

Title: Age and Gender Differences in Physical Activity Behavior among Primary School Pupils

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Abstract

This study examined age and gender differences in physical activity behaviour among primary school children in Tanzania with reference to Nyamagana Municipality in Mwanza region. A quantitative research approach was employed in testing the statistical hypothesis. Stratified random sampling technique was used to select a sample of 334 participants. Physical Activity Questionnaire for children (PAQ-C) was used to collect the data. The findings of the study revealed that physical activity declined with age. Similarly, females' participation rate in physical activity was low as compared to that of male, thus indicating a significant difference between sex and physical activity behaviour. Sex differences were observed in the intensity, physical activity scores and intensities of physical activities. In both boys ranked higher than girls. The study recommended that both moderate and sedentary children should accumulate at least 60 minutes per day of physical activity of varying level of intensity which is appropriate to their developmental age. Also, Physical education classes should be effectively organised and supervised so that children are given equal opportunities in physical activities. Moreover, in order to improve and make lifespan physical activity opportunities for people of all ages, educational and political efforts should not only be focused primarily on individuals, as a matter of individual responsibility; but also as a collective or structural responsibility. A similar study is recommended for a wider area and wider constituency in order to ascertain a situation of physical activity behaviour in rural versus urban and sub-urban settings.

Key Words: *Age, gender, physical activity, behavior, primary school pupils*

Introduction

Physical activity behaviour and the factors influencing it are very complex. Interaction of environmental, social, and individual factors is the function for an individual, group, or community to be physically active. According to World Health Organisation (WHO, 2010), Physical activity (PA) in children and adolescents may take many forms including play, games, sports, transportation, recreation, physical education or planned exercise in the context of family, school, and community. For adults, PA includes recreational or leisure-time physical activity, transportation (e.g. walking or cycling), occupational (i.e. work), household chores, play games, sports or planned exercise (Ibid).

Regular PA is necessary for the optimal development of an individual's work capacities and powers. In seeking to foster children's physical, social, and mental development; child-development experts have long recognized the importance of providing opportunities for physical activity (Siedentop, 2004). During childhood years, individuals who are more physically active have the opportunity to further refine their motor skills (Graf, Koch, Kretschmann-Kandel, Falhowski, Christ, & Coburger, 2004). For example, through active play, young children develop the fundamental movement patterns of crawling, standing, walking, running and jumping. However, restrictions in physical activity opportunities may jeopardize skill development and compromise body composition as a result of lower levels of energy expenditure (Booth, Okely, Denney-wilson, Hardy, Yang, & Dobbins, 2006).

Most evidence indicates that children who have enriched physical activity experiences as infants tend to be fit and more likely to participate in physical activity throughout their lives (Siedentop, 2004). On the other hand, unfit children tend to become unfit adults. This has been supported by Rhodes, Courneya and Jones (2004) who foresee prior behavior as an indicator for future behavior. Many fitness problems, therefore, have a pediatric origin (Siedentop, 2004). Thus, inactive children tend to become inactive adults exposing themselves to hypokinetic diseases. Hypokinetic diseases are those caused by or related to a lack of appropriate physical activity (Siedentop, 2004). Illnesses that are typical of the hypokinetic or degenerative group are coronary artery disease, high blood pressure, lower-back pain, obesity, diabetes and osteoporosis (Ibid).

It is recommended that in order to get substantial health benefits adults should participate in physical activity of modest amounts (low-to-moderate-intensity PA) for 30 minutes per day (Siedentop, 2004). For children, it is recommended at least 60 minutes per day of physical activity of varying level of intensity which is appropriate to their developmental stage (Ibid).

Since habits of participation in physical activity clearly begin in childhood, this suggests that engagement in physical activity should be encouraged at a very young age to produce a long-term health-benefits and lifestyle based on high levels of physical activity. In order to improve and make lifespan physical activity opportunities for people of all ages, educational and political efforts should not only be focused primarily on individuals, as a matter of individual responsibility; but also as a collective or structural responsibility (Siedentop, 2004). Given the importance of early-childhood Physical Education (PE), physical educators must develop appropriate programs that reach all children and the government should provide facilities that are accessible to and affordable for the public at large.

Despite the known and well documented benefits of physical activity, trends show that physical activity is dramatically declining all over the world both among children and adults. From the global point of view for example, prevalence of physical inactivity among primary school children has been reported to be higher in Philippines whereby 90% boys and 93% girls do not engage in a sufficient amount of physical activity (Guthold, Cowan, Autenrieth, Kann, & Riley, 2007). In China, 75% of school children are inactive, while in Uruguay, 59.1% school children are inactive (Ibid). In German, 20.4% of children aged 7-10 and only 6.6% of adolescents aged 14-17 achieve the recommended guidelines of PA (Ortlieb, Schneider, Koletzko, Berdel, Von Berg, & Bauer, 2013). Furthermore, evidence from cohort studies demonstrates that, only one third of European children achieve the current guidelines of at least moderate to vigorous physical activity per day which is between 30 to 60 minutes per day (Ibid).

In Africa, the highest prevalence of physical inactivity among primary school children is reported to be 95.9% and 91.0% in Egypt and Zambia respectively. In Namibia, 88% boys and 88.9% girls are reported to be physically inactive. In Kenya, Ojiambo, Easton, Casajus, Konstabel, Reilly, and Pitsilads (2012) reported that, 65% and 66% rural males and females respectively at the age of 12 to 16 years are not physically active. Physical inactivity for Uganda Primary school children has been reported to be 82% for boys and 84% for girls (Guthold, Cowan, Autenrieth, Kann, & Riley, 2007).

Tanzania is not exempted from the prevalence of physical inactivity among primary school children. Nyandindi (2008) reported that 62% of boys and 68.2% of girls of primary schools were physically inactive. This indicates higher rate of physical inactivity when compared to secondary students. For instance, Mabagala (2002) reported that, 41.4% of Tanzanian secondary school students were inactive due to increase of sedentary recreation time. In 2004, the percentage of secondary school students who developed sedentary behaviors increased to 43.69% (Ndabi, 2004). This implies that, physical activity has to be more emphasized among primary school children, a situation that may help in preventing the hypokinetic conditions during their childhood and as they grow to adulthood (Rhodes, Courneya & Jones, 2004).

Decline in physical activity participation across population can be attributed by number of factors. These include environmental, psycho-social, and biological factors. Environmental factors include a reduced emphasis in physical education programmes in schools and communities, and the misuse of open areas (children playing grounds). Increased use of electronic appliances such as television, video games and radios has made children spend much time watching television, listening to radio programmes and playing electronic games and sports which make children more inactive (Robinson, 2002; Kigwangallah, 2005; Pangani, 2007). Moreover, there is an increase of the labour saving devices of the modern lifestyle such as use of school buses for children, elevators and personal computers (Foster, 2004). All these have resulted into physical activity transition which refers to a shift away from the high energy expenditure activities towards more sedentary occupations together with less active modes of transportation and activity patterns during leisure hours (Adamo, Sheel, Onywera, Boit, & Tremblay, 2011). Psycho-social factors include perception of competence, self-efficacy, beliefs about activity, benefits of activity, and the influence of peers, teachers, and parents (Mabagala, 2002).

Biological factors play a role in determining physical activity level. Biological determinants of physical activity are factors that are biologically inherent towards physical activity (Eisenmann & Wickel, 2009). They include Body Mass Index (BMI) or weight status, physical fitness (NICE, 2007), and heredity, sex, adiposity, as well as sexual maturity (Eisenmann & Wickel, 2009). Welk (1999), considered biological factors as physical skills, fitness, and body fats which are also considered enabling factors. Generally such variables are usually studied as potential moderators of behavior as they can influence activity behavior.

There is a consensus that schools are a natural setting to influence the physical activity behaviours of young people through PE programmes. However, the prevailing World concern is that, young people are increasingly becoming physically inactive than their counterpart young people of previous generation (Berntsen, 2009; Mabagala, 2002). While it is presumably asserted that physical activity is a behavior (Martinez-Vizcaino & Sanchez-Lopez, 2008); and that, prior

behavior becomes an indicator for future behaviour (Rhodes, Courneya & Jones, 2004); trends show variations in physical activity whereby it declines with the increase of age. Moreover, studies reveal a more decline in participation in PA among girls than boys. The gaps in the literature also reveal that such study has not systematically done in Tanzania. Thus, in Tanzania it is not well known the extent to which age and gender influence PA behavior among primary school children. Therefore, the present study examined the influence of age and gender on physical activity behavior among school children in Tanzania.

The purpose

The purpose of this study was to examine the influence of age and gender differences on physical activity behavior among primary school pupils in Tanzania specifically in Nyamagana municipality.

Hypotheses

- i. There is no significant difference between age cohorts and physical activity behavior among primary school pupils
- ii. There is no significant difference between sex and physical activity behavior among primary school pupils

Conceptual Framework

This study was guided by Children's Physical Activity Model that was developed by Welk (1999). Welk (1999) identified and explained the factors influencing children's physical activity. Such factors include (but not limited to) biological modifying factors, and reinforcing factors which interact together to produce a phenotype in this case physical activity behavior. The conceptual model is as indicated in Figure 1.1 below.

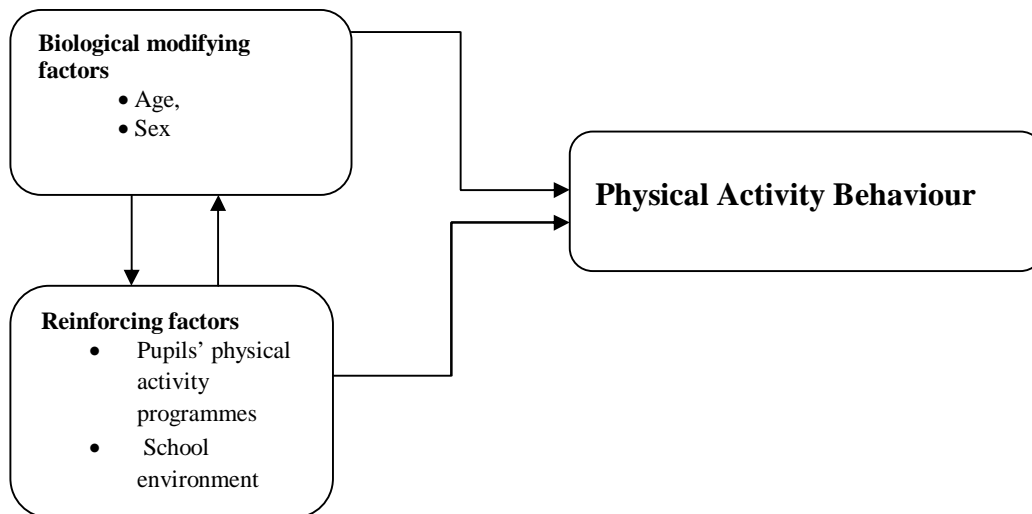


Figure 1: Children's Physical Activity-Related Model

Source: Adapted from Welk (1999, pg 12)

Biological modifying factors are variables which directly influence whether the new behavior is adopted. In this study, they include age and sex, which directly influence physical activity behavior. **Reinforcing factors** include variables that reinforce a child's physical activity behavior. In this case school environment attributes and pupils' physical activity programmes are considered as the reinforcing factors

The model presented above was used in this study to provide a conceptual framework for understanding the factors that may enable, modify and reinforce a child to be physically active.

Methodology

This study used quantitative research approach where inferential statistics were employed in testing the statistical hypothesis. Mainly numeric data used to test predetermined hypothesis was derived from objectively measuring of Body Mass Index (BMI) and differences in age cohorts, and sex in PA behaviour among school children. This study was conducted at Nyamagana district in Mwanza region. Nyamagana municipality was selected because it has many public and private primary schools that helped to provide the needed information for this study.

The target population included all 72,501 primary school pupils from 99 primary schools (81 public and 18 private schools) (Nyamagana Pupils Registry, 2014). Pupils were selected because they were the focus of the study. They were expected to provide useful information concerning physical activity patterns on daily bases whereby guidance to report the number of days over the past week during which they were physically active for at least 30 to 60 min per day was given. The questions were preceded by explanatory text that define moderate to vigorous physical activity that increases their heart rate and make them get out of breath for some time.

The study sample was obtained using ten percent (10%) of the given population. The sample size of 10 schools was selected from the population group of 99 schools in Nyamagana Municipality. The sample for this study was obtained using stratified random sampling technique. Pupils were stratified on the basis of their sex and age. Then, they were randomly selected for the study. Therefore, 8 public schools together with 2 private schools which constituted about 10% of the whole school population were randomly selected for this study. The selection of both public and private schools helped to diversify the context of the study in order to collect comprehensive information. A total of 306 pupils from 8 public primary schools and 76 pupils from 2 private schools were randomly selected. Pieces of paper written with words "YES" and "NO" were prepared by the researcher, then, each pupil was told to pick a piece of paper from a small box. Pupils who picked the papers written "YES" were selected to participate in the study and those who picked the "NO" papers were left out.

Data were collected through the use of the Physical Activity Questionnaires of Children (PAQ-C). The questionnaire was developed by Kowalski, Crocker, & Kowalski in 1997. In order to maintain validity and reliability of the instrument, the questionnaire was piloted at Nyamanoro primary school, which later was not included in the actual study. After data collection the calculated reliability was 0.78 for males and 0.76 for females. That reliability indexes were enough for the study. Moreover, children were given the PAQ-C as the guide to record PA patterns on daily basis. This was done two weeks before administering the final completion of the PAQ-C.

Data analysis regarding age and sex correlates of PA were quantitatively analysed using the statistical package for social science (SPSS) programme (version 20). Physical activity questionnaires (PAQ-C) provided information about physical activity in everyday life of primary school pupils. After pupils completed the PAQ-C, frequencies, means, and t-tests were computed to determine PA behaviour across sex differences in PA behaviour. One way ANOVA was computed to investigate the differences among age cohorts of school children in PA behavior. Alpha values (p-values) were set at 0.01 and 0.05 to determine significant relationship among variables. Activity time was coded as: 1 - Less than 15 minutes, 2 - 15 to 30 minutes, 3 - 30 to 45 minutes, and 4 – 45 to 60 minutes. Boys were coded as: 1, and girls were coded as: 0

Findings

Relationship between Age Cohorts in Physical Activity Behavior

It was hypothesised that there would be no significant relationship between age and physical activity behavior among primary school children. Age is one of the biological variables which influence physical activity behavior. Data regarding age and physical activity was collected using the PAQ-C and analysed using ANOVA. Table 1 below shows physical activity behavior between age groups among primary school children.

Table 1: Physical Activity Behavior between Age Groups for school children

Age Group	N	Mean	Std. Deviation
7-9	30	1.5000	.62972
10-12	200	1.7450	.72290
13-15	102	2.1078	.62785
above 15	2	1.0000	.00000
Total	334	1.8293334	.71297

Table 1 reveals that 30 out of 334 school children aged between 7-9 years which is 9% participated in physical activities. A steep increase in physical activity behaviour among school children is displayed at the age between 10-12 years. At this age group, out of 334 school children, 200 (59.88%) were reported to participate in physical activities.

A decrease in physical activity level among school children were also observed at the age group of 13-15 whereby 102 (30.54%) of school children participated in physical activities. Pupils at the age above 15 years showed a poor physical activity behavior. At this age category, 2 (0.59%) pupils participated in physical activities. To determine whether the different was significant or not, one way ANOVA was computed and the results are presented in table 2 below.

Table 2: One way ANOVA to test the statistical significance difference between Means of age and Physical Activity behavior

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	13.964	3	4.655	9.890	.000
Within Groups	155.309	330	.471		
Total	169.272	333			

The findings above show a significant relationship between age cohorts and physical activity behavior. From table 4.3b above, a significant value (P) was found to be $[F(3,330) = 9.890, P < .05]$. Since the value of P is less than 5% (.05), the null hypothesis that there is no significant relationship between age and physical activity behavior is rejected. So, this implies that a relationship exists between age cohorts and physical activity behaviour variables.

Sex Differences in Primary School Children's Physical Activity Behaviour

The objective was to examine gender differences in physical activity behavior among primary school pupils. The objective addressed three key questions, namely:..:

- Are there any significant differences between female and male students in type of physical activity chosen?
- Are there any significant differences between female and male students in intensities of physical activities?
- Are there sex differences in the amount of time spent in physical activity as reported on PAQ-C?

In this objective, it was hypothesized that that there would be no significant differences in physical activity behavior among male and female pupils.

Differences between female and male students in type of PA chosen

This first question was to determine whether there were any significant differences between female and male students in the type of PA chosen. In order to capture this, a t-test was computed to compare the means between male and female pupils' responses. Results are presented in table 3.

Table 3 t-value of Physical Activity Scores by Sex

Activity	Sex	Mean	Std. Deviation	Sig. (2-tailed)
swimming	Male	1.1677	.56667	
	Female	1.1916	.64876	.720
running	Male	1.6287	1.21482	
	Female	1.2395	.76999	.001
chasing each other	Male	1.3595	.93281	
	Female	1.1257	.63226	.008

Football	Male	2.5749	1.60724	
	Female	1.2635	.82289	.000
Netball, volleyball or basketball	Male	1.1198	.58908	
	Female	1.2395	.75418	.107
Cycling (bicycle)	Male	1.2754	.84785	
	Female	1.0599	.44857	.004
Tennis	Male	1.3234	.94595	
	Female	1.0240	.21821	.000
Musical instrument playing or singing	Male	1.0240	.21821	
	Female	1.0958	.50579	.093
Chatting with friends	Male	1.0000	.00000	
	Female	1.0898	.47626	.016
helping with house chores	Male	1.0719	.48556	.032
	Female	1.2216	.75571	

The results indicated the direction of the average scores of respondent's frequencies. T-test for these activities was computed at significant level of or greater than .05 for each individual activity. Table 4.4a above shows that there is sex differences on the chosen physical activities as were listed in the PAQ-C for the total population. Therefore, the null hypothesis that there would be no significant difference between sex and physical activity behavior was rejected.

Significant differences at the .05 level were found in chosen/selected physical activities for the entire sample population in Running, chasing each other, football, and doing domestic chores. The differences indicate that boys ranked higher in the chosen physical activities, with the exception of chatting with friends, and doing domestic chores. On the other hand there were very few responses that indicated that there were no significant sex differences in the activity listed namely swimming and; Netball, volleyball and or basketball.

Differences between Female and Male pupils Physical Activity's Intensities.

In looking at sex differences in physical activity behaviour, the researcher was also interested in examining differences in physical activity intensities within sexes. Respondents were asked to indicate how hard was physical activity which was intended to show the intensity of the chosen physical activity. Findings are presented in Table 4.

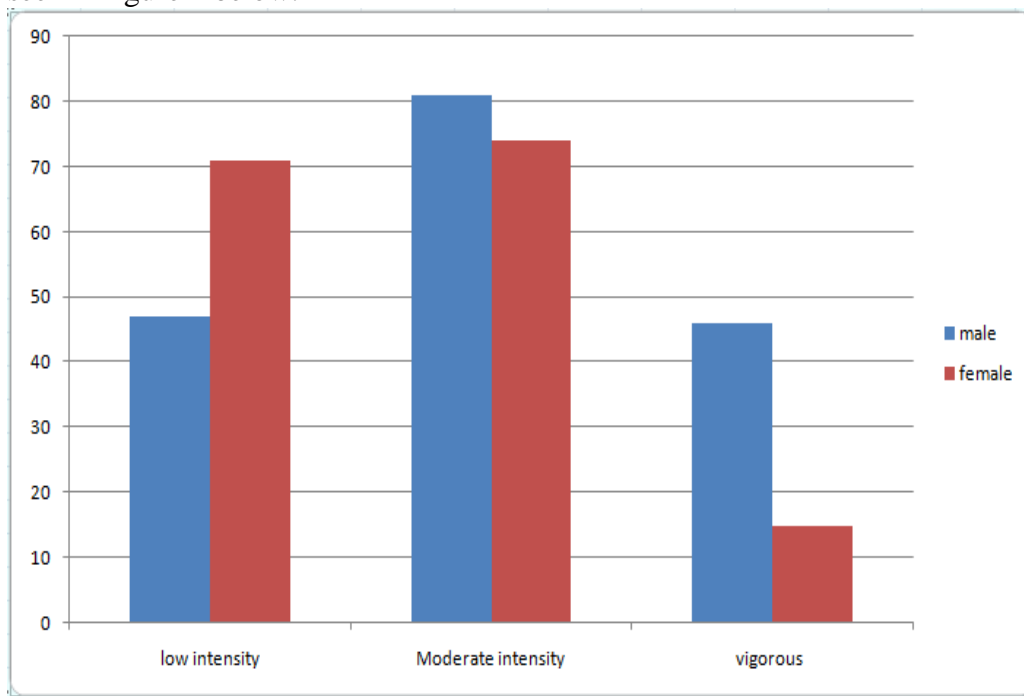
Table 4: Physical activities Intensity by Sex

Intensity	N		Total
	Male	Female	
Light physical activity (no sweating, normal respiration)	47	71	118
Moderate physical activity (some sweating, moderately increased respiration)	81	74	155
Vigorous physical activity (strong sweating, fast respiration)	46	15	61
Total	167	167	334

Source: Field data (2014).

The findings in Table 4 shows that, 118 (35.3%), 155 (46.4%), and 61 (18.3%) school pupils performed light, moderate, and vigorous physical activities respectively.

A visual representation of the variation of the intensities of the performed physical activities can be seen in figure 1 below.

**Figure 2: Physical Activity Intensity by Sex**

Source: Research Findings (2014)

In analyzing the differences in physical activity intensities between female and male school pupils, t-test for significance between means was used. T- test comparing means within sexes (males and females) found a statistically significant difference (.05 level) between male and female primary school pupils. From Table 5, a significant difference between the means of male and female pupils were ($t(332) = 4.332, p < 0.05$).

Table 5: t-value of Physical Activity Intensities Score by Sex

	Intensity of the activity	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Intensities	Male	1.9940	.74847	4.332	332	.000
	Female	1.6647	.63636			

The results from the table above indicates that mean of the Male group was significantly higher ($M = 1.99$, $SD = 0.75$) than the mean of the female group ($M = 1.66$, $SD = 0.64$). This implies that boys preferred physical activities with high demand of energy than girls. Therefore, the null hypothesis that there is no significant difference between sex and physical activity behavior among primary school pupils is rejected.

Sex Differences in the Amount of Time Spent in Physical Activity

The following part presents the results of this study pertaining to sex differences in the amount of time spent in physical activities. Analysis was done by comparing the means of female and male pupils. Furthermore t-test was performed and the findings were as presented in Table 6 below.

Table 6: Overall Difference Between Males and Females in Total Activity Time

Sex	Mean	N	Std. Deviation	t-value	df	Sig. (2-tailed)
Male	2.8862	167	1.39456	37.100	334	.000
Female	2.8144	167	1.42111			
Total	2.8503	334	1.40624			

The findings above show significant differences in the amount of activity time that males and females participated. From Table 4.5.3a, a significant difference between the means of male and female pupils were $t(334) = 37.100$, $p < 0.05$). The mean of the Male group was significantly higher ($M = 2.87$, $SD = 1.39$) than the mean of the female group ($M = 2.81$, $SD = 1.41$). This implies that males had great time activity than females. Therefore, the null hypothesis that there is no significant different between sex and total activity time was rejected.

Discussion

The findings derived from both tables (1&2) indicate a decline in physical activity as per age. Findings also indicate a significant difference between age and physical activity. The study findings above concur with that of Biddle, Coalter, Donovan, MacBeth, Nevill, and Whitehead (2005). Their study revealed that the levels of activity among girls were highest at age 11 with approximately 12.5 hours of sport per week. On the other hand, Telama and Yang (2000) asserted that the ages of greatest decline in physical activity behaviors are from 12-15 among Finnish Youth. Also Kemper (2000) found that the ages of greatest decline were 13-16 years among Dutch youth.

Many factors are associated with a decline of physical activity levels with aging. For instance, developmental factors such as physical size, strength, and coordination play an important role (Bell, 1998). It is also argued that, the manifestation of the particular phenotype (in this case physical activity level) is traditionally thought to be determined by the interaction between environment and genetic or biological factors (Knab & Lightfoot, 2010). The site of action of possible genetic/biological components affecting physical activity may include either peripheral mechanisms (e.g. fiber types, number of mitochondria, cell metabolism components, oxygen consumption etc), and or central mechanisms (e.g. brain signaling, neurotransmitters, motivational behaviours etc) (Ibid). Although all of these form the dopaminergic system, majority of studies investigate changes in neurotransmitter systems in relation to physical activities participation. This argument seems to be supported by Ingram (2000) who asserts that a decline in physical activity with age appears to be related to altered neurotransmission which involve the central dopamine system by either reduced dopamine release or loss of dopamine receptors.

This study also examined gender differences in physical activity behavior among primary school pupils. The findings revealed gender differences in physical activity among primary school pupils. For instance, gender differences were noted in pupils' choices of activity whereby, significant differences were found in running, chasing each other, football, Netball, cycling, Tennis, playing musical instrument or singing, and helping with house chores as chosen by pupils. Male pupils had higher mean levels in running, chasing each other, football, and Tennis. This means that there were great numbers of male pupils participating in those physical activities as opposed to female students. In contrast, female pupils had higher mean levels in playing musical instrument or singing, charting with friends, and helping with house chores. In relation to the study findings, Flintoff and Scraton (2001) observed that young women's out-of-school physical activity lifestyles included 'some of the more traditional "female" sports and activities, such as netball, hockey, keep fit, dance, swimming and aerobics' as well as 'other, less traditional activities, such as kick-boxing and weight training' albeit usually 'in female-only settings'. This reflects a gender difference regarding physical activities as certain activities may be considered to be a 'gender-type of task'. In other words, society determines which activities are suitable for which sex. According to USDHHS (1996), gymnastics, dance, aerobic dance, and jump rope activities are examples of feminine, while baseball, football, and running are examples of masculine activities.

There were also activities which indicated no significant sex differences. They included swimming, and Netball, volleyball and or basketball. There are two reasonable explanations for this. First, swimming activity showed no significant differences among male and female pupils due to the availability of natural water bodies (Lake Victoria) which provided equal opportunities for swimming activity. On the other hand, there were no facilities for netball, volleyball, and basketball which limited the opportunity to take part in those activities. This notion has been supported by American Transportation Research Board (TRB) (2005) which asserted that physical environment is the determinant of physically active behaviour.

In order to understand sex differences in physical activity, many plausible explanations may be offered. According to USDHHS (2000), girls have been reported to be less active than boys in physical education classes. Typical physical education programs may be contributing to the problem of the accelerating decline in physical activity engagement, rather than being part of the solution to increase adolescent girls' physical activity (Ennis, 1999). Children who do not get adequate

opportunity to be active in school do not compensate by being more active outside the school (Tudor-Locke, Pangrazi, Corbin, Rutherford, Vincent, Raustorp, Tomson, & Cuddihy, 2004). This means, if girls are less active in physical education classes their participation level will remain unsatisfactory thus exposing themselves to problems associated with physical inactivity. For boys, participation in sports, exercise, and physical activity is consistent with society's definition of masculinity and is reinforced, emphasized, and encouraged by the attitudes of parents, teachers, coaches, and peers (Landers & Fine, 1996).

Another reason is that the value that children place on sport activities varies according to sex, and that those differences emerge relatively early in schools. For example, Eccles, Wigfield, Harold and Blumenfield (1993) reported that boys in first, second, and fourth grades valued sport activities more highly than girls. McBride, Guan, and Solmon (2003) found that children's value of physical education significantly predicted their intent to participate. They suggested that when children place high value on physical education, they are more likely to continue in physical education and be active as they grow older. This supports the notion that students will be more motivated to be engaged when an activity or learning task is deemed interesting and meaningful.

Ability beliefs play a major role in most theories of achievement motivation. In these theories, perceptions of competence are assumed to influence achievement behaviour. The general conclusion is that when individuals feel competent that they can be successful at a particular task, they are more likely to choose to do the task and maintain their effort, even under adverse conditions (Wigfield, Eccles, & Rodriguez, 1999). Sex differences are also surfaced with ability beliefs. For example, boys are reported to have higher ability beliefs than girls in their throwing activities (Xiang, McBride, Guan, and Solmon, 2003). According to them, girls begin to show a sharp decline in their beliefs about their competence in physical activity as early as fourth grade and exhibit an alarming tendency towards physical activity.

From biological point of view, the literature indicates that women have less hemoglobin in their blood than men do, thereby reducing the amount of oxygen that can be delivered to working muscles (Wilmore & Costill, 1999). Women also tend to have more body fat, less skeletal muscle, and smaller lungs and hearts (Wilmore & Costill, 1999; Suetta, Kanstrup & Fogh-Andersen, 1996). The increase in body fat among female adolescent has been purported to limit their access and discourage them from participating in physical activity (Bunker, 1997; Rowland, 1999). Rowland (1999) 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 (1994) similarly reported that the general pattern of changes in absolute aerobic power decreases in adolescent girls from 13 to 15 years. Together, these factors mean that women have a lower VO_{2max} than men. This is the reason why girls prefer less demanding physical activities than boys. Since most of physical activities with health benefits are more demanding in terms of energy expenditure, sex differences surface the choice of physical activities.

Another area explored in this section was sex differences in pupils' physical activity intensities. The findings revealed significant differences in physical activity intensities between male and female pupils whereby the mean of male group was significantly higher than the mean of the female group. The literature reports that girls are often relegated to light duty chores such as sweeping (McKenzie, Sallis, Nader, Broyles, & Nelson, 1992). This may partially explain why girls are more attracted to

lower intensity, health enhancing physical activities, and boys to team sports and higher intensity activities. From biological point of view, Sparling, et al., (1998) explained that males and females differ in muscle strength and size which affect physical activity performance. According to Wilmore and Costill, (1999), the average woman has about half the upper-body strength of man, and one fourth the lower-body strength. From the above fact, it is therefore concluded that males are in the position of undertaking most vigorous physical activities than females.

Lastly, this section explored sex differences in the amount of time spent in physical activity. While in the urban area life is more modern with few light domestic chores since there is water and electricity supplies at home as well as television, sex differences in physical activity exists. As regards to duration in minutes spent in physical activity on daily basis, it was revealed from the findings that males had significantly higher activity time than females (0.05 levels). A plausible explanation for this may be that boys and girls receive different messages about how to be physically active. For example, it is often permissible for boys to go outside and play rougher or unattended than it is for girls. Perhaps parents are not as worried about the safety of children playing outdoors especially for boys than it is for girls. In addition, Mabagala (2002) asserted Tanzanian society is still among the societies that place most of family chores to females. In this way females have limited time to participate in sports and physical activities.

On the other hand, sex is generally considered a biological term indicating distinct, genetically inherited, anatomical and physiological characteristics. From this perspective there are anatomical and physiological factors that tend to affect the activity time between girls and boys. For example women have less hemoglobin in their blood than men do, thereby reducing the amount of oxygen that can be delivered to working muscles (Wilmore & Costill, 1999). Women also tend to have more body fat, less skeletal muscle, and smaller lungs and hearts (Wilmore & Costill, 1999; Suetta, Kanstrup & Fogh-Andersen, 1996). Together, these factors mean that women have a lower VO_{2max} than men. The VO_{2max} is related to cardiovascular fitness which is the functional unit in working time. So if women have lower VO_{2max} , this implies that they can spend little time in physical activities as compared to men.

Conclusions and Recommendations

Conclusions

Based on the findings, the following conclusions are warranted:

- i. There is a decline in physical activity behaviour with chronological age among primary school children. If this problem is not effectively addressed there is a possibility that physical inactivity that is established in childhood can be carried over into adulthood making the situation more critical during adulthood.
- ii. There are sex differences in physical activity choices. Boys have higher mean levels in running, chasing each other, football, and Tennis than girls. Girls have higher levels in playing musical instrument or singing, chatting with friends, and doing domestic chores. There are differences in the intensities of physical activity chosen. Girls spend more of their time in less vigorous types of physical activity than boys.

Recommendations

Based on the results of this study, it is evident that many urban children are inactive as they participate in less than 3 days per week in physical activities which accumulate 60 minutes per day.

It is therefore recommended that both moderate and sedentary children should accumulate at least 60 minutes per day of physical activity of varying level of intensity which is appropriate to their developmental age as supported by Siedentop (2004).

Two, it is recommended that Physical education classes should be effectively organised and supervised. According to Ennis (1999), typical physical education programs may be contributing to the problem of the accelerating decline in physical activity engagement, rather than being part of the solution to increase adolescents' physical activity if they are supervised effectively. So, if physical education classes are not well organized, they cannot provide adequate opportunity to be active both inside and outside of the schools. While teachers of physical education may claim that they espouse equality of opportunity for all children, their teaching behaviours and practices reveal entrenched sex stereotyping, based on common-sense notions of what is suitable for girls and boys. Such practices should not be left to continue.

Third, in order to improve and make lifespan physical activity opportunities for people of all ages, educational and political efforts should not only be focused primarily on individuals, as a matter of individual responsibility; but also as a collective or structural responsibility. Therefore, schools and community should collaborate to ensure that students are active in and out of the school environment.

Fourth, one of the central claims has been that girls' and young women's involvement in Physical activity are not merely different and unequal but in some ways inappropriate, even deficient – in terms of the range and accessibility of particular activities and with regard to their lived experiences of sport and Physical activity. So as to reduce gender stereotype that discriminate women from participating in social, cultural and health activities. Allied to this, girls' experiences of Physical activity and sport are believed to reinforce, rather than challenge, gender stereotypes and act as an additional barrier to participation. It is therefore recommended that education should be given to community members.

Fifth, given the importance of early-childhood Physical activities, physical educators must develop appropriate programs that reach all children and the government should provide facilities that are accessible to and affordable for the public at large.

Recommendations for Future Research

The following recommendations for future research are based on the findings of this study on biological correlates of children's physical activity behaviour.

- i. It is recommended that future research should investigate the effects of rural versus urban and sub-urban settings on PA. It was theorized in this study, that the setting may have been influential in this finding. There is no research which investigates the effects of these different environments on physical activity behaviour in children.
- ii. It is established that physical activity behaviour in childhood and adolescence carry over into adult behaviours, yet there is no research which directly supports these claims. These questions may be addressed by longitudinal or age stratified studies of specific populations in our society. Longitudinal studies should be conducted in order to explore the causes of physical activity attrition and intervention strategies for sedentary population.

- iii. It was discussed that physical inactivity leads into hypokinetic diseases. A research is needed to investigate the extent in which physical inactivity pose problems to national economy for medical services.

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