

Kenya
at **50**

Celebrating 50 Years of Healthy Active Living

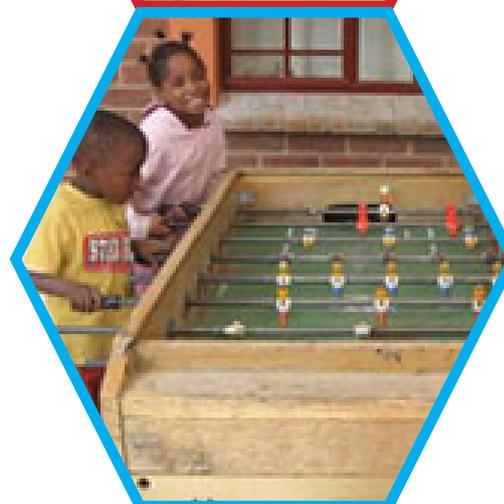
Kenya's 2014 Report Card on Physical Activity and Body Weight of Children and Youth

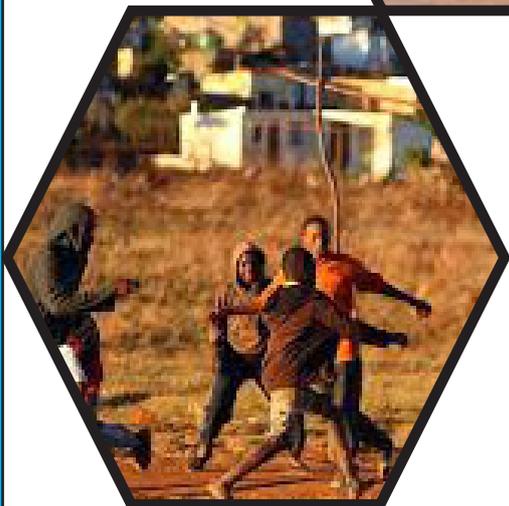


Prepared and produced by
HEALTHY ACTIVE KIDS KENYA in partnership
with **ACTIVE HEALTHY KIDS CANADA**

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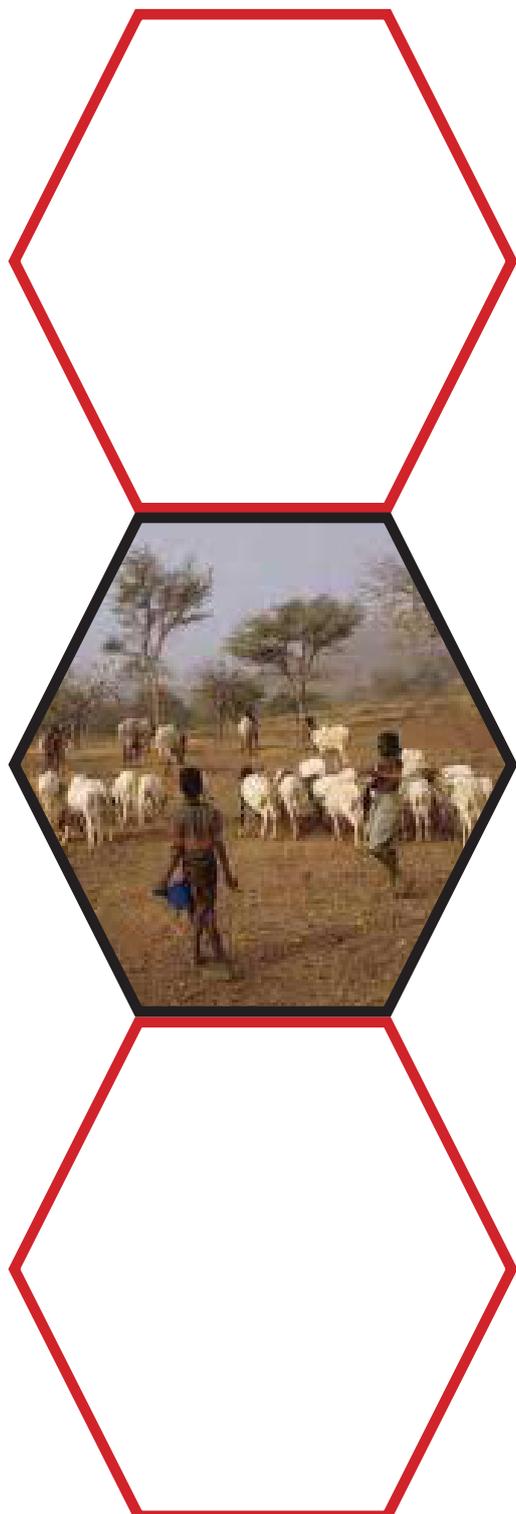
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Introduction

Worldwide populations are increasingly facing lifestyle related health risks due to rising prevalence of overweight/obesity, physical inactivity, and sedentary behaviours. The result has been a shift in the major causes of death from communicable diseases associated with poverty, under-nutrition, unsafe water, and poor sanitation, to a growing burden of modifiable non-communicable diseases (NCDs) such as hypertension, heart disease, stroke, cancers and type 2 diabetes [1]. Of major concern is the potential for lifelong health consequences in children and youth, who have not been spared from the effects of these shifts. Childhood overweight/obesity is significantly associated with increased risk of obesity, physical morbidity, and premature mortality in adulthood [2-5]. However, children who attain a normal weight by adolescence have better cardiovascular disease risk factor profiles compared to those remaining overweight [3].

The World Health Organization (WHO) classifies physical inactivity and overweight/obesity as the fourth and fifth leading causes of global mortality, and one of the greatest health challenges and determinants for various chronic diseases such as heart disease, hypertension, diabetes, and psychosocial problems in the 21st century [1, 2, 6-9]. This growing population health threat has garnered much attention in view of the declaration and global campaign on the prevention and control of NCDs signed by the United Nations (UN) in 2011 [10].

Kenya Vision 2030, a compendium of the country's endeavours for accelerated transformation into a globally competitive middle-income nation, has a main focus on strengthening the health sector. In particular, Kenya Vision 2030 aims to improve the overall livelihood of Kenyans by providing an efficient, integrated, high quality, and affordable health care system with prioritization of preventative care at the community and household level. As such, in light of the UN-NCD declaration, and in line with Kenya Vision 2030, there is a need to focus on promoting healthy active lifestyles for all Kenyan children and youth - the country's greatest resource for meeting Kenya's long-term national planning strategy [11]. This focus on active lifestyles in young people may be particularly crucial for Kenya, a country that prides itself for having dominated the middle and long distance running events globally for over 40 years, as it endeavors to preserve its athletic excellence and identity.

The WHO recommends that children and youth 5-17 years of age accumulate at least 60 minutes per day

of moderate-to-vigorous intensity physical activity (MVPA) to accrue positive health outcomes [12]. Further, given that sedentary behaviours (low-energy expenditure activities done while sitting or reclining) are independently associated with adverse health outcomes [13], the Canadian sedentary behaviour guidelines (the world's first evidence-based guidelines on sedentary behaviour) recommend that children of this age group should limit their recreational sedentary screen time to no more than 2 hours per day [14].

The Kenya 2014 Report Card on the physical activity and body weights of children and youth was inspired by the Active Healthy Kids Canada Report Card and joins an emerging network of Active Healthy Kids Report Cards including Mexico, the United States of America (USA), South Africa and Scotland. Data on child and youth body composition, physical activity, sedentary behaviours, school infrastructure, family and peers, community and the build environment, and governmental and non-governmental strategies and policies, were collected, assessed, and synthesized. Evidence regarding physical activity constructs was examined in order to situate and inform potential initiatives at home, at school, and in the community, aimed at promoting active and healthy lifestyles for Kenyan children and youth.



The KIDS-CAN Research Alliance

The Kenyan International Development Study – Canadian Activity Needs (KIDS-CAN) Research Alliance was formed in 2007 to bring together the expertise of Kenyan and Canadian researchers with interest in the area of childhood overweight/obesity and physical inactivity. This partnership is comprised primarily of leading researchers from Kenyatta University in Nairobi, Kenya, and the Children's Hospital of Eastern Ontario (CHEO) Research Institute in Ottawa, Canada. The alliance was formed to address international development goals. By fostering global partnerships and academic institutional alliances to promote collaboration among researchers in Canada and Kenya, KIDS-CAN aims to facilitate the establishment of relevant interventions for children and youth populations, effective dissemination of findings, and a contribution to innovative thinking.



Healthy Active Kids Kenya (HAKK)

Kenya's 2014 Report Card is the second report card completed in Kenya after the first ever Kenya's 2011 Report Card on the Physical Activity and Body Weights of Children and Youth. The aim is to synthesize the best available evidence and provide increased awareness on issues surrounding physical activity of children and youth. The Report Card, therefore, highlights areas where Kenya is succeeding as a nation and emphasises areas where more action is needed, in order to realize healthy active living goals for children and youth. Healthy Active Kids Kenya (HAKK) plans to produce the Report Card periodically as a means of monitoring healthy active living behaviours of Kenyan children and youth and as a means of holding us all accountable for the future health of our children. Indeed, as stated in the UN Declaration on the Rights of the Child, the child, by reason of his/her physical and mental immaturity, needs special safeguards and care including provision of suitable standards of living for adequate physical, mental, spiritual, moral and social development. Measures ought to be taken to support parents and other caregivers to implement this fundamental right. We are aware of the harmful effects of physical inactivity and obesity on the health of children and youth. As such, it is our foremost responsibility to act to preserve healthy and active living behaviours for the well being of Kenya's children and youth and particularly, the right to enjoy regular physical activity for the promotion and maintenance of health, wellness and healthy body weights [15, 16].

The Target Audience for the Kenya Report Card

This publication is for people with an interest in child and youth health and wellness as a foundation for a prosperous nation, particularly for:

- I. Those who are interested in childhood physical activity, overweight/obesity, and nutrition research;
- II. Those who develop and implement policies, such as politicians, governmental departments, non-governmental organizations, regional education authorities, school boards, school directors, principals, head teachers, advisors, nurses, social workers, school health coordinators, public health officials, and sporting organisations;
- III. Those who are charged with the responsibility of ensuring the built environment is supportive of healthy active living, such as city planners, designers, and contractors;
- IV. Teachers, parents, and children and youth, since effective promotion of health is an inclusive and participatory process;
- V. Those in a position to support or collaborate on future initiatives of HAKK; and,
- VI. International colleagues in a position to learn from and work with HAKK and the KIDS-CAN Research Alliance.



Kenya's 2014 Report Card on the Physical Activity and Body Weight of Children and Youth

The Grading System

The assigning of grades was based on comprehensive analyses of available data sources on the indicators for school-aged children and youth (5 – 17 years). These included peer-reviewed journal publications, data from supporting governmental organizations, and the recently concluded International Study of Childhood Obesity, Lifestyle and Environment (ISCOLE-Kenya). The primary aim of ISCOLE-Kenya was to investigate the influence of behavioural settings, and the physical, social, and policy environments on the observed relationship between lifestyle characteristics and weight status in school-aged children recruited from schools in Nairobi. Details of the ISCOLE study protocol are provided elsewhere [17]. A panel of experts discussed and assigned grades based on a set of specific criteria and existing grading schemes from similar report cards in Canada, South Africa, Mexico, and the USA. These are further explained below.

TABLE I: Grading System

Grade	Interpretation
A	We are succeeding with a large majority of Kenyan children and youth (81 - 100%).
B	We are succeeding with well over half of Kenyan children and youth (61% to 80%).
C	We are succeeding with about half of Kenyan children and youth (41% to 60%).
D	We are succeeding with less than half of Kenyan children and youth (21% to 40%).
F	We are succeeding with very few Kenyan children and youth (00% - 20%).
INC	Denotes there is insufficient data for grading.

The Indicators

TABLE II: Categories and Indicators of the Kenya's 2014 on the Physical Activity and Body Weights of Children and Youth

Categories	Indicators
Body composition	Body weight status
Physical activity	Overall physical activity levels Organized sport and physical activity participation Active play Active transportation
Sedentary behavior	Screen-based and non-screen based sedentary behaviors
School	Physical education Sport and physical activity opportunities at school School infrastructure and equipment School policy
Family and peers	Family physical activity Peer influence
Community and the built environment	Proximity and availability of infrastructure Usage of facilities, programs, parks, and playgrounds Community programming, policies, and regulations Perceptions of safety and maintenance Nature and the outdoors
Policy	National or county government strategies National or county government investments Nongovernment strategies and investments

Body Composition (Grade = B)

A majority of the studies included in this review of the evidence only reported on weights, heights, skin-fold measures, mid upper-arm circumference (MUAC), BMI, or mean BMI z-scores [18-36]. Samples were not further categorized based on widely acceptable growth standards or cut-points. The general findings from these studies suggested that children in the 5 – 17 year old age groups continued to accrue yearly growth deficits compared with international references, resulting in prolonged growth into the late teens (a higher percentage of older children were underweight and more stunted compared with younger children); that there was a persistence of under-nutrition; and, that urban or town populations had higher body composition measures than their rural or village peers [18, 19, 21, 22, 25, 29-32, 34, 36].

From direct measures, a study on rural children from Western Kenya found a high percentage of malnourished (underweight and stunted) children, especially during their adolescence years. This trend was more evident in boys. Based on WHO cut-points [37], the results showed that 6.3% of girls, and 10.6% of boys were underweight. The overall prevalence of overweight/obesity for this population was 3.2%, with the highest prevalence of overweight/obesity observed in younger children 5 - 8 years of age [38]. Another study on rural children from the Western highlands of Kenya reported that the proportion of underweight was 11.1%, normal weight was 84.7%, and overweight/obese was 4.2%, based on Centers for Disease Control and Prevention (CDC) cut-points [39, 40]. Yet another study on rural children found that 25.6% of the population were malnourished, with no prevalence of overweight/obesity [41].

A large study of 1479 pupils in private schools in the urban city of Nairobi found that 16.7% were overweight and 6.9% were obese, based on CDC cut-points [40,

42]. Of the 3846 pupils in public schools, 5.7% were overweight and 1.6% obese. Overall, more female than male pupils were overweight/obese (14.5% versus 9.1%), and more of those attending private schools (higher socioeconomic status) than those in public schools were overweight/obese (23.6% versus 7.3%) [41]. Data from the ISCOLE-Kenya study, also conducted in Nairobi, determined that 3.7% of children were underweight, 75.5% were normal weight, 14.4% were overweight, and 6.4% were obese (20.8% overweight/obese) based on WHO cut-points. The proportion of overweight/obesity was lower - 15.8% and 14.9% - when categorised based on CDC and International Obesity Task Force (IOTF) cut-points respectively [40, 43, 44].

A study comparing Kenyan rural and urban children found that 0% of rural children were overweight/obese, while 6.8% of urban boys and 16.7% of urban girls were overweight/obese based on IOTF cut-points [43]. Overall, 41.2% (44.4% boys & 37.9% girls) of the total sample of children were underweight, 53.2% (52.8% boys & 53.7% girls) had normal weight, 3.7% (1.9% boys & 5.6% girls) were overweight, and 1.9% (0.9% boys & 2.8% girls) were obese, that is, 5.6% (2.8% boys & 8.4% girls) were overweight/obese. The study authors concluded that urban Kenyan children were showing signs of a nutrition and physical activity transition, as judged by the anthropometric similarities to contemporary living Canadian children [45, 46].



TABLE III: Proportions of Underweight, Normal-weight, Overweight, and Obese Children based on various Cut-points.

First Author	Year	Population	Cut-Point	UW (%)	NW (%)	OW (%)	OB (%)	OW/OB (%)
Semproli	2007	Rural	WHO	8.5				3.2
Croteau	2011	Rural	CDC	11.0	84.7			4.2
Ramos	2011	Rural	WHO					0.0
Kamau	2011	Urban	CDC			8.8	3.1	11.9
Muthuri	2013	Urban	WHO	3.7	75.5	14.4	6.4	20.8
Onywera	2012	Urban and Rural	IOTF	41.2	53.2	3.7	1.9	5.6

Taken together, the results clearly show that Kenya is facing a double-burden of under-nutrition and overweight/obesity. It is important to note that child under-nutrition remains one of Sub Saharan Africa's most fundamental challenges for improved human development. This is particularly true for the school-aged child, since malnutrition affects their education outcomes, and consequently opportunities for success in later years [47]. There was also an age difference observed in body composition measures. A higher percentage of older children were underweight compared with younger children, with larger growth deficits found in adolescents compared with international references. Girls were found to have higher proportions of overweight/obesity and lower proportions of underweight compared to boys. It has been suggested that this sex difference may be related to differences in timing of sexual maturation in girls compared to boys; differences in gender roles, particularly those requiring higher physical exertion; and, cultural desirability whereby being overweight (i.e., "rounder") is an admired trait and seen as a sign of wealth and prestige, particularly in girls [48]. Lastly, it was determined that urban living children and those of higher socioeconomic status (SES) had higher body composition measures and higher proportions of overweight/obesity. This positive SES relationship may be a result of urbanization, that is, advancements in health care and education, in addition to increased availability of packaged foods high in saturated fats and sugars, and increased sedentary behaviour, all of which are more accessible to and affordable for those with a higher SES [48]. These findings emphasise a need for nationally-representative estimates of body weights of school aged children and youth.

Overall Physical Activity Levels (Grade = C)

The evidence consistently showed that children from rural Kenya were more physically active than their urban counterparts. Step-count data showed that rural children were statistically more physically active than their urban counterparts (14,700 ± 521 verses 11,717 ± 561 step counts) [45]. Approximately 72% of these children were classified as physically active as per the global guidelines for physical activity, which recommend that children and youth, 5 – 17 years of age, should accumulate at least 60 minutes of daily MVPA [12]. This should include aerobic activity, and muscle and bone strengthening activities at least 3 times per week [12]. In a different rural sample of children, the average daily step counts in boys were higher than those of girls (16,262 ± 4698 versus 13,463 ± 3051), with the total average step counts for the sample at 14,558 ± 3993 [39].

Accelerometry data from a rural sample of children revealed that children spent a mean of 244 minutes in light intensity activities, 82 minutes in moderate intensity activities, and 75 minutes in vigorous intensity activities. Total MVPA was 156 minutes. In this sample, boys had higher engagement in physical activity compared to girls.

Further, the authors concluded that habitual physical activity in Kenyan adolescents was much higher than levels reported in American children. With high physical activity levels in this sample of children associated with much higher levels of energy expenditure than observed in Western societies, which opposes the concept of physical activity being stable and constrained in humans [49, 50]. Accelerometry data also revealed that urban children had significantly lower MVPA than their rural peers. The mean minutes of MVPA for the total sample were 54 ± 23 , for rural males were 68 ± 22 , for rural females were 62 ± 20 , for urban males were 50 ± 17 , and for urban females were 37 ± 20 . The proportion of those meeting global physical activity guidelines was 35% in the total sample, 60% in rural males, 50% in rural females, 21% in urban males, and 12% in urban females [32]. In a sample of both urban and rural children, the mean daily time spent in light intensity activities was 127 ± 44 minutes (16% of the monitored time); time spent in moderate intensity activities was 53 ± 22 minutes (7% of the monitored time); with negligible time spent in vigorous intensity activity [51]. Data from the recently concluded ISCOLE-Kenya study demonstrated that the mean daily time spent in light physical activity was 463 minutes; mean daily time spent in moderate physical activity was 32 minutes; and mean daily time spent in vigorous physical activity was a mere 4 minutes. Only 12.8% of participating children met the recommendation of 60 minutes or more of daily MVPA [44].

From self-report data, frequent leisure time physical activity on 5 days or more was attained by 16.0% of Kenyan children [52]. In a different study, the percent of Kenyan children reporting 60 or more minutes of physical activity on 3 or more days per week was 36% [53]. Habitual daily physical activity was higher in a sample of village boys compared to their town living peers, with village boys spending more time running, in sport activities, and doing field work [19].

Taken together, owing to the vast heterogeneity in devices used to measure physical activity and methods to determine time spent in MVPA, comparing across studies difficult. Only 3 studies determined the proportion of children meeting global physical activity guidelines, with the first indicating that 72% of children met global MVPA guideline recommendations ($n=169$, urban and rural sample), the second finding that 35% of children met recommendations ($n=200$, urban and rural sample), and the third finding that only 12.8% of participating children met recommendations ($n=563$, urban sample) [32, 44, 45]. Based on a weighting of these findings, we may roughly estimate that just about half of Kenyan children met the global physical activity guidelines. While these figures are better than those observed in high income countries such as Canada – where only 7% of children in this age group meet the recommendations [54] – Kenyan children are showing signs of a physical activity transition. The data more generally show that urbanization is associated with a developing trend towards decreasing physical activity, and that girls are more susceptible to this decrease. Representative national-level surveillance on physical activity is needed to determine the overall activity patterns among Kenyan children and youth, and should include the key sources of physical activity such as active play, active transportation, sports participation, and physical education.

Organized Sport Participation (Grade = C)

Organized sports serve as an excellent opportunity for physical activity, and it is therefore essential to provide an all-inclusive sports culture and infrastructure, particularly in the school environment. Children and youth who play sports and participate in adequate physical activity have better body image, better academic performance, better leadership qualities, and a greater sense of team spirit than children who do not participate in sports [12]. Further, participation in

competitive sports may expose the players to the aspects of success and failure, thereby contributing to their social development for a positive competitive spirit.

A study by Larsen et al. 2004 on boys of the Nandi Tribe in Kenya found that town boys (higher SES) spent 12.8 ± 11.8 minutes/day in sport activities compared with village boys, who spent 32.0 ± 17.3 minutes/day [19]. The ISCOLE-Kenya study investigated the different kinds of sport activities offered in primary schools in Nairobi (i.e., intermural, intramural, or both). These results are presented in the table below.

TABLE IV: Percentage (%) of Schools that offered Selected Sports

Sport	None	Intermural	Intramural	Both
Basketball	69.0	17.2	6.9	6.9
Volleyball	44.8	27.6	6.9	20.7
Soccer	24.1	48.3	6.9	20.7
Baseball or softball	82.8	6.9	3.4	6.9
Rugby	93.1	-	6.9	-
Gymnastics	65.5	20.7	10.3	3.4
Wrestling	100	-	-	-
Track and field	44.8	34.5	6.9	13.8
Badminton	93.1	-	6.9	-
Swimming	44.8	31.0	3.4	20.7

Note: 29 schools of varying SES were sampled from Nairobi.

The ISCOLE-Kenya study found that a majority of the schools offered sport activities and allowed participation within the schools. Almost half of participating schools offered volleyball, track and field, and swimming, and only a few (24.1%) did not offer soccer. These sport activities offer a good variety for development of sport-related skills. None of the schools offered wrestling, and few offered rugby or badminton [55].

It has been previously reported that the key perceived barriers to participation in sports among Kenyan children and youth are disabilities, fear avoidance, overprotection by parents/guardians, and lack of opportunities and/or time [56]. Further, SES seems to be an additional disparity in participation. In a sample of older Kenyan youth, those from higher SES were found to predominantly participate in sports perceived as more “prestigious” and associated with higher costs, while those from the middle and lower SES dominated in generally more inexpensive sports such as soccer, netball, or hockey [57]. Schools must therefore encourage and allocate adequate time and resources to allow for participation in organized sports for all children irrespective of their SES.

Active Play (Grade = C)

Outdoor play – whether during or after the school day – is an important determinant of overall physical activity among school-going children [58]. Time spent outdoors is strongly associated with physical activity in younger children (<13 years), and outdoor play incorporates more health-related physical activity compared to indoor activities [59, 60]. In addition, patterns of physical activity have been found to vary by day of week (school-day versus weekend-day), and time of day [61]. The ISCOLE-Kenya study found that self-reported average time spent in outdoor play, either

before and after school, or on weekend-days, was 6.0 hours [55]. The charts below show the time spent outside before school, after school, and on weekends, by sex. Generally, children spent the most time outside on weekends, followed by after school, and before school. Chi-square analysis revealed that the association with physical activity was only significant for time spent outside on weekends [55].

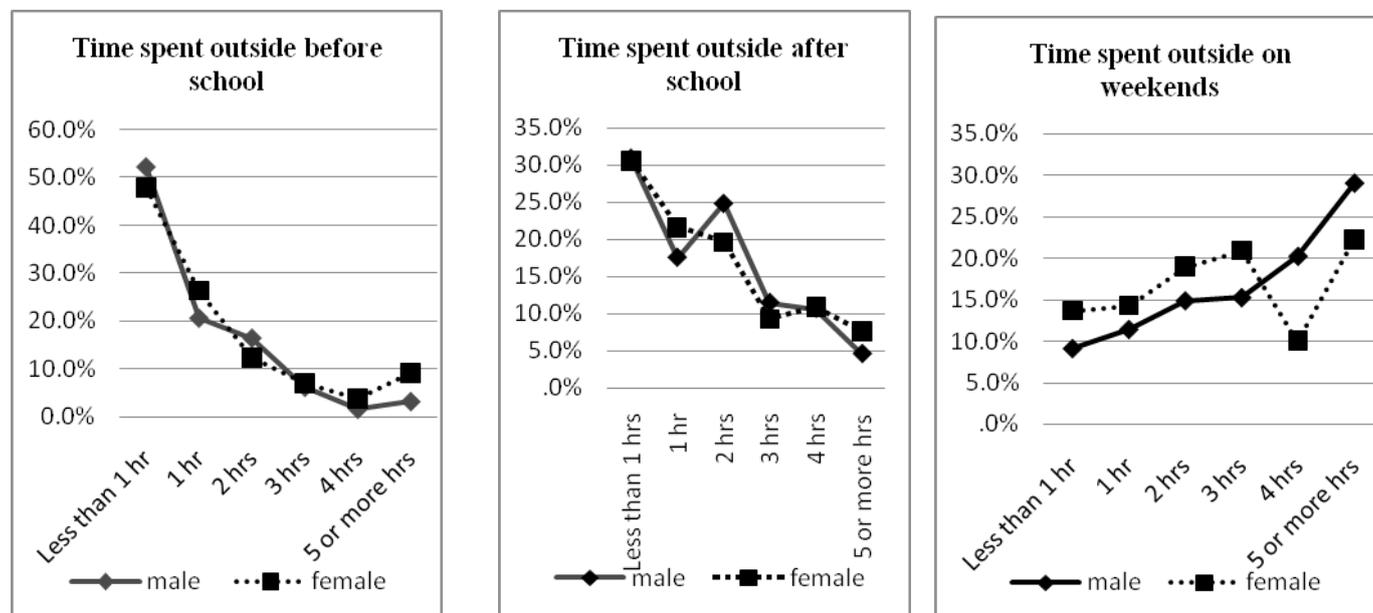


FIGURE I: Percentage (%) of Children Spending Time Outside Before School, After School, and on Weekends, by Sex.

It is noteworthy that recess/break time during the school day may also offer an opportunity for children to engage in active play. The ISCOLE-Kenya study found that private schools offered more and longer recess breaks compared to public schools [55]. Children ought to be encouraged to engage in active play during their breaks in order to achieve optimal health, fitness, and performance.

A study by Ojiambo et al. comparing urban and rural youth leisure time activities found that, besides active play, rural youth reported spending part of their leisure time engaged in physically active household chores [51]. For example, rural children and youth reported fetching water from distant streams, fetching firewood, gardening, and running associated with cattle herding. In contrast, their urban peers reported spending their leisure time pursuing largely sedentary activities such as studying, watching television, and listening to the radio [51]. It is therefore important to realize that leisure time physical activity may go beyond active play. Household chores during leisure time may also contribute to increased health benefiting activity.

Active Transportation (Grade = B)

From self-report data 87% (58% walking, 29% running) of rural and 42% (41% walking, 1% running) of urban children used active transport to and from school. A majority of urban children (58%) reported using either a car or a bus to get to or from school [45]. Similarly high levels of active transport to/from school in rural living compared

to urban living children was reported by Ojiambo et al. Specifically, among rural males, 0% used cars, 19% walked, and 81% ran. Among rural females, 0% used cars, 40% walked, and 60% ran. Among urban males, 50% used cars, 39% walked, and 12% ran. Finally, among urban females 51% used cars, 43% walked, and 6% ran. In the combined sample, 26% of children used cars, 41% walked, and 34% ran to/from school [32]. ISCOLE-Kenya data found that 45.7% of participating urban children reported that they used active transportation to/from school [44]. In a study of rural living children, boys were found to travel a longer mean total daily distance to and from school than girls (9.0 km versus 6.3 km); with the mean distance travelled by the group as a whole at 7.6 km [62].

Onywera et al. found that a majority of rural and urban Kenyan parents (99% and 89%) reported using active transport to/from school when they were children. When asked about their perceptions on the levels of physical activity of their children, 70% of the urban, and 34% of rural parents felt that they were more active during childhood than their children, indicating that rural children were still using active transport to a greater extent than their urban peers. However, this study provided further evidence of the decreasing levels of active transportation to/from school [45].

Taken together, the results reveal that a large percentage of rural living children (87% to 100%) use active transport to/from school compared to approximately half (46% to 51%) of urban living children. Active transportation was negatively associated with being overweight/obese, and positively associated with meeting the global physical activity guidelines [44].

Sedentary Behaviours (Grade = B)

The ISCOLE-Kenya study results revealed that directly measured daily sedentary time was 398 minutes (6.6 hours), including time spent in sedentary behaviours

while at school [44]. Children spent 70 minutes more in sedentary behaviours during the school week (420 minutes) than on weekends (349 minutes). This difference may be explained by the amount of time they were required to be seated in classrooms during the school week [44]. Based on self-report, children were spending an average of 1.75 hours engaged in screen-based sedentary activities on a school day, and 4.25 hours on weekend-days [55]. The Canadian sedentary behaviour guidelines recommend that children of this age group should limit their recreational sedentary screen time to no more than 2 hours per day [14]. The results are indicative that these urban children were spending more than the recommended amount of time on screen activities on weekends.

According to Onywera et al., rural Kenyan children accumulated less time in sedentary behaviours (555 ± 67 minutes/day) than their urban counterparts (678 ± 95 minutes/day) [45]. It was also found that a large proportion (50%) of children in urban Kenya spent over 2 hours/week on screen time activities compared to 30% of children in rural Kenya [45]. It is important to note that children who spend more time on screen-related activities are more likely to be overweight and/or obese regardless of their age, race/ethnicity, or family income [12].

To our knowledge, there are no studies that have reported on screen-based versus non-screen based sedentary behaviours among Kenyan children and youth. Further research is needed to address this knowledge gap. Nevertheless, when compared to other countries, Kenya is doing well in keeping sedentary behaviour to a minimum. However, with the emerging physical activity transition, this indicator must be watched closely. There is also a need for the development of national guidelines on sedentary behaviours for children and youth.

Family and Peers (Infrastructure, Support, Parental/Peer Behaviours) (Grade = C)

Parental or caregiver perceptions of the physical environment have an immense influence on children's physical activity behaviours. Positive parental perceptions of the neighbourhood environment are associated with less screen time, more physical activity, and increased active transportation [63]. Unfortunately, while parents have a significant role in promoting healthy active lifestyles for their children, they often are not aware of the requirements for physical activity and healthy eating, and tend to under-report their children's body weights and over-report their children's physical activity levels [64].

ISCOLE-Kenya data revealed that maternal education level, paternal education level, and total annual household income were also associated with meeting physical activity guidelines. There was a decreasing trend in the number of children who met the guidelines with increasing maternal and paternal education attainment. Proportions of children meeting the physical activity guidelines decreased with increasing household SES. Maternal education level and type of school remained significant predictors of meeting physical activity guidelines in multivariable analyses. Among mothers with a high school education or lower (compared to a primary school or lower education level), their children were 64.8% less likely to meet the physical activity guidelines. In contrast, among mothers with a diploma, higher diploma, or degree (compared to a primary school or lower education level), their children were 72.6% less likely to meeting the guidelines [44].

Traditionally, there have been gender differences in the encouragement and acceptability of-, or participation in physical activity. A study on Turkana pastoralists found that male and female roles were quite distinct. Men and boys were herders and therefore walked over long distances in rugged and hilly terrain. Women and girls remained closer to their homes and fetched water and firewood, while tending to the children (engaged in frequent and strenuous lifting) [31]. While considerable progress has been made regarding support for gender equity in physical activity engagement, it must be mentioned that certain socio-cultural beliefs do exist in many Kenyan communities, whereby female children are discouraged from being physically active, a trait deemed not feminine [65]. Parents in Kenya need to be educated about the positive effects of participation in physical activity and maintaining a healthy body weight, such that they are able to encourage and support their children to live healthy active lifestyles.

School (Infrastructure, Policies, Programs) (Grade = C)

The Ministry of Education in Kenya has a policy mandating that schools allocate 35 minutes of physical education (PE), 3 times/week, as part of the school curriculum. In contrast, no such regulation applies to private schools. ISCOLE-Kenya study results revealed that a majority of children (86.8%) indicated having attended a PE lesson on 1 to 3 days of the week [55]. Only 13.8% children attending a private school and 13.2% children attending a public school reported not having participated in any PE classes during the past week [55]. Unfortunately, anecdotal accounts from school administrators and teachers revealed that while PE was scheduled within the school program as required by government policy, PE sessions were in some cases used to teach other examinable subjects owing to mounting pressure on schools to perform well on National examinations.

Regarding school infrastructure, ISCOLE-Kenya data revealed that all sampled schools had access to an outdoor sports field where children could participate in formal or informal sports or physical activities. Of these, 65.5%

schools had an outdoor sports field within the school grounds [55]. Unfortunately, most schools did not have access to a gymnasium (93.1%), large indoor room for physical activity (e.g., dance studio, auditorium) (75.9%), or a fitness room (86.2%). Almost half (48.3%) of the sampled schools did not have access to a swimming pool, and few (20.7%) had no access to a running track [55]. As a group, private schools (mainly in middle to higher SES areas) generally had a wider variety of better quality facilities to support physical activity than public schools [55].

ISCOLE-Kenya data showed that 69.0% of the sampled schools reported having existing written policies and/or practices concerning physical activity, and 51.7% had committees to oversee the development of physical activity and healthy eating policies [44]. While these results are encouraging, there is a lot of work to be done in ensuring that all schools (i.e., both public and private) have similar policies and practices in place, and that schools remain compliant. It is also noteworthy that there are no Kenyan-specific physical activity guidelines for children and youth. Since children and youth spend a significant proportion of their waking hours in the school environment, schools provide an important opportunity to positively influence their healthy active living behaviours. School environments that encourage physical activity and healthy eating are strongly associated with improved health, physical activity, and fitness outcomes in students [66, 67].

Community and the Built Environment (Infrastructure, Policies, Programs, Safety)

(Grade = INC)

Rural versus urban residence has been found to significantly influence total physical activity volume, and percent of time in MVPA. As previously described, rural living children are more active than their urban living counterparts. This is likely a reflection of the

impact of urbanization on lifestyle in Kenya. Distinct socioeconomic and built environments between these two groups exist. Interestingly, these findings are unlike observations from the Western world where, for the most part, poor built environment negatively impacts physical activity. Despite poorer living conditions and built environment, rural living children participate in higher levels of physical activity.

There is a critical absence of funded governmental or non-governmental strategies to address the built environment, and its impact on physical activity of children. This gap requires more attention from relevant stakeholders.

Governmental and Non-Governmental (Strategies, Policies, Investments) **(Grade = C)**

ISCOLE-Kenya data found that, of the 563 participating children, a large proportion (i.e., 94.0% and 84.4%) attended schools with written policies or practices on physical activity and healthy eating respectively (as reported by their school administrators) [44].

The Ministry of Education mandates the amount of time/week that children and youth are required to participate in PE. In addition, all teachers that graduate from teachers training colleges are required to take PE as a compulsory subject. Unfortunately, as previously described, there may be lack of compliance with these regulations at the school level. Furthermore there are no physical activities or sedentary behaviour guidelines for Kenya. There is also no physical activity or healthy active living strategy and no national surveillance plan.

Recognizing the opportunity for reducing deaths and diseases worldwide by improving diets and increasing levels of physical activity, the World Health Assembly adopted the WHO Global Strategy on Diet, Physical Activity and Health, in May 2004. This strategy provides recommendations for member states and various other

stakeholders on the promotion of healthy diets and regular physical activity for the prevention of NCDs. Equally important, the 2013 World Health Assembly endorsed the Global NCD Action Plan 2013-2020, which includes a set of actions for Member States, international partners and the WHO Secretariat to promote healthy diets and physical activity, and to attain 9 voluntary global targets for NCDs including targets on diet and physical activity to be achieved by 2025 [Resolution WHA 66.10]. Kenya must work harder to implement such recommendations, since the environmental and societal conditions exist for developing nations to be forced to cope with a double burden of infectious and chronic diseases. Prevention strategies are of paramount importance to reduce the predicted detrimental impact of physical inactivity [65].

Recommendations for Policy and Practice

- I. Nationally representative data on the physical activity patterns of Kenyan children and youth is needed to inform policy and practice. There is a need for continuous surveillance of physical activity patterns among Kenyan children and youth from different geographic areas within Kenya. Monitoring physical activity knowledge, attitudes and behaviours of Kenyans as well as factors which facilitate or impede access to physical activity opportunities is required.
- II. There is a need to develop physical activity and sedentary behaviour guidelines for Kenyan children and youth.
- III. There is a need to establish a national report card scientific advisory panel, composed of researchers, exercise and sports specialists, nutritionists, media personalities, policy makers, medical doctors, and other key stakeholders. Sustained funding and infrastructure support is required to allow the production and dissemination of biennial report cards to monitor the healthy active living behaviours of Kenyan children and youth.
- IV. Collaborative efforts among relevant Kenyan government ministries as well as non-governmental organizations are necessary to combat emerging NCDs.
- V. Kenyan children and youth need to be supported in making physical activity choices that are convenient, sustainable, and compatible with their needs and interests.
- VI. There is a need to enhance the development of social and physical environments that support the integration of physical activity into daily life.
- VII. Increasing knowledge and understanding of interventions, which are effective in changing physical activity knowledge, attitudes, and behaviours, is required.
- VIII. Increasing knowledge and understanding of the relationships between physical activity, healthy eating and a range of other health determinants that contribute to or inhibit optimal health is recommended.
- IX. There is a need for networking with African and other international experts to implement promising practices for research, surveillance and public health interventions.
- X. Preserving the health of children and youth through healthy active living needs to be as high a priority as treating sick children.
- XI. There is need to educate parents and guardians in Kenya about the positive effects of participating in physical activity and maintaining a healthy body weight, so that they can encourage and support their children to live healthy active lifestyles.

Opportunities for Sponsorship and Collaboration

KIDS-CAN is continually looking for collaborators and partners to invest in our efforts to address the emerging threat of childhood physical inactivity and overweight/obesity. There are many possibilities for partnership investments in the KIDS-CAN Research Alliance. Support may include:

- Sponsoring scholarly exchanges between Kenya and Canada;
- Creation of graduate student scholarships for study in this area;
- Research donations including research grants;
- Donations for equipment acquisition;
- Support for staff and infrastructure for the development of Healthy Active Kids Kenya (HAKK), an organization committed to the promotion of healthy active living for children and youth in Kenya;
- Support for the development and dissemination of periodic Report Cards on the Physical Activity and Body Weights of Kenyan Children and Youth; and,
- Support for the development and implementation of Physical Activity Guidelines for Kenyan Children and Youth, building on the global physical activity guidelines by the WHO.

Potential partners may contribute via research or equipment donations, in-kind contributions such as working space and expertise, corporate donations and support, and philanthropic support. We are interested in any assistance, particularly support from corporations who are interested in making significant and sustained contributions, as part of a purposeful corporate marketing strategy with the potential to have an impact on healthy active living needs of children and youth throughout Kenya.

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