different groups. Significance was set at 0.05 α -level.

Results

Participants' Physical Activity Levels

One thousand four hundred and eighty participants completed this study. Seven hundred and eighteen (48.5%) were children and 762 (51.5%) were adolescents. Participants' ages ranged between 8-19 years with a mean of 9.79 ± 1.03 years for children and 14.1 ± 1.74 years for adolescents. Comparison, of age and physical activity levels of children and adolescents using independent t-test showed that there was significant difference between age and physical activity levels ($P = 0.047$) of children and adolescents with average values of physical activity observed as greater for children than adolescents (Table 1).

Comparison of Physical Activity Levels of Children and Adolescents

Physical activity levels of children and adolescents were compared using Chi square test. Result obtained showed that most participants 1162 (78.5%) were in the moderate level of physical activity significantly ($P < 0.05$) with more children 600 (83.6%) in the moderate category as opposed to adolescents 562 (73.8%) (Table 2).

Physical activity levels of children and adolescents were compared across gender using Chi square test. Result obtained showed that a significantly ($P \leq 0.05$) greater proportion of female children and adolescents were in the low physical activity category compared with their male counterparts. It was observed that the majority of participants; boys and girls were in the

Table 1. Independent t-test Comparison of Age and Physical Activity Levels of Children and Adolescents

N = 1480	Children $\bar{x} \pm SD$	Adolescents $\bar{x} \pm SD$	t	P
Age (years)	9.798 ± 1.028	14.116 ± 1.735	57.790	0.001*
PA	2.5213 ± 0.559	2.459 ± 0.628	1.985	0.047*

Key: PA- Physical Activity; $\bar{x}$ = Mean; SD = Standard Deviation; * = Significance at 0.05 α -level

Table 2. *Comparison of Physical Activity Levels of Children and Adolescents using Chi Square*

Age Group	PA						χ^2	P
	LOW		MOD		HIGH			
	n	%	n	%	n	%		
Children	113	15.74	600	83.57	5	0.70	17.004	0.001*
Adolescents	190	24.93	562	73.75	10	1.31		

Key: PA – Physical Activity; LOW = Low Physical Activity Level; MOD = Moderate Physical Activity Level; HIGH = High Physical Activity Level; n = Number of Participants; % = Percentage; * – Significance at 0.05 α -level

Table 3. *Chi-Square Test Comparing Physical Activity of the Different Age Groups by Gender*

	Children				Adolescents				χ^2	<i>P</i>
	Male		Female		Male		Female			
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%		
Low	33	10.06	80	20.51	73	18.81	117	31.28	53.906	0.001*
Mod	291	88.72	309	79.23	308	79.38	254	67.91		
High	4	1.22	1	0.26	7	1.80	3	0.80		

Key: Low = Low physical activity; Mod = Middle physical activity; High = High Physical Activity; n = Number of Participants; % = Percentage; * = Significance at 0.05 α -level

Table 4. *Chi-square Test of Comparison of Physical Activity Levels between Male and Female Children*

Sex	LOW		MOD		HIGH	
	n	%	n	%	n	%
Male	33	10.1	291	88.7	4	1.2
Female	80	20.4	309	79.2	1	0.3
χ^2	16.659					
P	0.001*					

Key: LOW = Low physical activity = 1-1.99; MOD = Middle physical activity = 2-3.99; HIGH = High physical activity = 4-5; n = Number of Participants; % = Percentage; * = Significance at 0.05 α -level

Table 5. *Chi-Square Test of Comparison of Physical Activity Levels between Male and Female Adolescents*

Sex	LOW		MOD		HIGH	
	n	%	n	%	n	%
Male	73	18.8	308	79.4	7	1.8
Female	117	31.3	254	67.9	3	0.8
χ^2	16.727					
P	0.001*					

Key: LOW = Low Physical Activity; MOD = Moderate Physical Activity; HIGH = High Physical Activity; n = Number of Participants; % = Percentage; * = Significance at 0.05 α -level

moderate category. More male adolescents 7 (1.8%) reported that they were involved in high level of physical activity compared with their female counterparts (Tables 3, 4 and 5).

Discussion

This study aimed at determining physical activity levels of school-aged children and adolescents of ages 8-19 years. Comparisons were made between physical activities levels of children and adolescents and of male and female participants also. The majority of

participants were in the moderate physical activity category. This observation is consistent with findings in literature. About half of the United States adolescent population are moderately active on a regular basis and 14% are completely inactive [18,19] furthermore, Sallis et al. [22] submitted that most young people do not meet the recommended 30-60 minutes of physical activity per day [23], such as brisk walking, bicycling or even dancing, on most days of the week. Colley et al. [24] in their study on assessment of physical activity among Canadian youths and children submitted that

the majority of participants (97%) engaged in moderate intensity physical activity. Janz et al. [25] using an axial accelerometer, also reported that participation in physical activity of the majority of 5 year olds in her study was of moderate intensity.

The observation in this study that the majority of participants were in the moderate physical activity category might be because participants were preparing for school examinations at the time of data collection which could have reduced their participation in physical activity in the previous week. Measurement of physical activity in this study was based on a 7-day recall of activity participation and physical activity in this was measured accordingly as a 7-day recall of activity. Students' home environment may not be well equipped with facilities for physical activities. Although home environment for physical activities was not considered in this study, Ile-Ife the site for the study is a semi-urban community with little or no access to physical activity facility around peoples' homes. Simire [26] studied physical activity levels of students of Obafemi Awolowo University, Ile-Ife, between ages 17 and 35 years. He concluded that students who lived in on-campus housing; with facilities for physical activity had better physical activity levels compared with their counterparts whose off-campus housing did not have enough facility for physical activity. Several authors have reported that presence of facilities for physical activity in a short distance from home will positively influence participation in vigorous physical activity [27-30].

This moderate/low levels of physical activity observed in this study is however inconsistent with results of some studies in Africa. Jepkemoi, [31] reported that the majority of adolescents who participated in her study in Kenya were physically active. Similarly Craig et al [10] reported high volume of physical activity among South African children and adolescents. A study by Hohepa et al, [32] involving adolescents also reported that only about 30% participants involved in the study was sedentary. Jepkemoi [31] however studied boarding school students in a high school in an urban community, as opposed to this study that considered students from different secondary schools in a semi-urban community.

Although the majority of participants were in the moderate category of physical activity, more children were in the moderate category with average physical activity level of children better than those of adolescents. This suggests that the physical activity level of children was better than those of adolescents. Physical activity levels for both males and females declined during high school years. This observation is similar to that of previous studies reviewed by Sallis et al. [22] and Pate et al. [33] on correlates of physical activity among children and adolescents in which they reported an inverse association between age and physical

activity among adolescents. Based on this observation, adolescents who were significantly older than children in this study reported lower physical activity levels suggesting that physical activity decreased as participants age increased. Kin Isler et al. [6] reported age decline with physical activity among Turkish adolescents. Caspersen et al. [34] submitted that there is a decline in physical activity from ages 15-18 years and Azevedo et al. [35] reported that physical activity declines with increase age. The observation in this study that physical activity decreased with age might also be because of the heavier academic workload of adolescents compared with that of children.

It was observed that physical activity levels of male participants were higher than that of female participants for both children and adolescents. Lower levels of physical activity have been reported among adolescent girls compared with their male counterparts [21,22,36]. This difference could be attributed to a lack of interest on the part of the females owing probably to avoidance of injuries likely to be associated with engagement in physical activity. The increase in body fat among female adolescent has been purported to limit their access and discourage them from participating in physical activity [36,37]. Rowland [36] submitted that increased fat makes exercise more difficult and causes a tendency to avoid physical activity, which in turn results in more body fat and a diminished urge to exercise among adolescent females. Armstrong and Weisman [38] similarly reported that the general pattern of changes in absolute aerobic power decreases in adolescent girls from 13 to 15 years.

Participation in household chores as opposed to outdoor activities is common among females in this environment and these activities do not constitute much of vigorous physical activities, and might be a reason why females are less physically active than males. The result of this study also tallies with results of a study by Trost et al. [39] who reported more participation by males in vigorous intensity physical activity in the United States of America. This study however disagreed with the findings of Jepkemoi [31] who found no difference in the physical activity levels of male and female adolescents in Nairobi, Kenya with the explanation of more sports facilities present in the female schools as compared with the male schools studied.

This study concluded that the majority of participants were in the moderate category of physical activity. Children had significantly higher levels of physical activity than adolescents. Also, males reported higher levels of physical activity than females. There should be an increased awareness of the health benefits of physical activity which should involve teachers, parents, guardians and the children and adolescents themselves. Female adolescents should be more encouraged to participate in physical activity. Since inactive chil-

dren are likely to become inactive adults, improving opportunities to reshape our sedentary society into one that facilitates and promotes participation in physical activity during childhood, throughout adolescence, and into adulthood is important.

The physical activity questionnaire used in this study involves a 7-day recall of events among adolescents and this might have affected accurate response of participants in this study. In youth physical activity research, self-report measures are most commonly used but there is a constant debate about their effectiveness [40]. Furthermore measuring physical activity in children is difficult [22,41]. Although a self-report instrument was used in this study, precautions were taken to reduce these problems. Instructions and questions were read aloud to younger participants to reduce socially desirable responses. The cross-sectional nature of the study may limit the ability to make causal inferences. An individual currently participating in a physical activity will not necessarily continue to do so.

Declaration of interest

The authors have no conflicts of interest to declare.

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