PREVALENCE OF OVERWEIGHT AND SELF-REPORTED CHRONIC DISEASES AMONG RESIDENTS IN PULAU KUNDUR, KELANTAN, MALAYSIA

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Abstract. This cross-sectional study was designed to determine the socio-demographic characteristics and prevalence of overweight/obesity and self-reported diabetes mellitus, hypertension and heart disease among the population in Pulau Kundur, Kota Bharu, Kelantan, Malaysia. This study was conducted in September 2005. We randomly selected 120 of 240 households in Pulau Kundur, Kota Bharu, Kelantan. Fifteen interviewers were trained to use a structured questionnaire to interview 348 adult respondents age 18 years and older in the selected houses. The mean age was 40.7 years; 52.7% were females and 99.4% were Malay. Sixty-two point seven percent were married and 50.9% of them had Ujian Penilaian Sekolah Rendah (UPSR) or less education. The mean head of family income was RM 532.4. The mean body mass index was 25.3. The overall prevalence of overweight/obesity, known hypertension, diabetes mellitus and heart disease were 49.1, 12.6, 7.8 and 2.0% respectively. Adults in this village had a high prevalence of overweight and obesity and self-reported chronic diseases. Health education and lifestyle modification are needed for those adults.

INTRODUCTION

Chronic diseases and overweight are common and cause significant mortality and morbidity. These debilitating illnesses are not only affecting urban areas but also rural areas. In developing countries, chronic diseases have emerged as a major public health threat (WHO, 2003). The emerging chronic disease epidemics in developing countries can be explained largely by social and economic changes that have increased the prevalence of risk factors for these diseases (Hoang *et al*, 2007). Hypertension prevalence in rural Africa and China have been reported as 12.5% (Giles *et al*, 1994) and 11.3% (Wu *et al*, 1995), respectively.

In Malaysia, the prevalence of diabetes mellitus has steadily increased over the years, with an estimate of 0.65% in 1960 and 2% in 1982 (Ooyub *et al*, 2004). In the National Health and Morbidity Survey (NHMS I) carried out in 1986, the prevalence of diabetes mellitus was estimated to be 6.3%. However, in 1996 the Second National Health and Morbidity (NHMS II) survey showed that the national prevalence of diabetes and impaired glucose tolerance in Malaysia were 8.3% and 4.8%, respectively. A similar trend has also occurred in other chronic diseases, such as hypertension and heart disease.

Many previous studies have shown the development of chronic diseases has a significant association with socio-demographic factors. In developed countries, rural and suburban areas tend to have a higher prevalence

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of diseases than urban areas, in contrast to developing countries where the incidence is equal. One major factor that leads to this phenomenon is poor motivation towards a healthy life style despite a good socioeconomic status. Those who are poor or have a low education level tend to expose themselves to a high risk life style (Singh *et al*, 1997; Wickrama *et al*, 2005).

Apart from chronic disease, an increase in the prevalence of overweight and obesity has become a major health issue worldwide (Lindström *et al*, 2003; Kelishadi *et al*, 2007; Singh *et al*, 2007). Overweight and obesity are casually related to chronic diseases and all-cause mortality. Obesity is associated with the development of hypertension, type 2 diabetes mellitus, and coronary heart disease (Mafauzy *et al*, 1999; Lee, 2000; Nawawi *et al*, 2002). The causes of weight problems are multi-factorial and can be different between genders and influenced by the environment (Ismail *et al*, 2002; Lindström *et al*, 2003).

There have been very few studies to determine the prevalence of these diseases in Kelantan. Understanding the characteristics of these individuals will help to prevent the disease from emerging in the general population. The aim of this study was to determine the socio-demographic characteristics and prevalence of overweight and self-reported diabetes mellitus, hypertension and heart disease among a population who stay in a suburban area in Kota Bharu, Kelantan. This knowledge is important to assess the extent of the problem for the purpose of health planning.

MATERIALS AND METHODS

Study design and selection of participants

A cross-sectional study was conducted in the village of Pulau Kundur, located about 20 km from Kota Bharu, a city in Kelantan state, in September 2005. In the process, all 240 houses (sampling unit) in the village were numbered. Simple random sampling using a random table was used to select 120 houses and all members in the selected house age 18 years and older were selected as our respondents giving a total number of 348 respondents.

Research instruments

Data collection included a structured interview using a validated questionnaire and physical examination. Those who answered being under treatment or who were told by medical practitioners they suffer from diabetes mellitus, hypertension or heart disease were considered to have those diseases. The heights and weights of the respondents were measured with the participants wearing light clothing and their shoes removed. Their weight was measured using a validated and calibrated Seca brand weigh machine. Their height was measured using a measuring tape which was attached to a rigid wall. During height measurement, their heels were close together and the subjects were asked to look ahead horizontally. The body mass index (BMI) was then calculated and a BMI of 25 kg/m^2 or greater was considered as being overweight.

Statistical analysis

Data were entered and analyzed using Statistical Package for Social Sciences (SPSS) software version 12. Descriptive statistics, including means and standard deviations (SD) for continuous variables, and frequencies and percentages for categorical variables were calculated. The chi-square test was used to determine the relationship between sexes and level of education and marital status and the independent *t*-test was used to compare the mean age between sexes. A p-value of less than 0.05 was judged to be statistically significant.

RESULTS

Of 348 respondents, 52.7% were females. The mean age of our respondents was

40.7 years. The majority (99.4%) were Malay Muslims, and the rest were Siamese. The mean head of family income was RM532.4. Among males, the proportions of current smokers, ex-smokers and non-smokers were 55.8, 8.0 and 36.2%, respectively. Among females, 98.3% were non-smokers and the rest were ex-smokers. The mean (SD) for BMI was 25.3 (5.82) kg/m^2.

Table 1 shows the socio-demographic characteristics of 348 respondents in the village of Pulau Kundur. There were no significant differences in the mean age and level of education between male and female respondents ($p > 0.05$).

The overall prevalence of overweight and self-reported chronic illnesses among all respondents in the village of Pulau Kundur, Kelantan is shown in Table 2. The overall prevalence (95% CI) of overweight, self-reported hypertension, diabetes mellitus and heart disease among the respondents were 49.1% (95%CI 43.9,54.4), 12.6% (95%CI 9.1,16.1), 7.8% (95%CI 4.9,10.6) and 2.0% (95%CI 0.5,3.5), respectively.

Table 3 shows the comparison of the prevalence of overweight and self-reported diseases between male and female respondents. The prevalence of overweight and self-reported hypertension was higher among females compared to males. There were no significant differences in the prevalence of self-reported diabetes mellitus and heart disease between male and female respondents.

DISCUSSION

The majority of the population in Pulau Kundur are Malays who comprised more than 99% of the total population. The mean ages and levels of education were comparable between males and females. The mean head of family income was below the Kelantan state poverty line based on the 9th Malaysia Plan.

Fifty-six percent of male adults were smokers. This prevalence is much higher than the findings of the Malaysian Second National Health and Morbidity Survey (NHMS II) among adult males (49%) (NHMS II, 1997). In the NHMS II, the smoking prevalence among the adult Kelantanese population was the highest compared to other states in Malaysia (32%) where it was also found that the prevalence

Table 1
Socio-demographic characteristics of male and female respondents of Pulau Kundur, Kelantan, Malaysia.

Variables	Male *n* = 165		Female *n* = 183		p-value[a]
	Mean (SD)	No. (%)	Mean (SD)	No. (%)	
Age	41.3 (16.58)		40.2 (15.88)		0.521[b]
Level of education					
No formal		27 (16.4)		47 (25.7)	0.128
Primary		50 (30.3)		52 (28.4)	
Secondary		79 (47.9)		71 (38.8)	
Tertiary		9 (5.4)		13 (7.1)	
Marital status					
Married		100 (60.6)		119 (65.0)	<0.001
Unmarried		61 (37.0)		39 (21.3)	
Divorced		4 (2.4)		25 (13.7)	

(SD): Standard deviation; [a]Chi-square test (Pearson); [b]Independent *t*-test

Table 2
Distribution of overall prevalence of overweight and self-reported chronic illnesses among the respondents in Pulau Kundur, Kelantan, Malaysia.

Diseases	No. (%)	95% CI
Overweight	171 (49.1)	43.9, 54.4
Hypertension	44 (12.6)	9.1, 16.2
Diabetes mellitus	27 (7.8)	4.9, 10.6
Heart disease	7 (2.0)	0.5, 3.5

CI = Confidence interval

Table 3
Comparison of proportion of overweight and self-reported chronic diseases among male and female respondents in Pulau Kundur, Kelantan.

Variables	Male *n* = 165 No. (%)	Female *n* = 183 No. (%)	*p-value
BMI			
High	62 (37.6)	109 (59.6)	<0.001
Normal	103 (62.4)	74 (40.4)	
Hypertension			
Yes	14 (8.5)	30 (16.4)	0.027
No	151 (91.5)	153 (83.6)	
Diabetes mellitus			
Yes	8 (4.8)	19 (10.4)	0.054
No	157 (95.2)	164 (89.6)	
Heart disease			
Yes	5 (3.0)	2 (1.1)	0.067
No	160 (97.0)	181 (98.9)	

*Chi-square test (Pearson)

was higher in rural areas than urban areas (NHMS II, 1997).

Overweight has been a major public health issue for a long time and is associated with increased morbidity and mortality as well as a significant risk factor for chronic diseases, such as diabetes mellitus, hypertension and heart disease. The Malaysian Ministry of Health started the Healthy Lifestyle Campaign Advocacy for good eating habits in 1991. We found that 49% of the population in Pulau Kundur is overweight despite the campaign being actively implemented. The prevalence was much higher than the findings of NHMS II (21%) and previous surveys among different ethnic of Hawaii residents using the Behavioral Risk Factor Surveillance System (14-21%) (Matthew, 1995). We also found the overweight problem is more prevalent among females. This finding is consistent with the NHMS II but not with a previous survey among Hawaii residents. A previous study in China among the population age 35 years and older found that the crude prevalence of overweight (BMI more than 25 km/m^2) was 29%; the prevalence among females was higher than males (Gu ***et al***, 2005).

For self-reported chronic diseases, hypertension, which is a major determinant and risk factor contributing to premature deaths from stroke, coronary heart disease and renal failure was the most common health problem in Pulau Kundur. We found that the overall prevalence of self-reported hypertension (13%) in our study was comparable with both the NHMS II and a previous study (14%) by Mafauzy ***et al*** (1999), however much lower than the finding from a study by Yunus ***et al*** (2004) in which the prevalence of self-reported hypertension among the rural population in Selangor was 26.8%. As it is well-accepted that hypertension is more prevalent among the older population, we postulated that the prevalence in Pulau Kundur was underestimated. Despite previous and current healthy lifestyle campaign efforts it is interesting to notice that the prevalence of hypertension was still high. As reported by the NHMS II, the prevalence of self-reported hypertension was higher among females than males, unlike a study in rural Selangor (Yunus ***et al***, 2004) where it was higher among males.

The prevalence of diabetes mellitus is increasing, especially in developing and newly

industrialized nations. Being a major global public health problem it is staggering to find that about half of diabetics are unaware of their disease (NHMS II, 1997). In Pulau Kundur, there was a higher prevalence (7.8%) of known diabetes mellitus, compared to the NHMS II (5.7%). Overweight, demographic shift and changes in lifestyle may be contributing factors.

Taking into account that the national prevalence of undiagnosed diabetes was 2.5%, the prevalence of diabetes in our study population would be 10.3%. The prevalence of diabetes mellitus is on the rise. The prevalence of adult diabetes in Peninsular Malaysia as reported in the 1st Malaysia NHMS in 1986 was 6.3% and in the 2nd Malaysia NHMS was 8.8%. In our study, self-reported diabetes mellitus seemed to be more prevalent among females although not statistically significant; which may be a result of obesity, a well known independent risk factor for the development of diabetes mellitus.

Among the chronic diseases examined, the prevalence of self-reported heart disease was the lowest (2%). The figure is slightly lower than Americans without diabetes age 36-64 years old (3.6%) (Anonymous, 2003). Analyzing the respondents in similar age groups of Americans would probably yield a similar figure. The prevalence being slightly higher among males than females though not statistically significant (p-value = 0.067) makes it appears that sex may be an independent risk factor for chronic heart disease.

In summary, the adults in the village of Pulau Kundur, in the state of Kelantan had a high prevalence of smoking, overweight and known chronic illnesses. These public health problems are increasing in prevalence, and being lifestyles related diseases, health education together with lifestyle modification are recommended. Strategic partnerships among stake holders are necessary to ensure these public health problems can be curbed.

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