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# The association between nutrition and physical activity knowledge and weight status of primary school educators

**Lucinda Dalais, Zulfa Abrahams, Nelia P Steyn**
Population Health, Health Systems and Innovation, Human Sciences Research Council, Cape Town, South Africa
npsteyn@hsrc.ac.za

**Anniza de Villiers, Jean M Fourie, Jillian Hill**
Chronic Diseases of Lifestyle Unit, Medical Research Council (MRC), Tygerberg, South Africa

**Estelle V Lambert, Catherine E Draper**
University of Cape Town/MRC Research Unit for Exercise Science and Sports Medicine, Sports Science Institute of South Africa, Newlands

The purpose of this study was to investigate primary school educators' health status, knowledge, perceptions and behaviour regarding nutrition and physical activity.Thus, nutrition and physical activity knowledge, attitudes, behaviour and risk factors for the development of non-communicable diseases of 155 educators were assessed in a cross-sectional survey. Height, weight, waist circumference, blood pressure and random glucose levels were measured. Twenty percent of the sample had normal weight (body mass index (BMI, kg/m²) < 25), 27.7% were overweight (BMI≥ 25 to < 30) and 52.3% were obese (BMI < 30). Most of the participants were younger than 45 years (54.2%), females 78.1%, resided in urban areas (50.3%), with high blood pressure (≥ 140/90 mmHg: 50.3%), and were inactive (48.7%) with a high waist circumference (> 82 cm: 57.4%). Educators' nutrition and physical activity knowledge was poor. Sixty-nine percent of educators incorrectly believed that eating starchy foods causes weight gain and only 15% knew that one should eat five or more fruit and/or vegetables per day. Aspects of poor nutritional knowledge, misconceptions regarding actual body weight status, and challenges in changing health behaviours, emerged as issues which need to be addressed among educators. Educators' high risk for developing chronic non-communicable diseases (NCDs) may impact on educator absenteeism and subsequently on school functioning. The aspects of poor nutrition and physical activity knowledge along with educators' high risk for NCD development may be particularly significant not merely in relation to their personal health but also the learners they teach.

**Keywords:** body weight, educators, health, knowledge, non-communicable diseases, nutrition, perceptions, physical activity, primary schools, risk factors

## Introduction

Overweight and obesity impact on the health of populations globally, as they are major risk factors for NCDs such as type-2 diabetes, certain cancers, heart disease and stroke (World Health Organization (WHO), 2008). Furthermore, 80% of NCD deaths are in low- and middle-income countries and it is projected that without intervention, NCD deaths will increase by 17% between 2005 and 2015 (WHO, 2005).

The South African population has not been immune to the onslaught of NCDs and currently has a quadruple burden of disease which includes NCDs, Human Immunosuppressive Virus (HIV)/Acquired Immunodeficiency Syndrome (AIDS), injury-related deaths and other infectious diseases (Bradshaw, Steyn, Levitt & Nojilana, 2011). However, preventing and managing NCDs in South Africa has been side-lined because of the focus on HIV/AIDS and the high prevalence of tuberculosis (Mayosi, Flischer, Lalloo, Sitas, Tollman & Bradshaw, 2009).

In South Africa and other low- and middle-income countries, a significant increase in deaths attributable to NCDs is projected to occur in the coming decades (Abedunde, Mathers, Adam, Ortegon & Strong, 2007). Underprivileged South Africans in urban areas are reported to be especially affected by an increase in NCDs emphasizing the need for chronic health care in this sector (Mayosi et al., 2009). Furthermore, there is the assumption that the medical costs of a country could increase along with premature deaths in the population if obesity became a norm in terms of the average body weight (Algazy, Gipstein, Riahi & Tryon, 2010).

South Africa has approximately 386 000 educators in its 266 292 schools (SouthAfrica.info, 2009). As part of a longitudinal study in 100 urban and rural disadvantaged schools in the Western Cape Province, a survey among primary school educators from low-income settings (Ndamane, 2013) found them to be overweight (31%) and obese (47%). Teaching per se is a stressful profession (Prakke, Van Peet & Van der Wolf, 2007) and there is evidence that this is related to poor health outcomes, such as cardiovascular morbidity (Guglielmi & Tatrow, 1998).

The most common self-reported health problems among educators (Shisana, Peltzer, Zungu-Dirwayi & Louw, 2005) in the public sector were high blood pressure (15.6%), stomach ulcers (9.1%) and type-2 diabetes (4.5%). Health promotion among this group of individuals is thus important as it may help them to manage and improve their personal health by imparting knowledge and skills to achieve better overall health (Steyn, Lambert & Tabana, 2009).

### South African studies

A high prevalence of overweight and obesity exists in adult South Africans. Fifty-six percent of adult women and 29% of adult men are either overweight or obese. The highest prevalence in women being among non-white groups (Indian, 59%; black, 56% and mixed ancestry, 52%) and in men among the white group (48%) (Department of Health (DoH), Medical Research Council & OrcMacro, 2007).

Local evidence (Puoane, Steyn, Bradshaw, Laubscher, Fourie, Lambert & Mbananga, 2002) however suggests that many men and women do not regard overweight and obesity as health problems. This may be because of the underestimation of their body size. Previous studies have shown that men and women of different ethnicities underestimate their body size, and the underestimation of weight is associated with individuals showing a preference towards an overweight body size (Puoane et al., 2002).

South Africa is a country with unique cultural diversity among its people. A few local studies (Puoane, Fourie, Shapiro, Rosling & Tshaka, 2005; Mciza, Goedecke, Steyn, Charlton, Puoane, Meltzer, Levitt & Lambert, 2005) have highlighted that cultural differences contribute to a higher regard for a larger body size particularly among South African black women. Factors such as health risk perceptions, societal, cultural and ethnic tradition or norms (Kuchler & Variyam, 2003; Mchiza, Goedecke & Lambert, 2011) are assumed to be the main influence.

Anderson, Eyler, Galuska, Brown and Brownson (2002) suggest that the need for a person to lose weight because of being diagnosed with a chronic disease may make their body image more important. Befort, Thomas, Daley, Rhode and Ahluwalia (2008) in their study, found that the participants' health was the main reason for them wanting to lose weight, as 48.8% suffered from hypertension and 25.8% from diabetes. In other studies, chronic conditions such as high blood pressure, heart disease and diabetes were correctly identified as consequences of overweight (Puoane et al., 2005; Puoane, Tsolekile & Steyn 2010).

In a few South African studies, researchers have reported on the causes of overweight as perceived by participants. Among those identified were overeating (Mvo, Dick & Steyn, 1999; Faber & Kruger, 2005); a biological disorder (96%), poor eating habits (39%) (Faber & Kruger, 2005); eating the wrong foods and/or not eating breakfast (Puoane et al., 2005; 2010). Interestingly, most women did not see the connection between health and food intake.

Studies on nutrition knowledge in recent years are limited in South Africa and even more so regarding the nutrition knowledge of educators. Peltzer (2004) reported on the gaps in nutrition knowledge in a sample of 90 urban black and 90 urban white South Africans (18 years and older) in Limpopo province through a telephone survey. This study aimed at particularly determining the level of nutritional knowledge in this urban population. The survey found that both groups, black and white, had reasonable knowledge of diet recommendations and nutrient sources. They were, however, less knowledgeable about the relationship between diet and disease and about choosing healthy foods daily. The white group illustrated more general nutrition knowledge than the black group. Importantly/interestingly, the participants did not appear to use dietary recommendations to make healthy food choices daily. This suggests that other motivational factors may be playing a role in the healthy foods chosen everyday. The education level of the participants was significantly associated with overall nutrition knowledge in particular diet recommendations (in the black participants) and the association between diet and disease (in the white participants). On a whole, the black female participants had significantly lower nutrition knowledge than white female participants. This was found even though the education level between the two female groups was not significantly different. In males, there was no significant difference in nutrition knowledge of the two groups.

In a pilot study that was conducted to gauge the impact of nutrition education on the nutrition knowledge of primary school Life Orientation educators, baseline results showed that their general nutrition knowledge improved considerably (63.3 ± 30.2% to 80.6 ± 21.1%) after the programme (Oldewage-Theron & Egal, 2012). This would be assumed to improve the nutrition education provided to the primary school learners and in this way improve not only learner, but also educators' nutrition knowledge and behaviour.

### Studies elsewhere

In the United States of America, a classroom-based early child hood obesity prevention programme was implemented by Head Start educators who teach the nutrition education curriculum and encourage healthy eating behaviour (Sharma, Dortch, Byrd-Williams, Truxillio, Rahman, Bonsu & Hoelscher, 2013). This educator health behaviour survey assessed behaviour of predominantly African Americans and Hispanics on diet, usual meal consumption, and time spent on being physically active and sedentary, dietary practices and their knowledge and attitudes on nutrition and health. The survey results indicated that the Head Start educators' nutrition knowledge was poor, as none of them could correctly answer all of the nutrition knowledge questions; only 3% and 18% correctly answered at least four and three nutrition questions, respectively. Only 38.5% of educators correctly answered that at least five fruit and vegetables should be eaten daily. Breakfast, lunch and dinner was eaten 'always or almost always' by 57%, 75% and 79% of educators, respectively. In addition, their nutrition behaviour indicated towards the consumption of high fat foods and low fruit and vegetables.

Eighty-eight percent of educators had ever tried to lose weight and as much as 71% had been trying to lose weight at the time of the survey. Seventy-eight percent agreed that excessive weight increased health risks (Sharma et al., 2013).

Little data exists on the health knowledge of educators, particularly with regard to the most important aspects of chronic NCD risk. The aim of this study was therefore to investigate not only primary school educators' health status, but also their knowledge, perceptions and behaviour regarding the two most important behavioural aspects of NCD risk, diet and physical activity.

## Methodology

### Study design and sample

This educator survey is a sub-study of HealthKick (Draper, De Villiers, Lambert, Fourie, Hill, Dalais, Abrahams & Steyn, 2010), which is a primary school-based nutrition and physical activity intervention programme, undertaken in 16 schools in the Western Cape Province. The sub-study took place at all the HealthKick intervention schools (four rural and four urban low-resourced schools). This is a cross-sectional descriptive study, which was a useful design to observe and examine the characteristics of primary school educators. This survey was

conducted 18 months into the HealthKick intervention programme and the educators were thus exposed to various health awareness activities (Draper et al., 2010). The study sample comprised 155 educators from the HealthKick Intervention schools of whom 76.7% were females and 32.3% males.

The study proposal was submitted and approved by the Research Ethics Committee in the Faculty of Health Sciences, University of Cape Town (REF No 486/2005). Approval for the research was obtained from the Western Cape DoE. All participants gave written informed consent. All information was confidential and subjects were not identified by name.

### Knowledge, attitudes and behaviour Questionnaire

Educators completed a 15-20 minute self-administered, closed-ended questionnaire assessing their nutrition and physical activity knowledge, attitudes and behaviour. Nineteen questions were included in the questionnaire. The knowledge section was based on a validated nutritional knowledge questionnaire developed for use among urban South African adolescents (Whati, Senekal, Steyn, Nel, Lombard & Norris, 2005). Fundamental to its development was the South African food-based dietary guidelines (FBDGs), promulgated by the South African DoH (Love, Maunder, Green, Ross, Smale-Lovely & Charlton, 2001). The other sections of the questionnaire relating to attitudes and behaviour were developed and pretested as part of the 100 Schools study (Draper et al., 2010).

### Procedures

Educators completed a short questionnaire assessing various risk factors for the development of chronic NCDs, such as smoking status, level of physical activity, dietary intake pattern and family history. Their height, weight, waist circumference (WC), blood pressure (BP) and non-fasting glucose levels were measured by trained fieldworkers according to the WHO procedures (WHO, 1995). Educators were weighed to the nearest 0.1 Kg, without shoes and jackets using a digital scale. Height was measured to the nearest 0.1 cm using a lightweight, portable stadiometer which was placed on an even surface. Educators stood on its base without shoes, with heels together, looking straight ahead. Waist was measured around the narrowest part of the middle, while hip measurement was done around the broadest part of the hips. Blood pressure was measured using an Omron Automatic Digital BP Monitor (model M2, Omron Healthcare, Bannockburn, IL, USA). Measurements were taken after at least 5-10 minutes of rest. The cuff was applied to the upper non-dominant arm so that the midpoint of the length of the cuff lay over the brachial artery and the mid-height of the cuff was at heart level. With the ante-cubital fossa at heart level, two BP readings were taken. A non-fasting blood glucose measurement was taken by means of a finger prick using an ACCU-CHEK Active blood glucose meter.

### Data analysis

Data analysis was carried out using the STATA/SE statistical software package version 11.0 (StataCorp, College Station, TX, USA). Each participant's BMI was calculated [weight (kg)/ height (m²)]. The sample was stratified into actual weight categories based on their BMI (normal weight < 25; overweight ≥ 25 to < 30; obese ≥ 30) (WHO, 2000). The characteristics of the sample were analysed according to actual weight categories and chi-square *t* tests were performed to assess statistical significance. Hypertension was defined as a systolic BP ≥ 140 and/or diastolic BP ≥ 90 mmHg (Guidelines Committee, 2003). Glucose values were stratified into high and low levels based on random glucose measurements (high if glucose ≥ 11.1 mmol/ℓ; low if glucose < 11.1 mmol/ℓ) (Franz, Powers, Leontos, Holzmeister, Kulkarni, Monk, Wedel & Gradwell, 2010). Measurements for WC were stratified into high, and normal, based on gender (high: females ≥ 88 cm and males ≥ 102 cm) (NHLBI Obesity Education Initiative, 2000). Family history referred to having a biological family member who was diagnosed with high BP, high blood cholesterol, diabetes, and/or had suffered from a heart attack or stroke.

**Table 1** Sample characteristics (in percent) of primary school educators by actual weight categories

| | Normal weight* n 31 % | Overweight † n 43 % | Obese †† n 81 % | Total % | *p* |
|---|---|---|---|---|---|
| Younger than 45 years | 54.8 | 60.5 | 50.6 | 54.2 | 0.023 |
| Female | 67.7 | 69.8 | 86.4 | 78.1 | 0.031 |
| Urban | 51.6 | 60.5 | 44.4 | 50.3 | 0.233 |
| Blood pressure ≥ 90/120 mmHg | 29.0 | 51.2 | 58.0 | 50.3 | 0.023 |
| Glucose level > 11.1 mmol/ℓ | 12.9 | 14.0 | 14.8 | 14.2 | 0.966 |
| Smoke tobacco | 22.6 | 20.9 | 12.3 | 16.8 | 0.251 |
| Waist circumference ≥ 88/102 cm | 9.7 | 23.3 | 93.8 | 57.4 | 0.000 |
| Family history § | 29.0 | 51.2 | 65.4 | 54.2 | 0.002 |
| Attempt at weight loss ‖ | 12.9 | 32.6 | 56.8 | 41.9 | 0.000 |
| Active participation in exercise/sport | 22.6 | 14.0 | 5.0 | 11.0 | 0.096 |

* BMI < 25 kg/m²

† BMI ≥ 25 - < 30kg/m²

†† BMI ≥ 30kg/m²

§ refers to having an immediate family member with high blood pressure, heart attack, stroke, diabetes or high blood cholesterol

‖ refers to someone who attempted to lose weight during the previous year

Pie charts were generated to show the difference between educators' actual weight versus their perceived weight. Nutrition and physical activity knowledge, attitudes and behaviour questions were analysed and reported as categorical variables according to the number and percentage in each category.

## Results

The study sample comprised 155 primary school educators. Table 1 shows the characteristics of the educators stratified into actual weight categories based on their BMI. Of these educators, 20% had a normal weight (BMI< 25), 27.7% were overweight (BMI ≥ 25 to < 30) and 52.3% were obese (BMI ≥ 30). Many educators were younger than 45 years (54.2%), female (78.1%), from an urban area (50.3%), and had high BP (50.3%) and a large WC (57.4%). In addition, many had a family history of heart disease (54.2%) and had attempted to lose weight (41.9%) during the past year. High blood glucose levels were found in 14%, while 16.8% smoked cigarettes and only 11% were physically active. Statistically significant associations were found between actual weight and age ($p = 0.023$), gender ($p = 0.031$), BP ($p = 0.023$), WC ($p = 0.0001$), family history ($p = 0.002$), and whether an attempt was made to lose weight ($p = 0.0001$) during the previous year.

Table 2 and Figure 1 present educators' actual weight versus their perceived weight in the form of three pie charts. While most educators with a normal weight perceived themselves as having a normal weight (27/31), many of those who were overweight also perceived their weight as being normal (23/43). Of those individuals who were obese, only nine out of 81 perceived themselves as being obese.

Table 3 indicates that many educators (56.9%) thought that gaining weight was a result of unhealthy eating habits. The most common barriers to healthy eating and physical activity, respectively, were a busy lifestyle (29.6%; 28.8%), cost (23.3%; 23.3%), and little self-discipline (24.5%; 20.2%). Thirty-five percent of educators reported eating three meals and snacks every day, while 63% reported regularly bringing a healthy lunch to school. Almost half of the sample (49%) reported a sedentary lifestyle, which included sitting most of the time, little walking and no participation in exercise or any sport.

**Table 2** Actual weight versus perceived weight based on Stunkard's body image silhouettes

| Perceived weight categories | Actual weight categories (N 155) | | |
|---|---|---|---|
| | Normal weight* (n 31) | Overweight† (n 43) | Obese†† (n 81) |
| Normal weight* (n 59) | 27 (87) | 23 (53) | 9 (11) |
| Overweight† (n 85) | 4 (13) | 20 (47) | 61 (75) |
| Obese†† (n 11) | 0 | 0 | 11 (14) |

* BMI < 25kg/m²
† BMI ≥ 25 - < 30kg/m²
†† BMI ≥ 30kg/m²

**Table 3** Questions and answers on perceptions and behaviour of primary school educators regarding healthy eating and physical activity

| Questions | Multiple choice answers | n | % |
|---|---|---|---|
| Reason for weight gain | Runs in the family | 18 | 12.3 |
| | Eating too much | 23 | 15.8 |
| | Eating unhealthy food | 83 | 56.9 |
| | Too little exercise | 11 | 7.5 |
| | Lack of knowledge | 11 | 7.5 |
| Barriers to healthy eating | Busy lifestyle | 76 | 29.6 |
| | Cost | 60 | 23.3 |
| | Little/no self-discipline | 63 | 24.5 |
| | Little/no motivation to change | 18 | 7.0 |
| | Little/no knowledge | 12 | 4.7 |
| | Little/no cooking skills | 11 | 4.3 |
| | No family support | 6 | 2.3 |
| | Don't enjoy healthy food | 11 | 4.3 |
| Barriers to physical activity | Busy lifestyle | 73 | 28.8 |
| | Cost | 59 | 23.3 |
| | Little/no self-discipline | 51 | 20.2 |
| | Little/no motivation to change | 16 | 6.3 |
| | Little/no knowledge | 9 | 3.6 |
| | No sport skills | 16 | 6.3 |
| | No family support | 5 | 2.0 |
| | Don't enjoy physical activity | 24 | 9.5 |
| Usual eating plan | 3 meals without snacks | 34 | 21.9 |
| | 3 meals with snacks | 54 | 34.8 |
| | 1-2 meals without snacks | 26 | 16.8 |
| | 1-2 meals with snacks | 37 | 23.9 |
| | Nibbling with no specific meals | 4 | 2.6 |
| Healthy lunch taken to school | Yes | 97 | 63.0 |
| | No | 57 | 37.0 |
| Activity pattern time or work | Sitting most of the time, little walking, no sport | 76 | 48.7 |
| | Less sitting, more walking and/or participating in light exercise or sport | 63 | 40.4 |
| | Very little sitting, mostly walking and/or active participation in exercise/sport | 17 | 10.9 |

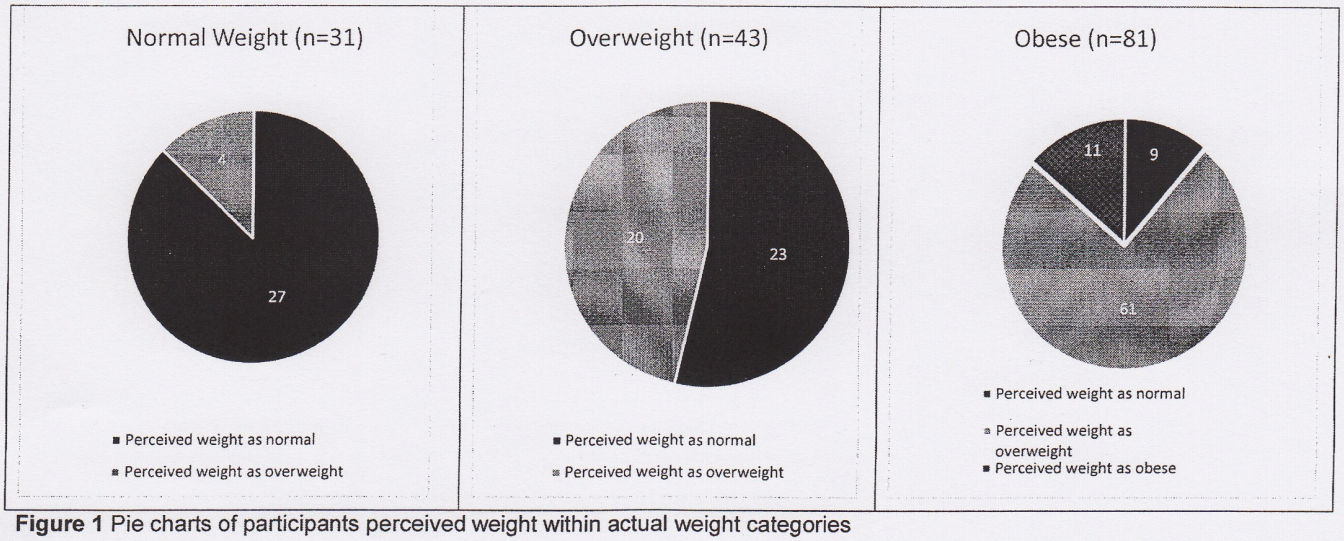


**Figure 1** Pie charts of participants perceived weight within actual weight categories

**Table 4** Primary school educators' knowledge scores on nutrition and physical activity based on the food-based dietary guidelines for South Africa propagated by the Department of Health

| | Correct answers (n 155) | |
|---|---|---|
| | n | % |
| **Multiple choice questions** | | |
| Eating starchy foods at most meals may … | 7 | 4.6 |
| From which group of foods should you eat the most every day? | 28 | 18.5 |
| The key to a healthy way of eating is to? | 115 | 75.1 |
| Being physically active means … | 101 | 65.6 |
| How many fruits and vegetables should be eaten? | 23 | 14.7 |
| A well-balanced diet consists of mostly … | 47 | 30.5 |
| Which one of the following groups of nutrients is found in large amounts in fruits and vegetables | 105 | 69.1 |
| Which of the following breakfast menus contain little fat | 65 | 42.2 |
| Which foods are the lowest in fat | 40 | 26.1 |
| How much water should you drink a day | 133 | 85.8 |
| **True/false statements** | | |
| You should eat a lot of sugar to give you enough energy | 127 | 82.5 |
| If you are eating a healthy diet there is no need to be physically active | 147 | 94.2 |
| Eating a lot of different kinds of foods is healthier than eating only a few kinds of foods | 99 | 63.9 |
| Starchy foods should not be eaten when one is trying to lose weight | 69 | 44.8 |
| Your body only needs a little bit of salt to be healthy | 126 | 82.4 |
| Dry beans, peas, and lentils are a healthy choice to eat in place of meat | 138 | 89.0 |
| Drinking a lot of wine, beer, and cider can cause weight gain | 119 | 76.8 |
| Salt should be added to all foods except fruits | 112 | 72.3 |
| You can eat as much meat as you want every day | 148 | 97.4 |

| | Mean | *SD* | % |
|---|---|---|---|
| Knowledge score (Total score = 19) | 10.6 | 2.02 | 55.79 |

In Table 4 educators' nutrition and physical activity knowledge is reported as being poor [mean = 55.8%). Only 4.6% of educators correctly believed that eating starchy food at most meals was recommended. While most educators (75%) knew what healthy eating was, in terms of eating a variety of foods, only 15% knew that eating five portions of fruit/vegetable a day was recommended. Only 30.5% were able to describe a well-balanced diet. No significant associations were found between educators' knowledge and any of the characteristics listed in Table 1.

## Discussion

To the best of our knowledge, no data have been published on South African educators' health status, knowledge, perceptions and behaviour regarding diet and physical activity.

This study of educators in primary schools has identified a

number of risk factors associated with NCD development as indicated by the WHO (WHO, 2005). These include hereditary diseases (non-modifiable risk factor), overweight/obesity, an increased WC, elevated BP (intermediate risk factors), as well as physical inactivity (modifiable risk factor). Elevated BP was also found to be a common self-reported health problem (15.6%) among educators in a survey of public schools in South Africa (Shisana et al., 2005).

Additionally, in this survey, more than half of the educators reported a family history of diabetes, heart attack, stroke, high BP and high blood cholesterol. Known risk factors for high BP are overweight/obesity, family history and stress levels (WHO, 2008). Educators in South Africa have been shown to have very stressful working conditions (Emsley, Emsley & Seedat, 2009), which not merely increase BP, but are also linked to an increased risk for cardiovascular diseases (Vrijkotte, Van Doornen & De Geus, 2000).

Thus, the number of risk factors and family history of NCDs, and the increased workload-induced stress levels among this group of educators may contribute to greater educator absenteeism and, consequently, on the functioning of schools, as suggested by Shisana et al. (2005).

The findings of this survey also showed that most educators fell within the obese and overweight BMI categories and that central obesity was prevalent in more than half of them. These findings surpass those of the South African Demographic and Health Survey (SADHS), which showed that most adults fell within the overweight and obese BMI categories and that hypertension was the most prevalent self-reported condition (DOH et al., 2007).

There are three possible explanations for overweight/obese educators not attempting to lose weight. First, they may not perceive themselves as being overweight or obese, since many overweight/obese educators thought their weight was normal. This explanation is supported by findings from the SADHS (DOH et al., 2007). Moreover, the misconceptions appear to increase as the BMI category increased. Possibly there are ethnic and cultural values attached to these educators' perception of body weight, as most participants in the present survey were from the mixed ancestry and black African groups. These two groups appear to be under greater misconception of their own body size than their white counterparts (Puoane et al., 2005; Matoti-Mvalo, 2006).

Second, these educators may not realise that excess body weight increases their risk for certain diseases, therefore they do not see the health benefits of weight loss. Local evidence (Puoane et al., 2002) suggests that many men and women do not regard overweight and obesity as health problems. Hence, if a specific NCD was not diagnosed in these educators they would not be particularly motivated to lose weight.

The third and final explanation may be that the barriers to weight loss are too high to attempt to overcome. Our findings show that almost 30% of the educators acknowledged that a busy lifestyle was a barrier to physical activity and healthy eating. Although some educators had attempted to lose weight within the previous year, very few were physically active. This implies that educators may find it difficult to follow a healthy lifestyle through physical activity because of other demands on their time. At school, educators' time is bound to the daily school programme and almost half of them reported that most of their time is spent sitting and not much walking. As such this does not bode well for increasing physical activity during the work day of a typical educator.

In addition, schoolwork may encroach on family time at home because educators, for example, have to mark test papers at home. Other family responsibilities may also contribute to their lack of time during the day. Women are generally the ones who prepare meals for their families which may be a quick meal prepared in an unhealthy way or buying take-away/fast foods to save time cooking. These meals are often high in energy and fat, but low in fibre and micronutrients (Temple & Steyn, 2011).

Unhealthy eating habits or eating too much was identified by most educators as the reason for weight gain, which is similar to other studies in South Africa (Mvo et al., 1999; Faber & Kruger, 2005; Puoane et al., 2005; 2010).

The present survey also found that educators had poor nutrition knowledge, which is contrary to our expectation that they would have good basic nutrition knowledge to educate their learners. A relatively small proportion of educators knew of what a balanced diet consisted, and associated starchy foods with weight gain. This misconception that starchy foods lead to weight gain is contrary to message of the FBDGs.

Another concern was the finding that half of the educators did not know how many portions of fruit or vegetables should be eaten a day. Similarly, the Head Start educators survey in the USA found that less than half of educators knew the number of fruits and vegetables servings to be eaten daily (Sharma et al., 2013). This is disturbing, since fruits and vegetables play such an integral role in the fight against chronic NCDs (Peltzer, 2004).

These findings support that of South African adults who have less knowledge in making healthy daily food choices (Peltzer, 2004), and may also allude to a lack of knowledge about the association of disease and nutrition.

While educators had many risk factors for developing NCDs, along with poor nutrition knowledge and misconceptions about their weight status, it is encouraging that several of those who were overweight/obese had attempted losing weight in the previous year. This seems promising for the DoE to evaluate options for making a weight-loss intervention available at schools. Recommendations are that the FBDGs be used as an education tool for educators regarding good nutrition. Basic nutrition and physical activity should be considered as an examinable subject in future training programmes for all educators. For experienced educators, we recommended that the DoE consider making a distance learning nutrition course available.

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