

## FORUM

## ISSUES IN PUBLIC HEALTH

## Low levels of physical activity in female adolescents cause overweight and obesity: Are our schools failing our children?

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The increasing prevalence of overweight and obesity among female adolescents is a global health problem. In developing countries such as South Africa, this increase is often associated with urbanisation and the adoption of a Western lifestyle. Two aspects of the Western lifestyle that contribute to the development of overweight and obesity are a decrease in physical activity levels and an increase in the consumption of energy-dense food, high in fats and refined sugar. Information on the prevalence of increased body fatness in populations in transition is scarce, but necessary for effective planning and intervention. Current indications are that there is a trend towards unhealthy behaviour among high-school girls, globally and in South Africa. Schools can play an important role in the prevention of overweight and obesity among schoolgirls. It is recommended that school governing bodies institute remedial action to prevent weight gain in children, especially girls.

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Obesity develops rapidly during adolescence.<sup>[1]</sup>

According to the World Health Organization (WHO), childhood obesity is a major global public health problem.<sup>[2]</sup> The prevalence of overweight and obesity is increasing rapidly in Africa; between 1990 and

2010, the number of overweight or obese children doubled.<sup>[3]</sup> Armstrong *et al.*<sup>[4]</sup> noted that there was an increase in overweight and obesity in South Africa (SA) from 1994 to 2004. According to the WHO,<sup>[5]</sup> females are more likely to be obese than males. This is especially true for black females in SA, who according to Martorell *et al.*<sup>[6]</sup> are often overweight or obese, or have abdominal obesity. In African culture increased body fatness is viewed as a sign of health and wealth. Mothers therefore tend to over-feed their infants, thereby increasing the risk of developing obesity.<sup>[7]</sup>

Although traditional culture remains strong in many parts of SA, a transition is currently occurring between traditional and Western-orientated lifestyles.<sup>[8]</sup> This has potential consequences for overweight and obesity among black schoolchildren, especially girls, who live in periurban and urban environments. Their increase in body fatness increases the risk of development of chronic diseases of lifestyle such as hypertension, stroke, coronary heart disease and type 2 diabetes mellitus.<sup>[9]</sup>

### Possible causes for increased body fatness in schoolgirls

Since increased body fatness is a consequence of a positive energy balance,<sup>[10]</sup> schoolgirls who use less energy than they consume will gradually become overweight and eventually obese. The two most obvious causes of increased body fatness in schoolgirls are probably a decrease in physical activity and an increased consumption of energy, both of which are associated with urbanisation and westernisation.<sup>[11]</sup>

Life in an urban setting has a severe negative impact on the amount of physical activity a child has the chance to enjoy.<sup>[12]</sup> In urban and periurban regions, safety concerns contribute to the decrease in physical activity,<sup>[11]</sup> e.g. it is no longer safe for children to walk to school or to play in parks. Finances also contribute to the decreased physical activity level in children,<sup>[11]</sup> many parents lacking the money to allow their children to participate in organised sport activities. Periurban communities often lack access to sports facilities in any case, and few schools in these environments have such facilities.<sup>[11]</sup> The result is that children grow up in an environment that is conducive to sedentary rather than physical activities.

The typical Western diet is high in energy-dense foods, fat and refined sugar<sup>[10]</sup> that easily lead to a positive energy balance. This is especially true in the presence of decreased physical activity. During the process of urbanisation and westernisation, children (and adults) consume more snacks and convenience foods, which are very high in salt, fat, refined sugar and energy.<sup>[13]</sup> Part of the problem may be that the SA public is continually confronted with misleading and confusing dietary information.<sup>[10]</sup> Parents may not know what constitutes a healthy diet, or of the dangers associated with an unhealthy diet and the resultant increase in body fatness. Many public schools have feeding or nutrition programmes, where children receive at least one meal per day at school. The meals are prepared at the school and the menu is often determined by what is available, rather than what constitutes a healthy diet. Another factor contributing to childhood obesity is the foods sold at the school snack shop,<sup>[13]</sup> which for many schools is an opportunity to increase income. The selection of snacks tends to be based on popularity rather than dietary benefit.

Urbanisation and westernisation in SA are therefore setting the stage for an increasing prevalence of overweight and obesity in

schoolchildren, with the associated risks of development of a variety of chronic diseases of lifestyle.<sup>[10]</sup>

### Case study

We recently undertook a study at a high school in a periurban area of the Polokwane Local Municipality, Limpopo Province. The study population comprised 56 black girls aged 13 - 19 years. They were not specifically selected to participate in the study, any girl who brought back a consent form signed by her parents/guardian being allowed to take part. Each girl also received a questionnaire (with questions on physical activity and snacking behaviour) that the parents/guardian completed. The weight and height of each girl was measured according to the internationally accepted methods described by Marfell-Jones *et al.*<sup>[14]</sup> The body mass index (BMI) was calculated using the formula  $\text{kg/m}^2$ .

Table 1 shows that the girls consumed significant quantities of snacks (such as

sweets, biscuits and cake), between one and seven times per week, and beverages (e.g. cold drink or fruit juice), between two and six times per week. In addition, on average they spent a significant amount of time each day performing sedentary activities (refer to Table 1 for a list), and spent very little time being physically active (Table 1).

Fig. 1 shows the percentages of girls who fell into each of the BMI categories (as suggested by Reilly<sup>[15]</sup>). Of the girls, 67.8% had a normal BMI ( $>25 \text{ kg/m}^2$ ), 12.5% were overweight and 3.6% were obese. The prevalence of overweight and obesity in this young female population is a cause for concern, because overweight in adolescents frequently continues into adulthood. The longer these girls are exposed to the increased body fat, the higher their risk of developing complications later in life.<sup>[16]</sup> Just over 16.1% of the girls were underweight/lean. The causes of underweight are usually poor nutrition or malnutrition and infections.<sup>[8,17]</sup> We did not investigate the causes for underweight in this study.

There was a negative but weak correlation ( $p=0.017$ ) between age and being physically active at home, indicating that as these girls grow older, their physical activity levels decrease. This may be one of the causes for the strong positive correlation between age and BMI ( $p=0.001$ ), as well as the weak negative correlation between BMI and time spent being physically active at home ( $p=0.41$ ), and between BMI and participation in sport ( $p=0.009$ ). There were also weak positive correlations between watching television and frequency of consuming sweets ( $p=0.13$ ) and soft drinks ( $p=0.20$ ), indicating that watching television is associated with snacking behaviour. Furthermore, there was a weak positive correlation between time spent playing electronic games and watching television ( $p=0.009$ ) and frequency of consuming sweets, biscuits and cakes ( $p=0.009$ ), once again indicating the occurrence of unhealthy behaviours in the same girls.

### What do we need to do?

The girls in our study were not selected on the grounds of their unhealthy behaviour. The behavioural trends they displayed are probably typical of girls in this age group. Taking into consideration that children spend a considerable amount of time at school, schools can play a very important role in promoting regular physical activity and the consumption of a healthy diet. It is recommended that schools introduce and promote sustained healthy physical activities during and after school hours via sports activities to counteract overweight and obesity, especially in girls. The establishment of safe community playgrounds would go a long way towards encouraging physical activity. Ideally, the above should be supplemented by counselling for weight loss and weight management in overweight and obese children. Furthermore, emphasis in the school curriculum must be placed on the health benefits of physical activity and a prudent diet. School snack shops should provide healthy alternatives to sweets and biscuits or cake.

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**Table 1. Data on the study population**

Variables, mean (SD)

Age (years)	15.4 (1.9)
Sweets such as chocolate bars, biscuits and cakes (n/week)	3.6 (2.9)
Any form of cold drink or fruit juice (n/week)	3.6 (2.0)
Sedentary activities* (hours/day)	2.0 (1.3)
Physical activities at home† (hours/day)	1.2 (1.5)
Participating in organised sports (hours/day)	1.1 (1.1)
Weight (kg)	54.0 (11.6)
Height (m)	1.56 (0.06)
BMI	21.9 (3.7)

SD = standard deviation; BMI = body mass index ( $\text{kg/m}^2$ ).

\*Watching television, DVDs or videos; playing video games or cellphone games; using the computer/internet, e.g. to e-mail or chat online; reading and doing homework.

†Playing, running around outside, climbing trees, kicking balls, riding a bicycle, swimming.

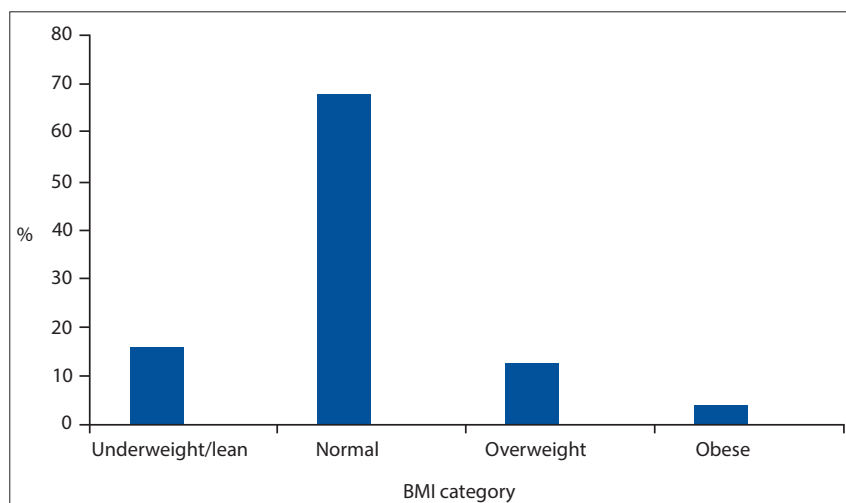


Fig. 1. Percentages of the girls in specific BMI categories. (BMI = body mass index.)

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