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PREVALENCE AND AWARENESS OF OBESITY AMONG PEOPLE OF DIFFERENT AGE GROUPS IN EDUCATIONAL INSTITUTIONS IN MOROGORO, TANZANIA.

C.N.M. Nyaruhucha, BSc, MSc, PhD, Senior Lecturer, J.H. Achen, BSc, J.M. Msuya, BSc, MSc, PhD, Senior Lecturer, N.B. Shayo, BSc, MSc, PhD, Associate Professor and K.B.M. Kulwa, BSc, MSc, Assistant Lecturer, Department of Food Science and Technology, Sokoine University of Agriculture, P.O. Box 3006, Morogoro, Tanzania

Request for reprints to: Dr. C.N.M. Nyaruhucha, Department of Food Science and Technology, Sokoine University of Agriculture, P.O. Box 3006, Morogoro, Tanzania

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C.N.M. NYARUHUCHA, J.H. ACHEN, J. M. MSUYA, N.B. SHAYO and K.B.M. KULWA

ABSTRACT

Objective: To determine the prevalence rates and level of awareness of obesity among people of different age groups in Morogoro Municipality, Tanzania.

Design: A cross-sectional, descriptive study.

Subjects: One hundred adults aged 19-50 years old and 40 pupils aged 14-18 years old.

Setting: Four educational institutions in Morogoro Municipality were included in the study. The four institutions included a primary and a secondary school, a teacher's training college and a university.

Results: The prevalence of obesity among the sampled subjects in Morogoro Municipality was 25 %, whereby 15.7% had a Body Mass Index (BMI) of between 25 and 30, and 9.3% had a BMI of more than 30. Age and occupation of all the subjects, together with marital status of adult subjects, were significantly related with obesity status. Prevalence of obesity increased with the increased age whereby subjects in the 41-50 years had the highest rate (45.4%). Employed subjects had higher rate of obesity (22.2%) than pupils or students. Similarly, married adults had higher rate of obesity (27.8%) than the single ones (4.7%). Unlike the old age group (41-50 years), 70% of the youngest subjects were not aware about the harmful effects of obesity. On the other hand, more than two thirds of all the subjects could not associate excess body weight with chronic non-communicable diseases such as coronary heart disease, high blood pressure and breathing problems.

Conclusion: Results of the current study indicate that obesity is increasingly becoming a public health problem in Morogoro Municipality, and probably in many other places in Tanzania. There is need for more public awareness on the effect of obesity on people's health through information, education and communication. It would be of great importance if such interventions were introduced at early age of life, for example by inclusion in school curricula.

INTRODUCTION

Obesity, which is characterised by excess accumulation of body fat accompanied by minimal physical work or exercise, is a danger to the good health and well being of a person. While under-nourishment is of concern to most people, over-nourishment is as well dangerous. Obesity can lead to development of several complications such as physical disabilities, metabolic disorders, cardiac failure, stroke, high blood pressure, respiratory problems, psychological effects, osteoarthritis of the weight-bearing joints, low life expectancy and vulnerability to accidents(1).

The prevalence of overweight and obesity is increasing at an alarming rate. Populations living in

developed and developing countries are all affected. Moreover the problem appears to be increasing more rapidly among children compared to adults, implying that the health consequences will become fully apparent in the future. Trends in obesity have been documented in only a few African countries or populations. However, a study conducted by the WHO in Mauritius, a representative of the African region found a dramatic increase in obesity prevalence over a five-year period in both men and women aged 25-74 years. The prevalence of obesity among Tanzanian men and women (35-64 years old) in 1986-89 period was 0.6% and 3.6% respectively(2).

Many factors have been identified as the causative agents of obesity. They include hormones, high adipose

cell count, heredity, defective metabolic mechanism, large fat cell, brown fat, lack of physical exercise and over-eating. However, the most common and main cause is consumption of calories in excess of the normal body requirements(3).

Despite the increasing knowledge on the health of dangers associated with obesity, its prevalence rate among populations in least developed countries is still not clear. Similarly, the level of awareness is still, to a greater extent, confined to very few individuals affiliated with the health field. The determination of prevalence rates and level of awareness among people is therefore an important step to the development of useful interventions intended to minimise this health problem.

The objective of this study was to determine the prevalence rates and the level of awareness on the condition of obesity among the different age groups of people in educational institutions in Morogoro Municipality, Tanzania.

MATERIALS AND METHODS

Study area: The study was conducted in Morogoro Municipality four educational institutions. Morogoro, which is the administrative headquarter of Morogoro region is situated 200 Km west of Dar es Salaam. The four educational institutions included a primary school, a secondary school, a teacher's training college and Sokoine University of Agriculture. The two schools were SUA primary school and Kigurunyembe secondary school while a college was Morogoro Teachers' training institute.

Subjects: Primary and the secondary schools were obtained by systematic sampling, while the college was selected by simple random sampling. Sokoine University of Agriculture being the only university in Morogoro Municipality was included for convenience. The study subjects from the two schools were obtained by randomly selecting pupils aged

between 14 and 18 years. The study subjects from the institutions of higher education were obtained by randomly selecting those aged between 19 and 50 years. A total of 40 children and 100 adults were included in the study.

Collection of data: Primary data were collected using a structured questionnaire. Body weight was measured to the nearest 0.25 kg using a bathroom scale with the subject in minimal clothing. Height was measured using a stadiometer to the nearest 0.1 cm, with the subject barefoot, standing with feet together, and with head, shoulder, buttocks and heels touching the wall. Body mass index was calculated for each subject as the ratio of body weight (in kg) and squared height (in metres). A subject was judged to be obese or not using the BMI criteria (cut-off points) proposed by Beaton *et al.*(4). Body mass index of between 25 and 30 was considered to reflect possible obesity, while that of above 30 was considered to reflect obesity. The above mentioned cut-off points imply that any BMI of below 25 indicates a non-obese status.

Statistics: A Statistical Package for Social Sciences (SPSS) programme was used to process and analyse the data. The results obtained were summarised and expressed as percentages and means. Chi-square statistic was used to determine relationships between BMI of the subjects and their socio-economic characteristics(5).

RESULTS

Prevalence and factors affecting obesity status: Seventy five percent of the study subjects were non-obese (Table 1) leaving out 25% to be either obese (9.3%) or possibly obese (15.7%). Eight variables of characteristics of respondents were tested for relationship with obesity status using Chi-square statistic. The results of the tests are summarised in Table 2. Three of the variables were significantly related with the obesity status of respondents. The variables were age and occupation of respondent and marital status of the adult respondents, all at $p = 0.000$.

Table 1

*Distribution of the subjects in various categories of obesity status according to their socio-economic status**

Socio-economic variable	Non-obese (%)	Possibly obese (%)	Obese (%)	Total (%)
	No. (%)	No. (%)	No. (%)	No. (%)
Age of subjects in years				
Between 14-25	73 (90.1)	6 (7.4)	2 (2.5)	8 (100)
Between 26-30	13 (72.2)	3 (16.7)	2 (11.1)	18 (100)
Between 31-40	15 (50)	11 (36.7)	4 (13.3)	30 (100)
Between 41-50	4 (36.4)	2 (18.2)	5 (45.4)	1 (100)
Total	105 (75)	22 (15.7)	13 (9.3)	140 (100)
Occupation				
Pupil	4 (97.6)	0 (0)	1 (2.4)	42 (100)
Student	48 (77.4)	10 (16.1)	4 (6.5)	62 (100)
Worker	16 (44.4)	12 (33.4)	8 (22.2)	36 (100)
Total	105 (75)	22 (15.7)	13 (9.3)	140 (100)
Marital status of adult subjects				
Married	14 (38.9)	12 (33.3)	10 (27.8)	36 (100)
Single	51 (79.7)	10 (15.6)	3 (4.7)	64 (100)
Total	65 (65)	22 (22)	13 (13)	100 (100)

Table 2*Results of Chi-square tests of eight variables of characteristics of respondent for relationships with obesity status*

Variable tested	Chi-square value	df	p-value
Age	86.962	6	0.000
Occupation	99.770	4	0.000
Marital status of adult subjects	82.210	4	0.000
Sex	3.909	2	0.206
Frequency of eating	1.569	8	0.835
Type of daily activities	3.876	4	0.274
Extent of alcohol consumption	2.686	6	0.467
Presence of chronic diseases	1.142	4	0.534

denotes significant at $p = 0.000$

Table 3*Distribution of subjects according to their awareness about obesity according to four selected variables and their age category*

Awareness variable	Age category (in years)*				Total
	14-18	19-23	24-40	41-50	
Knowledge about harmful effects of obesity:					
Knows	12(30)	25(61)	21(44)	9(82)	67(48)
Does not know	28(70)	16(39)	27(56)	2(18)	73(52)
Total	40(100)	41(100)	48(100)	11(100)	140(100)
Knowledge about the association between excess body weight and certain chronic diseases:					
Knows	10(25)	14(34)	11(23)	2(18)	37(26)
Does not know	30(75)	27(66)	37(77)	9(82)	103(74)
Total	40(100)	41(100)	48(100)	11(100)	140(100)
Concern about body weight:					
Worried about body weight	12(30)	13(32)	23(48)	3(27)	51(36)
Not worried about body weight	28(70)	28(68)	25(52)	8(73)	89(64)
Total	40(100)	41(100)	48(100)	11(100)	140(100)
Preference of body type:					
Prefers slim type	22(55)	14(34)	26(54)	8(73)	70(50)
Prefers fat type	4(10)	18(44)	13(27)	2(18)	37(26)
Undecided	14(35)	9(22)	9(19)	1 (9)	33(24)
Total	40(100)	41(100)	48(100)	11(100)	140(100)

¹High blood pressure, coronary heart diseases, and breathing problems

* Values in brackets indicate percentages

Prevalence of obesity was higher among the subjects in 41-50 year age group (45.4%) than the other age groups (Table 1) while prevalence of possibly obese was highest among the subjects in 31-40 year age group (36.7%). On the other hand, the majority of the youngest age group (i.e. 14-25 years old) were non-obese (90.1%). The table also reveals that employed subjects had the highest rates of obesity (22.2%) and

possibly obese (33.4%) compared to students or pupils. On the other hand, married adult subjects had higher rates of obesity (27.8%) and possibly obese (33.3%) compared to the single ones (4.7% and 15.6%, respectively).

Awareness about obesity: Four aspects of awareness concerning obesity were examined from the study

subjects. The four aspects were; knowledge about harmful effects of obesity; knowledge about the association between excess body weight and certain chronic diseases; concern about body weight, and preference of body type.

Results of the awareness tests according to age group of the subjects are presented in Table 3. It is not surprising that 70% of the youngest age group (14-18 years), who were mostly primary school children, could not tell the harmful effects of obesity. On the contrary, the majority (82%) of the very old age group (41-50 years) were well aware of it. However, more than two thirds of the subjects in all the age groups could not associate excess body weight with chronic diseases such as those of coronary heart disease, high blood pressure and breathing problems. More than a half of all study subjects did not worry about body weights, and except for the 19-23 years age group, similar proportions had preference for slim bodies.

DISCUSSION

Overall prevalence of obesity (9.3%) found in this study is higher than either 0.6% reported among men or 3.6% reported among women in Tanzania(2). When the prevalence among adults between 31 and 50 years is considered alone, the figure elevates to about 22%. This shows that obesity is increasingly becoming a public health problem, something that should no longer be ignored in Tanzania.

BMI was found to increase with the age of the subjects, with the 41-50 years age category having the greatest proportion of obese subjects followed by that of 31-40 years. This is in agreement with the findings by Antia(3) who found that obesity tended to increase with age and was most likely to occur after the age of 35 years. Reduced physical activity may explain this observation.

Lack of relationship between BMI and sex of an individual is supported by Karen(7) who suggested that it is the dietary habits of a family or individual, rather than biological factors, that are responsible for cause of obesity. But the significant relationship between BMI and marital status of adult respondents may be explained by the fact that married couples tend to have children who need to eat regularly and therefore such parents are unlikely to skip meals. In other words, parents may need to be present and participate in sharing meals with their children, and therefore have a high intake of calories. Brown and Konner(8) observed that most traditional cultures in developing countries tend to view "plumpness", especially among married ladies as an ideal condition of feminine beauty. Hence higher prevalence of obesity among married subjects in this study is not surprising.

In this study occupation was found to be associated with BMI whereby greatest proportion of obese subjects

was found to be among the workers. However, it is disturbing that no significant relationship was observed between BMI and type of daily activities that were conducted by the individual subjects. This is contrary to the findings of many studies, which suggest that BMI of an individual sometimes depends on the person's activity. For instance, Antia(3) suggests that moderate exercise can help to expend more energy and bring about decrease in body weight in obese persons consuming low caloric diets. Skender(9) indicated that a combination of exercise and diet is more effective than either method alone in promoting fat loss.

Similarly, this study found no relationship between frequency of eating and BMI. This finding is not consistent with that of Antia(3) who indicated that three meals a day results to greater tendencies to overweight, elevated serum cholesterol, and to diminished glucose tolerance. However, Jung(10) explains that it is the total calories intake rather than the frequency of eating that determines the weight change, something that seems to reflect our findings to a greater extent.

Alcohol intake was not related with obesity status of an individual. Although alcohol is known to be a rich source of calories, and hence a high intake would be expected to cause obesity, this was not the case in this study. The finding is not totally surprising because very high consumption of alcohol is likely to be associated with poor appetite for food, something that has been proved in epidemiological studies(11) whereby individuals with high alcohol intakes were found to be thinner and to eat less.

Results of the study revealed that only about one half of the study subjects were aware of the harmful effects of obesity, and among them, the greater proportion were old individuals. It is really a great concern that the majority of the young individuals, who hold much of the future of the nation, were not aware. Given the fact that any effort to control the situation can only be successful if people are aware, there is a need to take deliberate action to raise awareness. However, the fact that one is knowledgeable about the effects of obesity may not provide full guarantee that the person might not become obese.

In conclusion, results of this study indicates that there are reasons to worry that obesity is becoming a public health problem in Morogoro Municipality, and probably in many other places in Tanzania. There is need for more public awareness on the effect of obesity on people's health through information, education and communication. It would be of great importance if such interventions were introduced at early age of life, for example by inclusion in school curricula.

REFERENCES

1. Shils, M.E., Olson, S.A. and Shike, M. Modern Nutrition in Health and Disease 8th Edition, Williams and Williams, London, 1994.
2. World Health Organisation. Report of WHO Consultation

- on Obesity Preventing and Managing the Global Epidemic. World Health Organisation, Geneva, 2000.
3. Antia, F.P. Clinical dietetics and nutrition. Oxford University Press, London, 1989.
 4. Beaton, G., Kelly, A., Kevany, J., Martorell, R. and Manson, J. Appropriate uses of anthropometric indices in children. ACC/SCN Nutrition Policy Discussion Paper No. 7. ACC/SCN, Geneva, 1990.
 5. Steel, R.G.D. and Torrie, J.H. Principles and procedures of statistics. A biometrical approach. McGraw Hill Book Co., New York, 1980.
 6. Mo-shwanl, L., Junjuna, C. and Puetpailboon, A.: Increasing obesity in school children in a transitional society and the effect of the weight control program. *Southeast Asian J. Trop. Med. and Public Health* 1993; **24**:590-594.
 7. Karen, W. Obesity reviewed. *Amer. Clin. J.* 2000; **45**:1893-1900.
 8. Brown, P.J. and Konner, M. An Anthropological Perspective on Obesity, *Annals of the New York. Academy of Sciences*, 1987.
 9. Skender, C. Comparison of 2-year weight loss trends in behavioural treatments of obesity diet, exercise and combination interventions. *J. Amer. Diet. Assoc.* 1996; **96**:342-346.
 10. Jung, R.T. Obesity and its related diseases. *Brit. J. Hosp. Med.* 1977; **20**:250-257.
 11. Prentice, A.M. Alcohol and obesity. *Int. J. Obesity Related Metabolic dis.* 1995; **19**:S44-S55.

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For further details and registration contact:

Dr. Gordon Peter T.K. Yossa

Scientific Conference Secretary

Office: KMA Office, Pandya Memorial Hospital

Nyerere Avenue

P.O. Box 83178, Mombasa

E-mail: kmamsa@ikenya.com

Fax: (011) 316482 (through Pandya Hospital)

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