Prevalence of overweight and obesity among primary school children in Tanzania: Experiences from Kinondoni and Njombe Districts

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Introduction

Overweight and obesity among school children are currently increasing at an alarming rate worldwide (Gavin, 2005). In the past, overweight and obesity were common in highly developed countries, but in recent years a progressive increase is being noticed in developing countries including Tanzania. Overweight and obesity were also considered health conditions for adults; currently they are highly prevalent among children and adolescents (Gavin, 2005 & Wang, 2004). Overall, overweight and obesity entail health risks with potential effects in social and economic wellbeing of an individual and community at large. The poor health condition resulting from overweight and obesity among children may act as a barrier to the development of good mind and thus pave the way to poor learning behaviours and outcomes. This article discusses about the prevalence and causes of overweight and obesity among primary school children in Tanzania, based on the findings, which were obtained from Kinondoni and Njombe districts.

Literature shows that, high percentage of the world's population is overweight and obese, with USA having 50%, Australia 37%, Western Europe 30% and India 17% (Gavin, 2005). Such an increase in overweight and obesity levels is associated with an increased risk of developing cancer, cardiovascular diseases, non-insulin-dependent diabetes, severe articular dysfunctions, and hypertensions worldwide (WHO, 2005).

The growth and effects of overweight and obesity in developing countries are also increasing at a high rate. Puoane, Steyn, Lambert & Mbananga (2002) report that approximately 40% of South African population is overweight and obese. On the other

hand, Sobngwi, Mbanya, Unwin & Albert (2002) observed that 22% of the urban population and 1.8% of rural population in Cameroon were overweight and obese.

As it is for other developing countries, Tanzania is also experiencing an enormous increase of overweight and obesity for both adults and children. Kigwangallah (2005) and WHO (2006) stress that, impacts resulting from overweight and obesity in Tanzania are on the increase. WHO (2005) projects that this prevalence will increase in Tanzania at the rate of 3% by 2015. Besides, technological advancement and consumption of modern foods are sought to mitigate this trend from increasing arithmetically to increasing geometrically (WHO, 2005).

At present children are changing the nature of their leisure activities, from actively participating in sports to electronically played games that they play while seated (Gavin, 2005; Mood, Musker & Rink, 1995). Ekblom (2005) and Gavin (2005) asserts that at present, more than ever, life is sedentary, whereby children spend more time playing with electronic devices, in computers and handheld video games, than actively participating in physical activities. Currently, most of the urban schools have neither a plot for cultivation nor a play ground for sports activities. However it is known in Tanzania that since 2001, the Tanzanian government abolished competitive sports and physical education in schools (Bulamile, 2002). This makes urban children to have limited opportunity for sports and becoming more vulnerable to overweight and obesity than their counterparts in rural areas who frequently engage in farming and other physical activities after school hours.

Participation in physical activities and sports has a lot to do with children's life. Physical activities are considered important in enhancement of physical fitness and good health as well as development of good mind. The ancient Greeks believed that a sound mind existed in a health body as it was previously stated by Plato that "*mens sana en corpore sano*" (cited in Rowland, 1990). According to Mabagala (2002), sports and physical activities have a potential role in the development of good body health and fitness. It is also potential in developing good mind and thus improving academic performance among

school children (Mabagala, 2002). Mood *et al.* (1995) argued that in order to provide and maintain optimum health, it was necessary for people of all ages to participate in physical exercises such as walking, jogging, hiking, swimming and cycling.

Determining who is overweight and obese

The decision on whether somebody is underweight, normal weight, overweight or obese is made after taking measurement of Body Mass Index (BMI) or Body Fat Percentage (BFP). BMI refers to a measure of relative body weight that takes height into account and is correlated with direct measures of body fat (Sharkey, 1997) while BFP refers to the percentage of total body weight that is composed of fat (Insel and Roth, 2002). Determination of the prevalence of overweight and obesity is made by referring the number of those children who exceeds a certain level of BMI and BFP. Otherwise it is difficult to judge ones body status by using eye observations.

BMI is determined by measuring body weights (using weight scale) and heights (using tape measure) while BFP is determined by measuring the diameter of the Skinfold (using skinfold caliper). The following formula is normally used in the calculations of BMI: $\text{BMI} = {}^{\text{weight in kg}}/_{\text{height in m}^2}$. BMI results help to classify a person into either of the following weight status; "underweight, normal weight, overweight, obesity level I, obesity level II or obesity level III" as shown in Table 1.

Table 1: BMI and Body Weight Status by Implications

BMI	Implications to the weigth status
Less than 18.5	Underweight
18.5-24.9	Normal weight
25.0-29.9	Overweight
30.0-34.9	Obesity level I
34.9-39.9	Obesity level II
Greater than 40	Obesity level III

Source**:** Gavin (2005) and Sharkey (1997)

Calculation of body fat percentage can be done by computing the total skin folds divide by weight, and then multiply by 30 for girls or by 28 for boys (Punshon, 2006). The

following formula is normally used: BFP = ($^{\Sigma skinfolds\ (mm)}/_{weight\ (kg)}$) x 28 for male or BFP = ($^{\Sigma skinfolds\ (mm)}/_{wcight\ (kg)}$) x 30 for female (Punshon, 2006). Results obtained from this calculation can help to classify an individual as having "minimum body fats, lean, ideal, average or overweight and obesity" as presented in Table 2.

Table 2: Body Fat Percentage in Relation to Body Health Implication

Body health implication	Body fat percentage	
	women	men
Minimum amount to stay alive	10-12%	2-4%
Lean	14-20%	6-13%
Ideal	21-24%	14-17%
Average	25-31%	18-25%
Overweight and obesity	32% plus	26% plus

Source: American Council on Exercise (2003)

Prevalence of overweight and obesity in Tanzania

Prevalence of overweight and obesity in Tanzania rose steadily as well as progressively from 3.6% in 1995 to 9.1% in 2004 (Villamor *et al.,* 2004). Kafyulilo (2006) reported that over 30% children were overweight and obese in urban areas in Tanzania. WHO (2005) adds that, out of 571,000 deaths in Tanzania, in the year 2005, 107,000 were due to chronic diseases which are by-products of overweight and obesity. WHO estimates that, deaths from chronic diseases in Tanzania will rise by 33% and deaths from cancer will rise by 45% by 2025. Chronic diseases; heart diseases, artery diseases, diabetes, cirrhosis of liver, gall stones, digestive system diseases and cancer are among the indicators of overweight and obesity (Insel and Roth, 2002).

Prevalence of overweight and obesity is also reported to differ between rural and urban Tanzania (Nyaruhucha *et al.,* 2004). Also a study by Kuga, Njelekela, Noguchi, Kanda, Yamori & Mtabaji (2002) showed that, prevalence of hypertension and overweight was higher in urban areas of Tanzania than in rural areas. Plasma leptin concentration was also the highest in urban areas. Mendez, Monteiro & Popkin (2005) added that

hypertension, diabetes, and cholesterol level were minor in rural Tanzania compared to most other populations.

A recent study by Kafyulilo (2008) indicates that the prevalence of overweight and obesity among primary school children in Njombe and Kinondoni districts were as shown in figure 1 below;

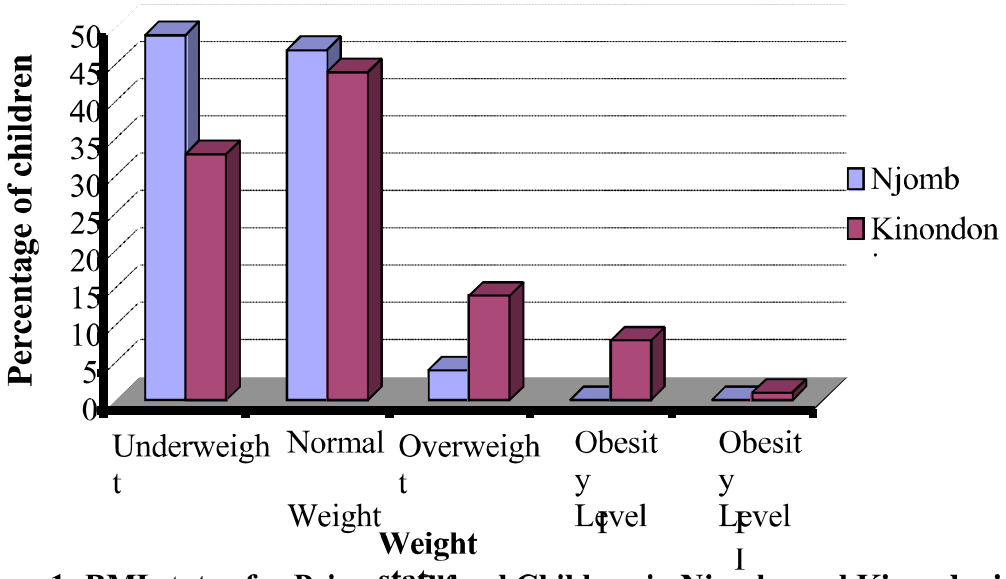


Figure 1: BMI status for Primary School Children in Njombe and Kinondoni districts

Source: Kafyulilo (2008)

From figure 1, BMI measurement results show that there is higher prevalence of overweight and obesity among urban primary school children than rural primary school children. These findings were similar to those of Sobngwi *et al.* (2002) and Nyaruhucha *et al.* (2004) who reported for high prevalence of overweight and obesity in urban than it is in rural areas. According to Kafyulilo (2008), the prevalence of overweight and obesity was five times higher among urban school children (in Kinondoni) than among rural school children (in Njombe) as further shown in Figure 2.

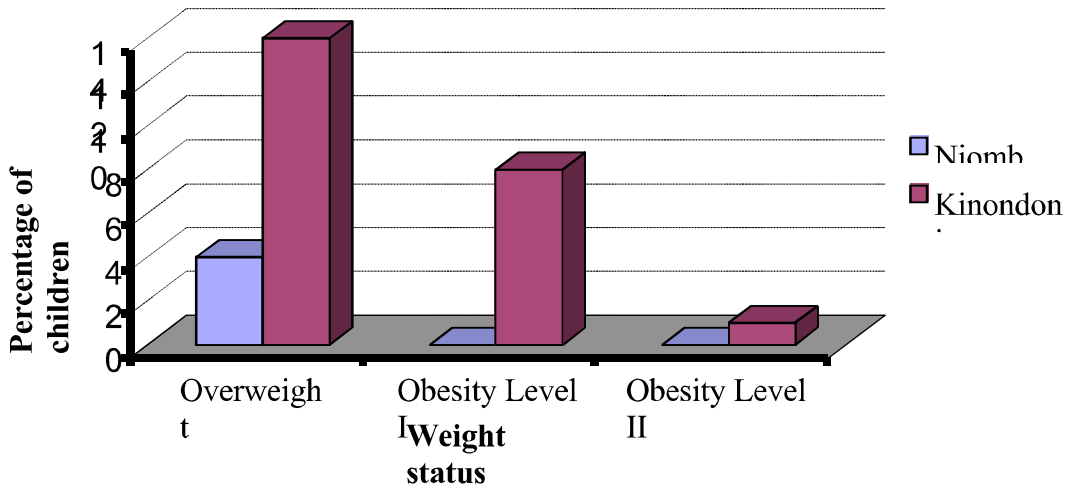


Figure 2: Trend of overweight and obesity in Njombe and Kinondoni

Source: Kafyulilo (2008)

Computation of skinfold measurement into body fat percentage also showed a significant (χ^2 = 26.70, d.f = 4 and sig. = 0.000) difference in prevalence of overweight and obesity between rural and urban primary school children. The skin fold results showed that in rural schools, there were 1% children with minimum fats, 36% lean fats, 37% ideal fats, 23% average fats and 3% overweight and obesity. In urban schools, there were 0% minimum fats, 20% Lean fats, 22% Ideal fats, 32% average fats and 26% overweight and obesity.

What causes overweight and obesity among primary school children?

Many studies (Sobngwi *et al.*, 2002; Nyaruhucha *et al.,* 2004) have reported for the differences in overweight and obesity that exist between rural and urban settings of Tanzania. Kafyulilo (2008) argue that the difference in overweight and obesity between rural and urban school children is highly attributed to the differences in the level of physical activities, nature of transport, household occupation and dietary manipulations that exist between the rural and urban settings. He further revealed that over 65% of urban primary school children were engaging in private studies, watching television and playing computer games after school hours, while majority of rural primary school children were engaging in various physical activities such as farming, playing and having

a distance walk to collect water and firewood; which were considered significant in cutting down the excess weight in the children's body (Kai-Ming, 1998).

Influence of physical activities on overweight and obesity

In the analysis of children's level of activeness, it was revealed that, majority of inactive children were overweight and obese. Very few children who were very active were overweight, and none of them was obese. Majority of overweight and obese children were moderately active or inactive. Sedentary life was previously mentioned by Johnson (2002) and Gavin (2005) as a factor for the prevalence of overweight and obesity among school children. Children with limited physical activities were more vulnerable to overweight and obesity than children who were engaging in various physical activities.

Table 4: The Percentage of Children in Each Weight Status According to the Physical Activeness levels (N=200 and p< 0.05)

Weight status	Level of physical activeness			
	Very active	Active	Moderately active	Inactive
Underweight	46	51.1	42.1	30.2
Normal weight	51.5	40.4	49.1	42.9
Overweight	3	6.4	8.8	14.9
Obesity level I	0	2.1	11.1	4
Obesity level II	0	0	0	2

Source: Kafyulilo (2008)

A human body, as it is for a machine, which uses fuel to generate energy, needs food to maintain body warmth and carry out voluntary and involuntary activities for perpetuation of life. However humans do not expend all the consumed energy, the extra amount of energy that is unutilized in metabolic activities is stored as fat (Rowland, 1990; Sharkey, 1997). The excess amount of fat storage is what leads to overweight and obesity among children. Pangrazi (1995), Kai-ming (1998) and Mazengo *et al.* (1997) argued that advancing technology in the world has replaced the active physical activities that children were previously engaging in, instead they engage in computer based activities which make them expend minimal amount of energy while energy consumption level has increased (Gavin, 2005). Interviews with teachers revealed that, majority of urban school

children were spending more time in front of screens watching video or playing computer games than participating actively in physical games at playgrounds.

A study by Kafyulilo (2008) on overweight and obesity revealed that over 76% of children from urban schools were not participating in physical activities both at their homes and school. Activities such as school cleanliness and domestic works at home were being done by employed workers. In rural areas children were exposed to the long way travel to fetch water or collect firewood and participating in the farming activities. Urban school children have no place to cultivate and play games, most of the open spaces in urban areas have been utilized for other infrastructures such as house quarters and so on. All physical activities that were performed at schools before the government banned sports competitions in 2001; do not exist at schools (Bulemile, 2002).

Nutrition

The quality of nutritious consumed by children at their homes was found to be another important determinant of overweight and obesity among school children. It was found that majority of children in rural areas were getting one or two meals per day. More than 20% of the rural school children reported to stay the whole day without anything to eat. They said, their residences were located far from school. Thus they faced difficulties to go home for lunch. They used to get only dinner or leftovers in the morning if they happened to be available. These hardships were hardly experienced by urban school children, who reported to get three to four meals per day. In addition to the number of meals, urban children were getting meals with plenty of fats or oils such as fried meat, canned foods and other junk foods. Many children who were feeding on modern foods including canned and packed foods were more vulnerable to overweight and obesity than those who were getting poor meals.

On the other hand rural children were getting low quality food contents. Mostly they ate stiff porridge (ugali), potatoes and "makande" with green vegetables and beans. It was further revealed that about 96% of urban school children were having something to eat at school out of the normal eating routine. For example, urban children were buying ice-

cream, chew gums, chocolates and fruits at school a pattern that was not observed among rural children. Urban children were in addition eating food with a lot of oils added in, blueband, and other fatty components for increasing flavour.

It was also revealed that advanced families were seldom eating food prepared in a kitchen; instead they were eating artificial foods not cooked by water and fire. Findings from this study also revealed that, over 20% of urban children were eating canned foods. Among them, 30.4% were overweight and obese. These findings confirm those of Gavin (2005) who argued that, today's busy families have fewer free moments to prepare nutritious cooked meals. Instead they depend on canned foods which have considerable contribution to weight gains. Most of canned foods have a lot of additives of which are thought to have significant contribution to weight gains. Gavin (2005) adds that one contributing factor in the onset of these complications of overweight and obesity is taking in a diet lacking fibres and antioxidants, but rich in processed foods loaded with added fats and sugars. Figure 5 below shows the difference in weight status between children getting good supply of food and those with poor or medium supply of food.

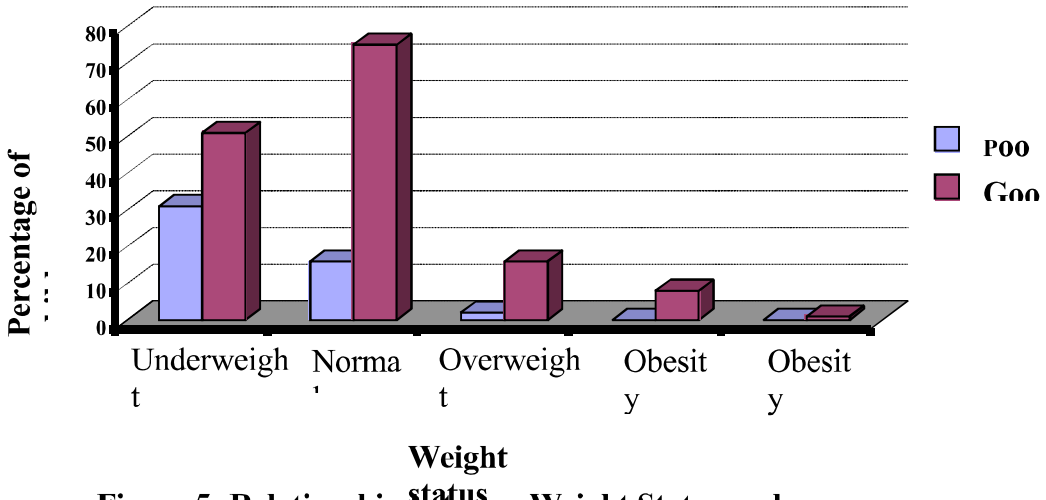


Figure 5: Relationship between Weight Status and Nutrition

Economic factors

Family economic status and household occupations were also determinants of the quality of diet the children were taking, nature of transport were using, home services and

presence of sophisticated home appliances which make little use of child's body energy. Children from families with sophisticated home appliances were found to be more vulnerable to overweight and obesity than those from families with simple home appliances (Kafyulilo, 2008). From figure 5, it is appreciated that good economic status is directly linked with a high possibility of becoming overweight and obese than moderate and poor economic status as can be depicted from Figure 5 below.

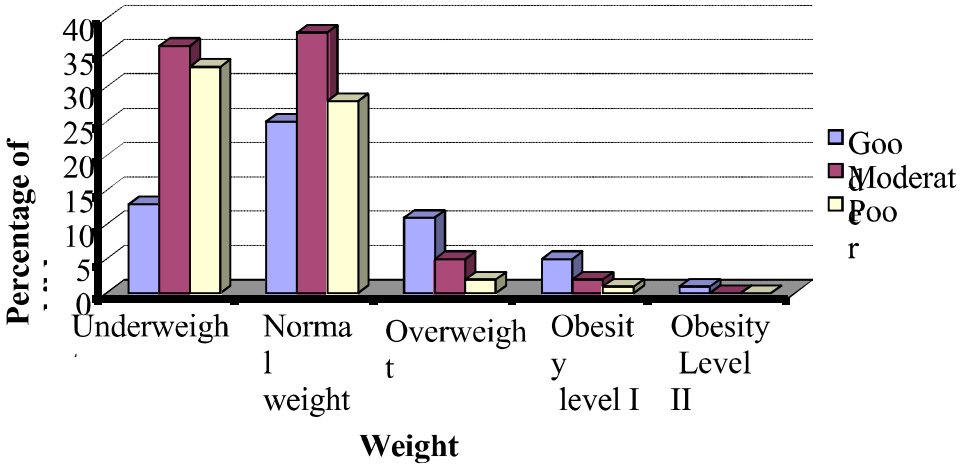


Figure 5: Body weight status against economic status

Many children from well off families got home from school virtually, all their free time before dinner and getting to bed spent in front of a screen. Gavin (2005) argues that screen time have a great impact on children's weight status. Accordingly, children who watch televisions more than four hours a day are more likely to be overweight than children who watch two hours or less. Gavin (2005) further reported that screen time have stronger evidence of increasing the risk of obesity than any other factor.

Nowadays, many advanced families have home workers such as house girls and house boys who are responsible for all activities carried out at home (Kafyulilo, 2006). For example, one teacher from urban school said the growing tendency of some rich people to employ machines and house workers for all household activities has made majority of children from such families to be lazy, inactive and obese. These findings are inline with

those of Newbold (2004) who argued that even domestic activities, which were previously carried out by the family members are now left to house girls and house boys or else they are done by a machine. Simple works like cooking, washing, fetching, water and grazing are now done by modern tools, thus subjecting children to a great risk of becoming overweight and obese.

Conclusion and recommendations

The study reported in this paper aimed at investigating the difference in prevalence of overweight and obesity among primary school children between rural and urban settings. It also intended to identify the causes of overweight and obesity by assessing lifestyle behaviours that subjects children to overweight and obesity.

Findings of this study showed a significant difference in prevalence of overweight and obesity among rural (4%) and urban (23%) children. It also revealed that physical inactivity (sedentary life), family economic status, household occupations, nature of transport and nutrition have significant effects to overweight and obesity among primary school children.

This paper recommends that design and introduction of education programs that will address issues related to overweight and obesity is of paramount importance for building a generation with a health body and health mind. This may include educating parents and other stakeholders in education, sports and health through Media, such as Radios, Newspapers, Television and online programmes. Through these programmes, the common goal of children's wellness and fitness will help physical education become an integral part of total education curricula. For the schools to function properly in these aspects they will need to be equipped with relevant facilities and equipment necessary for improving movement skills as well as fitness among school children. Parents, teachers, guardians and other stakeholders in education, sports and health should make efforts to ensure that physical education programs are not only part of the curricula but also a compulsory component of education programmes.

Education policies should also put sports and leisure activities as a compulsory component of education, since they have an important attribute in the development of the whole human body. Leisure activities and exercises are very important component in development of the child's physical, mental and intellectual characteristics (Rowland, 1990). Therefore, policies on education should view physical education and sports as a foundation stone towards children with good body health and minds, together with well developed intellectual and physical capabilities.

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