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The HealthKick Study: Modifiable Lifestyle Factors in Primary Caregivers of Primary School Learners from Two School Districts in the Western Cape Province, South Africa

Anniza de Villiers, PhD[1]; Marjanne Senekal, PhD[2]; Johanna Nel, DSc[3]; Catherine E. Draper, PhD[4]; Estelle Lambert, PhD[4]; Nelia P. Steyn, PhD[2]

Background: The HealthKick (HK) study showed that educators (teachers) had a high prevalence of risk factors for the development of non-communicable diseases (NCDs). Little data are available on parents or other primary caregivers of learners from disadvantaged schools.

Aim: The aim of our study was to determine modifiable risk factors for the development of NCDs in a sample of caregivers of schools included in the HK intervention program.

Participants: Caregivers of grade 4 children from 25 schools were invited to take part in the study and 175 participated. Caregivers were Black Africans and of mixed ethnic origin.

Methods: Dietary intake was measured using a validated frequency questionnaire. Physical activity was measured by completing the Global Physical Activity Questionnaire (GPAQ). Caregivers described their smoking habits and alcohol usage. Weight and height were measured for each participant and body mass index (BMI) was calculated.

Results: Eighty percent women and 50% men had a BMI ≥25 (overweight or obese). The most frequently consumed categories of foods were processed foods, energy-dense foods, and high-fat foods representing unhealthy food choices. More than half of the total group (81.7%) and both males and females were meeting physical activity recommendations of 600 METs/week. Many caregivers, particularly men (53%), smoked cigarettes and reportedly consumed alcohol during the week and on weekends.

Conclusion: Caregivers of children in the HK study population presented with a large number of modifiable health risk behaviors. These results highlight the importance of engaging caregivers, as part of a whole school intervention, to promote healthy eating and physical activity. *Ethn Dis.* 2018;28(2):93-98; doi:10.18865/ed.28.2.93.

Keywords: Non-communicable Diseases; Caregivers; Obesity; Modifiable Risk Factors, Diet

[1]Non-communicable Diseases Research Unit, South African Medical Research Council, Cape Town
[2] Division of Nutrition, Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town
[3] Department of Logistics, University of Stellenbosch, Stellenbosch
[4] Division of Exercise Science and Sports Medicine, Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town

Address correspondence to Nelia Steyn, PhD; Division of Nutrition, Department of Human Biology, Faculty of Health Sciences; University of Cape Town, Cape Town, South Africa. nelia.steyn@uct.ac.za

Introduction

South Africa is an upper-middle income country that has a quadruple burden of disease. These include: 1) maternal, child health and nutritional deficiencies; 2) non-communicable diseases (NCDs); 3) injuries; and 4) chronic communicable diseases, such as HIV/AIDs and tuberculosis.[1] Malnutrition presents as both under-nutrition and over-nutrition, with stunting in South African children under five years at 27.4% and overweight and obesity being highly prevalent in adults, at 31% in men and 67.6% in women.[1] In South Africa, 29% of all deaths are from NCDs, with 18% of these from cancers and cardiovascular disease.[2]

Substantial evidence has indicated that up to 80% of NCDs, such as type 2 diabetes, heart disease and stroke and more than one third of cancers can be prevented through minimising exposure to risk factors: unhealthy diet and obesity, tobacco use, physical inactivity, and harmful use of alcohol.[3,4]

In 2009 the South African Medical Research Council initiated a randomised controlled intervention trial HealthKick (HK) aimed at primary school children, educators and caregivers in disadvantaged areas around Cape Town. Intervention results have been published on the educators and learners[5-7] but to date no data have been published on caregivers of children in the HK study.

The results of a health risk assessment conducted on educators participating in the formative assessment phase of the HK study

showed them to be at risk for NCDs with 31% overweight, 47% obese; 38% with high waist circumference; 46% with high blood pressure; and 30.4% with high blood cholesterol.[8] Study of their dietary habits further showed that sugar and margarine/butter were the two food items most frequently consumed, with fruits and vegetables only consumed about twice a day.[9] In a qualitative study conducted in the same geographical area, senior level school staff have raised the issue that educators' weight status and eating behaviors are potential challenges to teaching food-based dietary guidelines.[10]

The aim of our study was to develop a profile of modifiable risk factors for NCDs in the caregivers of learners attending the schools that were included in the HK study.

When school principals were interviewed regarding the health challenges of learners, educators and caregivers, they identified substance abuse, tobacco use and overweight as the top health priorities for caregivers in these socio-economically disadvantaged South African communities.[6] The aim of our study was to develop a profile of modifiable risk factors for NCDs in the caregivers of learners attending the schools that were included in the HK study.

Methods

Study Design

This study included schools within historically disadvantaged, low-income communities from an urban area close to the city of Cape Town and from two rural areas outside of Cape Town, South Africa. The three Educational Districts involved were Metropole North, Cape Winelands, and the Overberg. The study had three phases, with the present study part of the intervention mapping and formative phase described in detail elsewhere.[5] During this phase a representative sample of 100 schools were randomly selected (50 urban and 50 rural schools). For the present study, 25 schools were selected from the 100 schools. A cross-sectional, descriptive study design was used to develop a profile of the primary caregivers on the following: weight status, food choices, tobacco, alcohol use, and physical activity.

Study Participants

Primary caregivers (n= 887), mostly mothers or other family members, who had given consent for their grade 4 children to participate in the assessment forming part of the situational analysis[5] were invited to participate in the survey. One hundred and seventy-five (response rate 17.5%) participated. The very low response rate was despite: 1) fieldwork conducted after hours to make it easier for employed caregivers to attend; 2) each school visited at least twice; and 3) a small incentive offered for attending the screening. This poor participation of parents was also noted during other phases of the intervention study.

Anthropometry

The measuring sessions were conducted in private rooms where men and women were separately measured. Only loose clothing and shoes were removed. The height of each adult was measured to the nearest 0.1cm by means of a stadiometer. Weight was measured to the nearest 0.1kg with a digital Seca scale. Body mass index (BMI) was calculated as weight (kg) divided by height (m^2). BMI was classified into normal weight (BMI, 18.5- 24.9,kg/m^2); overweight (BMI, 25-29.9 kg/m^2) and obese (BMI, 30+ kg/m^2).[11]

Questionnaire

The questionnaire was developed using a theoretical framework developed by post-graduate students. The framework was informed by the survey data collected at the 100 schools surveyed and a thorough review of the applicable literature.[5]

Sociodemographic and Health Section

Sociodemographic questions included sex, age, ethnicity, tobacco use (smoke daily) and alcohol use (week and/or weekend).

Dietary Intake Section

We used a non-quantified validated indicator food frequency questionnaire (IFFQ)[12,13] that reflects frequency (times per week or times per month) of poor and healthy food choices focusing specifically

on foods/drinks/snacks associated with the development/prevention of obesity, diabetes and other NCDs.

For data analysis, the indicator foods were assigned to six food categories, namely: 1) fruit and vegetables; 2) high fat foods (such as processed meats; yellow cheese; margarine; fried foods, take-outs, and pastries); 3) energy-dense snacks/ items (such as sugar, chocolate, cake, crisps, sweetened beverages); 4) white bread and starches; 5) brown bread, legumes, high fiber cereals ; 6) processed (high salt/high fat) foods (tinned meat/fish, bread, margarine, cheese, crisps, take outs, eg, fast foods, pies). The high-fat category and the processed foods categories are not mutually exclusive since many of the same foods are found in both.

Physical Activity Section

The Global Physical Activity Questionnaire (GPAQ) was used to measure physical activity levels of caregivers. This instrument was developed by the World Health Organization for the quantification of energy expenditure in adults in developing countries[14,15] and has been validated in South Africa.[16] The GPAQ focuses on physical activity that takes place in three settings (activity at work; travel and recreational activities). It allows for the classification of physical activity as high, moderate and low (categorical) and quantification in terms of Metabolic Equivalents (METs) per week.[17]

Pilot Testing of the Questionnaire

The interviewer-administered questionnaire was pilot tested on school educators (grades 4 to 6) in three different schools in Cape Town. The questionnaire had also been previously tested in a national sample[12] of South Africans of all levels of education and income.

Data Analysis

The data were not normally distributed (Shapiro-Wilk test P<.05) hence medians and interquartile ranges (IQR) are also presented. Associations between BMI, sex, age, physical activity and food choices were assessed using Pearson's chi-square test, Wilcoxon two-sample test, and Kruskal-Wallis. Logistic regression analysis was done to identify predictors of BMI.

Ethics

Ethical approval for the study was obtained from the University of Cape Town's Human Research Ethics Committee (REC REF: 486/2005). All procedures were in accordance with the ethical standards of the Helsinki Declaration of 1975. Informed written consent was obtained from each parent. The purpose of the study was described on the information sheet; confidentiality was ensured, and participants were informed that only codes (not their names) would be used on all data. During recruitment, we explained that they did not have to participate and if they participated and wanted to withdraw at any point, they were welcome to do so without any negative consequences.

Results

Despite more than 800 caregivers being invited to the study (including a free health screening) and schools visited at times convenient to caregivers, only 175 caregivers chose to participate in the study (20 men and 155 women). Of the participants 28 were Black African and 147 described themselves as being of mixed ethnic origin. The median age was 39 (IQR 33.0- 44.0) (median age for women 39 and men 36) (Wilcoxon two-sample test, P=.096), and no difference between BMI groups (Kruskal-Wallis P=.379).

The median BMI for the group was 29.0 kgm^2 (IQR 25.0-34.0) and differed significantly between the sexes (men: median=24.6 kgm^2; IQR 23.0-28.5; women: median=30.0 kgm^2, IQR 25.7-34.0) (Wilcoxon two-sample test P:.011). Women were significantly more likely to be obese (BMI>30 kgm^2) than men (20% vs 52.7%; chi square P=.005). Thirty percent of men and 27.3% of women were overweight (BMI 25-29.9 kg/m^2) and 50% of men and 20% of women were normal weight (BMI 18.5-24.9 kg/m^2).

A total of 36.8 % of participants indicated that they smoked cigarettes. There was a non-significant trend for men to be more likely to smoke than women (52.6% vs 35.5%; chi square P=.145), while obese participants were significantly less likely to smoke (normal weight: 59%; overweight: 46.8%; obese: 22.9%; chi square P<.001). Alcohol intake during the week and over weekends for the total group was 4.8% and 24.8%, respectively and was significantly higher among men than women during the week and over weekends (week: 25% vs 2.7%, chi square P=.001; weekends: 58% vs 21.4%; chi square P=.005). Obese

Table 1. Frequency of consumption of indicator foods by the caregivers

Food item	Mean ± SD, per day	Median (IQR), per day	Food item	Mean ± SD, per day	Median (IQR), per day
Vegetables	1.51 ± .294	1.29 (.85-2.00)	Porridge (eg, oats)	.34 ±.377	.14 (.00-.71)
Fruits	.94 ± .386	.86 (.28-1.42)	Chicken	.31 ±.279	.29 (.14-.57)
Sugar	.89 ± .271	1.00 (1.00-1.00)	Jam	.30 ± .368	.14 (.00-.57)
Margarine	.78 ± .362	1.00 (.71-1.00)	Red meat	.28 ± .281	.14 (.07-.42)
Starches (eg, rice)	.77 ± .313	1.00 (.57-1.00)	Cheese	.26 ± .282	.14 (.03-.28)
Milk, yogurt	.67 ± .408	1.00 (.28-1.00)	Chocolate	.24 ± .315	.14 (.00-.28)
Bread, white	.56 ± .445	.71 (.00-1.00)	Cake, biscuits	.20 ± .255	.14 (.03-.25)
Bread, brown	.49 ± .419	.43 (.07-1.00)	Fried foods	.19 ± .193	.14 (.07-.28)
Breakfast cereals	.42 ± .408	.29 (.00-1.00)	Legumes	.19 ± .180	.14 (.07-.28)
Processed meat	.41 ± .390	.29 (.10-.42)	Fish	.19 ± .191	.14 (.07-.28)
Sweets	.39 ± .412	.14 (.00-1.00)	Potato chips	.19 ± .229	.14 (.36-.28)
Sweet drinks	.39 ± .411	.21 (.00-1.00)	Pastries	.12 ± .174	.07 (.00-.14)
Fruit juice	.39 ± .380	.29 (.10-1.00)	Tinned fish	.12 ± .120	.14 (.00-1.00)
Eggs	.38 ± .302	.29 (.14-.57)	Take-outs	.09 ±.129	.04 (.00-.14)
Peanuts/peanut butter	.37 ± .383	.29 (.00-.71)	Organ meat	.09 ± .087	.07 (.00-.14)
Crisps	.36 ±.369	.29 (.03-.57)	Popcorn	.08 ±.204	.00 (.00-.07)

IQR, interquartile range; SD,standard deviation.

participants were significantly less likely to use alcohol over weekends (normal weight: 37%, overweight: 35.3%; obese: 15.3%; P=.033).

Table 1 reports on the median (and IQR) frequency of intake of indicator foods included in the IFFQ. The 10 most commonly consumed foods were: vegetables; fruits; sugar; margarine; starches (rice, pasta, potatoes); dairy (milk, yogurt); white bread; brown bread; breakfast cereals and processed meats. In terms of the food categories, we combined food types into three main categories and found these consumption median values per day for men and women, respectively: fruits and vegetables, 2.4 and 2.6; high-fat foods ,3.0 and 2.3; energy-dense foods, 2.7 and 2.6; white bread and starches 1.7; high fiber cereals, brown bread and legumes, 1.3 and 1.1; and processed foods high in salt, 4.0 and 3.6 (Table 2).There were no associations between sex and BMI and frequency of intake.

More than half of the total group (81.7%) and both males and females were meeting physical activity recommendations of 600 METs per week. The greatest amount of physical activity was spent at work and the lowest in sports and leisure. There were no significant differences between physical activity and sex (P=.420); age (P=.763) or BMI (P=.972). There was a non-significant trend for METS per week to be the highest in the normal weight group and the lowest in the obese group.

...in our present study, BMI ≥25 was found in 50% of the men and 80% of the women, indicating a higher prevalence than shown in the national study.

We found no significant associations when logistic regressions were done using BMI as dependent and sociodemographic, dietary and physical activity as independent variables.

Discussion

In this study, we attempted to characterize the health risk status of a self-selected group of caregivers, from schools representing the HK, a primary school-based intervention. Among the respondents, we found a high prevalence of overweight and obesity, thereby confirming one of the health concerns for caregivers previously reported by the school principals.[6] Caregiver data were compared with data from a national study[1] that found that 43.7% of men and 73.4% women in the Western Cape Province had a BMI ≥ 25, while in our present study, BMI ≥25 was found in 50% of the men and 80% of the wom-

Table 2. Frequency (times per day) of intake of indicator food categories by sex and BMI

Category	Fruits and Vegetables		High-fat Foods		Energy-dense Foods	
Sex	**Mean (SD)**	**Median (IQR)**	**Mean (SD)**	**Median (IQR)**	**Mean (SD)**	**Median (IQR)**
Male, n=20	2.6 (1.38)	2.4 (1.8-3.6)	2.6 (.95)	3.0 (1.9-3.3)	2.8 (1.25)	2.7 (1.9-3.6)
Female, n=155	2.9 (1.59)	2.6 (1.7-3.9)	2.3 (.98)	2.3 (1.7-2.9)	2.8 (1.38)	2.6 (1.7-3.9)
P, Kruskal-Wallis	P>.05		P>.05		P>.05	
BMI						
Normal, n=40	2.6 (1.57)	2.4 (1.4-3.0)	2.3 (.96)	2.3 (1.9-2.9)	2.8 (1.63)	2.4 (1.4-2.1)
Overweight, n=47	2.9 (1.69)	2.6 (1.6-4.1)	2.2 (.99)	2.1 (1.6-2.7)	2.7 (1.25)	2.9 (1.7-3.4)
Obese, n=83	3.0 (1.49)	2.9 (1.9-3.9)	2.5 (.98)	2.4 (1.9-3.1)	2.9 (1.28)	2.6 (1.9-3.9)
P, Kruskal-Wallis	P>.05		P>.05		P>.05	
Total, n=175	2.8 (1.57)		2.4 (.98)		2.8 (1.36)	

Category	White Bread and Starches		Cereals, Brown Bread and Legumes		Processed Food High in Salt and Fat	
Sex	**Mean (SD)**	**Median (IQR)**	**Mean (SD)**	**Median (IQR)**	**Mean (SD)**	**Median (IQR)**
Male, n=20	1.7 (.53)	1.7 (1.6-2.0)	1.1 (.49)	1.3 (.8-1.5)	4.0 (1.22)	4.0 (2.8-4.9)
Female, n=155	1.7 (.62)	1.7 (1.3-2.0)	1.1 (.64)	1.1 (.6-1.5)	3.7 (1.38)	3.6 (2.6-4.4)
P, Wilcoxon two-sample	P>.05		P>.05		P>.05	
BMI						
Normal	1.7 (.72)	1.7 (1.4-2.1)	1.0 (.55)	1.0 (.6-1.4)	3.7 (1.38)	3.7 (2.7-4.5)
Overweight	1.7 (.61)	1.7 (1.1-2.0)	1.1 (.70)	1.0 (.4-1.6)	3.5 (1.45)	3.6 (2.4-4.4)
Obese	1.7 (.56)	1.7 (1.3-2.0)	1.2 (.64)	1.1 (.6-1.6)	3.9 (1.31)	3.6 (3.0-4.7)
P, Kruskal-Wallis	P>.05		P>.05		P>.05	
Total	1.7 (.61)		1.1(.63)		3.7 (1.36)	

IQR, Interquartile range; SD,Standard deviation.

en, indicating a higher prevalence than shown in the national study.

It is interesting to note that both educators and caregivers have similar tendencies regarding categories of foods eaten. In caregivers, the top four categories were processed foods, energy dense foods, fruits and vegetables, and high-fat foods. In educators, the categories were processed foods, high-fat food, and fruits and vegetables.[13] In both groups the consumption of fruits and vegetable falls far below the recommended five a day.[18]

Another concern regarding the caregivers was the high prevalence of those who smoked and consumed alcohol. Participants were not asked about the amount of alcohol consumed, which is a limitation since it may have been low or moderate in many cases. However, high alcohol consumption is of concern, since the Western Cape Province has one of the highest levels of fetal alcohol syndrome in the world.[19] Chronic respiratory diseases (CRDs) such as constrictive obstructive pulmonary disorder and asthma, which are associated with smoking, are also very high in the Western Cape Province.[20] CRDs account for four million deaths a year globally and many are preventable.[21]

While this study has highlighted the modifiable risk factors for NCDs in caregivers of primary school learners in the HK study, it has to be interpreted with caution since the study group is small. The small study group is, however, in itself an important finding as it supports the difficulties schools report in engaging caregivers.[22] As mentioned in the results, only 175 chose to participate, with few males participating. This highlights the potential difficulties school-based healthy lifestyle interventions that include a parental component as suggested by best practices[23] may face. This became true in the HK intervention where over three years, the eight participating schools planned four actions that involved caregivers and only implemented three.[7]

The health-promoting schools initiative argues that in order to promote long-term health in children, schools should work closely with caregivers and the local community.[24] Children in South Africa, like many other countries, are faced with many health issues. The latter range from drug abuse, obesity, violence, suicide,

alcohol abuse, to teenage pregnancies. Therefore, it is essential to involve caregivers in an effort to promote the health of their children in schools.[25]

Conclusions

Overweight and obesity, cigarette smoking, and alcohol intake were prevalent among caregivers. The high frequency of consumption of processed and high fat foods and low consumption of fruits and vegetables are indicative of a diet that does not comply with the principles of a prudent diet. These results highlight the importance of engaging caregivers as part of a whole school intervention to promote healthy eating and physical activity.

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Conflict of Interest

No conflicts of interest to report.

Author Contributions

Research concept and design: de Villiers, Senekal, Lambert, Steyn; Acquisition of data: de Villiers, Senekal, Draper; Data analysis and interpretation: de Villiers, Senekal, Nel, Draper, Lambert, Steyn; Manuscript draft: de Villiers, Senekal, Nel, Draper, Lambert, Steyn; Statistical expertise: Nel; Acquisition of funding: Lambert, Steyn; Administrative: Steyn; Supervision: de Villiers, Draper

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