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Overweight Problem among Primary Health Care Workers in Suburban District of Hulu Langat, Selangor, Malaysia

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Abstract: Globally, overweight has become the epidemic due to world growth in industry, economy, urbanization and globalization. This study was conducted to highlight the overweight problem and its associated factors among health care workers in Suburban District of Hulu Langat, Selangor, Malaysia. A cross sectional study was conducted using IPAQ short version and Food Frequency Questionnaire to measure fat intake while knowledge was measured using a set of validated questionnaire. The anthropometric measurement was carried out using a calibrated SECA scale, body meter and measurement tape. Data was analyzed using software Diet 4. The overweight prevalence in this study is 46.1%. Age, sex, marital status, length of service, parity, education and income were significantly associated with overweight. However logistic regression showed that only education level and income has significant associations with overweight. It is concluded that the overweight prevalence among health workers is higher compared to previous studies in Malaysia. Higher income and low level of education are the predictors of overweight among health care workers.

Key words: Overweight, risk factor, BMI and physical activity

INTRODUCTION

Globally, overweight has become the epidemic due to world growth in industry, economy, urbanization and globalization. Co-morbidity arises from overweight and obesity causing national economic burden in terms of health issue (WHO, 2003). Until 2005, at least 1.1 billion adults are overweight, including 312 millions with obesity problem (Haslam *et al.*, 2005). In Malaysia, results from the 1996 National Health and Morbidity Survey II (NHMS II) showed that the prevalence of overweight was 16.6% and obesity was 4.4% (Institute of Public Health, 1999). After 6 years, the prevalence has increased to 26.7 and 12.2% for overweight and obesity, respectively (Ministry of Health, 2007).

Overweight occurs as a result of imbalance between energy intake and energy expenditure (Salbe and Ravussin, 2002) and it is further influenced by biological, metabolic and behavioral factors (David and Ball, 2002). A rapid increment of obesity in a nick of time is not due to genetics but rather than environmental factors such as eating habit and physical activity (David and Ball, 2002). Therefore, it is essential for researchers to explore eating habit, physical activity and sedentary lifestyle apart from other risk factors associated with overweight and obesity in the community.

Fat or calorie intake is the common dietary components used in many studies in determining the relationship between eating habit and overweight. Nevertheless, this

relationship is still controversial. Two studies done in China revealed different findings with one study had insignificant relationship (Stookey, 2001) whereas the other had significant relationship but only for males (Paeratakul *et al.*, 1998). Meanwhile, a cohort study in India found that females with high intake of fat and sugar experienced a significant increase in weight (Agrawal, 2005).

A few cross sectional studies revealed a significant relationship between physical activity and overweight (Martinez-Gonzalez *et al.*, 1999; Proper *et al.*, 2007). Socio-economic factor plays an important role apart from physical activity and desired food intake (Jane, 2002). Other factors related to overweight are parity (Denise *et al.*, 2001), marital status (Jeffery and Allison, 2002), age and gender (WHO, 2000), smoking (Flegal *et al.*, 1995) and alcohol (Ahmed and James, 2005).

Health care worker is no exception to this overweight trend. A few studies conducted by the State Health Department in Malaysia from 2004 to 2005 showed that the overweight prevalence among the health personnel were between 33.2 and 41.4% and obesity were between 12.6 and 19.7% (Ministry of Health Malaysia, 2004). These results were higher than the result of previous studies (Institute of Public Health, 1999; Ministry of Health, 2007).

Increasing overweight prevalence among health care workers should be the main concern as they are the

front liner in the community to practice healthy life style. Therefore, this study is aimed to determine the over weight prevalence and its related factors among the health care workers. The outcome of the study could be used as reference for relevant institutions/departments when planning for any intervention activities and strategies to reduce the over weight problem among the health personnel.

MATERIALS AND METHODS

A cross-sectional study was carried out in health clinics under the Health Department of Hulu Langat jurisdiction from June 2010 until August 2010. There are a total of nine Government Health Clinics in Hulu Langat District but only six clinics were chosen by stratified sampling method. All health staffs from the six clinics were selected as samples. The inclusion criteria for respondents for this study were Malaysian, employee of Health and Medical Department and aged 18 years old and above. Those who were pregnant, bedridden, physically disabled or having health problem that can affect the Body Mass Index measurement were excluded from the study.

This study used the Short International Physical Activity Questionnaire (IPAQ) to measure physical activity (Craig *et al.*, 2003), Food Frequency Questionnaire to measure the fat intake (Norimah and Wai, 2003), Knowledge was measured using a set of validated questionnaire (Lim *et al.*, 2003). Knowledge on healthy diet was measured by using 12 questions for each variable. For measuring knowledge score respondents were required to answers either wrong or right. One mark will be given to the right answer for positive statement and one mark for right answer for negative statement. No mark will be given for 'do not know' answers. While the anthropometric measurement was carried out using a calibrated SECA scale, body meter and measurement tape. To reduce the measurement errors, only two (2) trained researchers are responsible to measure the respondent weight and height.

Overweight was defined as a body mass index of more or equivalent to 25 kg/m². Body Mass Index is calculated by the following formula (WHO, 2000):

$$\text{BMI} = \text{body weight (kilogram)} / \text{Height}^2 \text{ (meter)}$$

Physical activity is a daily movement of the respondents during work, recreation, exercise and sports (WHO, 1997). Physical activity depends on the type of activity and is measured by the International Activity Questionnaire-Short Form (IPAQ). It is then categorized into low, moderate and high (Craig *et al.*, 2003; Tehard *et al.*, 2005). Physical activity is measured using multiples of resting metabolic rate (MET). Physical activity was categorized into low, moderate and high. Using the following criteria:

Low = No activity or activity less than in moderate or high category

Moderate = either one of the following

- >3 days vigorous activities at least 20 minutes/day
- >5 days moderate activities or walking at least 30 minutes/ day or
- >5 days combination between walking, moderate or vigorous activities which meet at least 600MET-minute/week

High = either one of the following

- vigorous activities at least 3 days which meet at least 1, 500 MET-minutes/week or
- >7 days or combination of walking, moderate or vigorous activities which achieve at least 3, 000 MET-minutes/weeks

Fat intake is the amount of fat taken by respondent in the form of calories and measured using Diet 4 software. Normal or abnormal classification is based on the Recommended Nutrient Intakes for Malaysia (RNI) (Ministry of Health Malaysia, 2004).

	Male	Female
<RNI	<54 gm/day	<46 gm/day
within RNI	54-82 gm/day	46-70 gm/day
>RNI	>82 gm/day	>70 gm/day

Sitting time is measured by IPAQ questions and defined as total sitting time during working hours, at home, leisure time and watching television per day within the last seven days.

Statistical analysis: Data were analyzed using SPSS version 12.0 software and Diet 4 programme for Food Frequency Questionnaire (FFQ). Relationships between categorical variables were analyzed using Chi-square test whereas U-Mann Whitney test was used to compare means of two variables which are not normally distributed. Correlation test is used to determine correlation between quantitative variables. Multiple Logistic regression analysis was performed to determine the predictors of overweight problems. Significant level is at p<0.05.

This study was approved by the UKM Medical Centre Research and Ethics Committee. Permission for conducting the study at Health Clinics was obtained from the Ministry of Health Malaysia and the Selangor Health Department.

RESULTS

A total of 267 respondents fulfilled the inclusion criteria. However, only 254 respondents agreed to participate in this study which is accounted to the response rate of 95.1%.

Table 1 shows the socio demographic characteristics of the respondents. Almost three quarter of the respondents (69.7%) aged less than 40 years old and they are mostly females (78.0%). Majority of the respondents were Malays 89.3 and 78.7% were married or ever married. Among female respondents, half (50.0%) of them has less than 2 children. More than half of the respondents were categorized under low and middle income group in which the family income per month is less than RM 3,500.00 (55.9%). Most of the respondents were highly educated (62.2%). More than half of them are professionals and first rank supportive group (64.2%)

Median fat intake of the respondents is 66.3 gram (53.0-82.7) which is still within the recommended nutrient intake for Malaysia. Half of the respondents (50.0%) consumed within RNI, about 39.9% consumed more and 10.1% less than RNI.

The overweight prevalence was 46.1% which constitutes of 27.6% pre-obese and 18.5% obese. Obesity was much higher among females (49.5%) as compared to males (33.9%). The respondents less than 30 years old less obese (31.3%) as compared to the older age group especially those who are 50 years and above (73.3%).

Table 2 shows that the gender (p = 0.039), age (p = 0.0001), marital status (p = 0.002) length of service (p = 0.003), parity (p = 0.047), education (p = 0.043) and level of income (p = 0.001) have significant association with overweight.

Logistic Regression Model shows that income (AOR 2.622, B 0.964 and p = 0.004) and level of education (AOR 2.833, B 1.041 and p = 0.001) are predictors for overweight as shown in Table 3. Respondents with low education level and high income are 2.8 and 2.6 times respectively more likely to be overweight. The value of R² in this model is 0.178 which showed that 17.8% of the household income and education status contributed to the overweight problem of the respondents, while 82.2% is contributed by other factors which are not studied such as husband support, role of media, the working environment, availability of fast foods, etc.

DISCUSSION

The prevalence of overweight in this study was 46.1% which constitutes of 27.6% of pre-obese and 18.5% of obese. The pre-obese prevalence is higher compared to the National Health and Morbidity Survey 1996 (27.6% vs 16.6%) but more or less the same as the National Nutrition Survey 2000/2003 (27.6% vs 26.7%) (Ministry of Health, 2007). But lower as compared to the latest Surveillance Research by the Ministry of Health Malaysia (27.6 vs 31.6%) (Norimah and Wai, 2003). Females found to be more obese and this finding is supported by the National Health and Morbidity Survey 1996 (Institute of Public Health, 1999) and also MyNCDS-1 Malaysia NCD Surveillance-1 2005/2006 (Tehard *et al.*, 2005). The obesity prevalence among males showed an

Table 1: Characteristics of the respondents (n = 254)

Characteristics	F	%age	Median (IQR) 25-75 th percentile
Age (years)			
<30	115	45.3	31 (26-42)
30-39	62	24.4	
40-49	47	18.5	
>50 years old	30	11.8	
Sex			
Men	56	22.0	
Women	198	78.0	
Ethnic			
Malay	227	89.3	
Non Malay	27	10.7	
Marital status			
Married/Ever married	200	78.7	
Never married	54	21.3	
Parity (female only)			
<2	99	50.0	
≥2	99	50.0	
Household income			
<RM 3, 500.00	142	55.9	
≥RM 3.500.00	112	44.1	
Level of education			
PSS	96	37.8	
Higher education	158	62.2	
Occupational status			
Professional/ Supportive group I	163	64.2	
Supportive group II	91	35.8	
Fat intake			
*<RNI	15	10.1	66.3(53.0-82.7)
Within RNI	74	50.0	
> RNI	59	39.9	

*RNI: Recommended Nutrient Intake; PSS: Primary/secondary school
F = Frequency, IQR = Interquartile Range

increasing trend up to age 55-64 years old while for the females the prevalence is proportional to age (Proper *et al.*, 2007; Lim *et al.*, 2003). This is probably due to low metabolism, continuous unhealthy eating habit and low physical activity which lead to overweight problem. Physiological process in female's body caused fat to accumulate more as compared to males as a preparation for an efficient reproductive system (Salbe and Ravussin, 2002). For married couples, eating together with family members, variation and quantity of prepared meals at home will boost the appetite. Besides there is probability of lack of self motivation to lose weight among married couples due to the assumption that perfect figure is no longer important after marriage as well as highly occupied with family and work (Denise *et al.*, 2001).

The significant parity factor in this study is supported by the cross-sectional study in Brazil which showed that the increase in body weight among obese women with 2 children is 1.21 kg as compared to 1.82 kg in women with parity 3 or more (Jane, 2002).

The education level and income were the overweight predictors in this study and this finding is same as the studies done in China and England (David and Ball, 2002; Proper *et al.*, 2007). In the USA, respondents with higher educational level have low risk of obesity

Table 2: Association between independent variables and overweight

Variables	Overweight (BMI \geq 25 kg/m ²)		p-value	POR (95% CI)
	Yes [n (%)]	No [n(%)]		
Sex				
Female	98 (49.5)	100 (50.5)	0.039*	1.908 (1.027-3.545)
Male	99 (33.9)	37 (66.1)		
Age (years)				
<30	36 (31.3)	79 (68.7)	0.0001*	2.245 (1.289-3.910)
30-39	36 (58.1)	26 (41.9)		
40-49	23 (48.9)	24 (51.1)		
>50 years old	22 (73.3)	8 (26.7)		
Ethnic				
Malay	104 (45.8)	123 (54.2)	0.818	1.098 (0.494-2.441)
Non Malay	13 (48.1)	14 (51.9)		
Marital status				
Married/ever married	102 (51.0)	98 (49.0)	0.002*	2.706 (1.403-5.219)
Never married	15 (27.8)	39 (72.2)		
Length of service				
>5 years	72 (55.0)	59 (45.0)	0.003*	2.115 (1.279-3.488)
\leq 5 years	45 (36.6)	78 (63.4)		
Family history				
yes	51 (57.3)	38 (42.7)	0.374	1.311 (0.721 -2.383)
No	66 (40.0)	99 (60.0)		
Parity				
\geq 2	56 (56.6)	43 (43.4)	0.047*	1.767 (1.007-3.103)
<2	42 (42.4)	57 (57.6)		
Education				
Primary/secondary School	52 (54.2)	44 (45.8)	0.043*	1.691 (1.104-2.820)
Higher education	65 (41.1)	93 (58.9)		
Occupational status				
Professional/Supportive Group I	71 (43.6)	92 (56.4)	0.284	1.325 (0.792-2.216)
Supportive Group II	46 (50.5)	45 (49.5)		
Level of income				
\geq RM 3,500.00	53 (60.2)	35 (39.8)	0.001*	2.413 (1.422-4.096)
<RM 3,500.00	64 (38.6)	102 (61.4)		
Exposure to healthy life style campaign				
Yes	71 (48.3)	76 (51.7)	0.402	0.807 (0.489-1.332)
No	46 (43.0)	61 (57.0)		
Smoking status				
Stopped smoking/Not smoking	5 (45.5)	6 (54.5)	0.967	0.975 (0.290-3.280)
Current smoker	112 (46.1)	131 (53.9)		
Physical activity				
Low	40 (46.5)	46 (53.5)	0.957	1.014 (0.598-1.720)
Moderate/high	72 (46.2)	84 (53.8)		
Sitting time				
\geq 6 hrs	47 (48.0)	51 (52.0)	0.897	1.035 (0.616-1.738)
<6 hrs	65 (47.1)	73 (52.9)		
Fat intake				
>RNI*	36 (50.0)	36 (50.0)	0.262	1.407 (0.775-2.545)
\leq RNI	47 (41.6)	66 (58.4)		
Knowledge on healthy diet				
Low/moderate	3 (27.3)	8 (72.7)	0.201	0.424 (0.110-1.638)
Good	114 (46.9)	129 (53.1)		

*Significant at $p \leq 0.05$; * RNI: Recommended Nutrient Intakes, POR = Prevalence Odds Ratio, CI = Confidence Interval

Table 3: Logistic Regression Model to predict factors affecting overweight status among the respondents

Factors	RC (β)	S.E.	Wald	p-value	AOR	95% C.I.
Age	0.239	0.323	1.997	0.460	1.270	0.67-2.39
Sex	0.653	0.356	0.654	0.066	1.922	0.927-3.86
Marital status	0.559	0.380	8.061	0.142	1.749	0.83-3.69
Education	1.041	0.326	4.808	0.001*	2.833	1.49-5.37
Income	0.964	0.331	0.792	0.004*	2.622	1.37-5.02
Practice Score	-0.391	0.286	0.001	0.172	0.676	0.39-0.19
Constant	-1.718	0.519		0.001*		

* Significant at $p < 0.05$, RC = Regression coefficient, S.E. Standard error, AOR = Adjusted odds ratio

(OR = 0.36, CI 0.20-0.61) (WHO, 1997) and the prevalence of obesity was higher among less educated health staffs in Perak (Flegal *et al.*, 1995).

Dietary intake and socio-economic status are main contributing factors and the key factors in influencing the eating habit and Body Mass Index. In developing

countries, income has a positive correlation with fat intake from animal sources but a negative correlation with carbohydrate intake. Hence, the socioeconomic factor is vital in its relationship with eating habit and Body Mass Index (WHO, 2003). In this study, all respondents are working, majority of them came from the middle household income group, endure modest physical activity and attained higher educational level. Socio-economic factor also has a significant relationship with overweight in the multivariate analysis.

Conclusion: The study revealed that the overweight prevalence among the health personnel is higher as compared to the previous study in Malaysia. Socioeconomic factors, namely level of education and income are predictors to overweight. Higher-income workers are 2.6 times more likely to become overweight as compared to the lower-income individual. While the lower education group of respondents are 2.8 times more likely to become overweight.

Recommendations: As for the prevention and controlling measures, Healthy Life Style Campaign among the health personnel should be enhanced continuously. The lower educated group which falls into the support group should be emphasized on the vitality of balance and healthy food concept while the higher income group should be emphasized on the food selection as they have more power in purchasing. Nevertheless, this is a cross sectional study, therefore it is difficult to determine the causal relationship. A cohort or case control study is recommended in the future.

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REFERENCES

Agrawal, P., 2005. Role of Lifestyle and diet in emerging obesity among Indian women and its impact upon their health status. Paper for the oral presentation in the IUSSP XXV International Population Conference Tours, France.

Ahmed, A.A. and E.R. James, 2005. Patterns of alcohol drinking and its association with obesity: Data from the third national health and nutrition examination survey, 198-1994, *BMC Public Health*, 5: 126.

Craig, C.L., A.L. Marshall, Sjöström M, A.E. Bauman, M.L. Booth, B.E. Ainsworth and the IPAQ Consensus Group and the IPAQ Reliability and Validity Study Group, 2003. International Physical Activity Questionnaire (IPAQ): 12-country reliability and validity. *Med. Sci. Sport Exerc.*, 2002 (in press).

David, C. and K. Ball, 2002. Behavioural determinants of the obesity epidemic. *Asia Pacific J. Clin. Nutr.*, 11: S718-S721.

Denise, C.C., S. Rosely, H.D. Maria and A. Benicio, 2001. Obesity and weight change related to parity and breast feeding among parous women. *Brazil Public Health Nutr.*, 4: 865-870.

Flegal, K.M., P. Richard, T. Elsie, R. Pamuk, J. Robert, Kuczmarski and S.M. Campbel, 1995. The influence of smoking cessation on the prevalence of overweight in the United States. *New England J. Med.*, 333: 1165-1170.

Haslam, D.W., W. Philip and T. James, 2005. Obesity. *Lancet*, 366: 197-209.

Institut Kesihatan Umum, 1996. Kementerian Kesihatan Malaysia. 1999. Exercise volume 13, Nutritional status volume 14, Smoking volume 15 dan Alcohol consumption volume 16, Laporan Kajian Morbiditi Kebangsaan II (NHMS II), 1996.

Jane and Wardle, 2002. Sex differences in the association of socioeconomic status with Obesity. *Am. J. Public Health*, 92: 1299-1304.

Jeffery, R.W. and Allison, 2002. Cross-sectional and longitudinal associations between Body Mass Index and marriage-related factors. *Obesity Res.*, 10: Np. 8 August 2002.

Kementerian Kesihatan Malaysia, 2004-2005. Laporan Teknikal Jabatan Kesihatan Negeri Pahang, Perak, Johor dan Terengganu.

Martinez-Gonzalez, M.A., J.A. Martinez, F.B. Hu, M.J. Gibney and J. Kearney, 199. Physical inactivity, sedentary life style and obesity in the European Union. *Int. J. Obes. Relate. Metab. Disorder*, 23: 1192-1201.

Ministry of Health, 2007. Nutrition Section Family Health Division. The Malaysian Adult Nutrition Survey 2003, 2007.

National Coordinating Committee On Food And Nutrition Ministry of Health Malaysia, 2005. Recommended Nutrients Intake For Malaysia. A Report of the Technical Working Group On Nutritional Guidelines Nutrition, 62: 195S-201S.

Norimah, A.K. and C.C. Wai, 2003. Assumed of fat and cholestrol intake among Malaysian Adult: Development and callibration of food frequency question. The 5th International Conference On dietary Assessment Methods.

Lim, H.M., H.L. Chee, K. Mirnalini, S. Khadijah, J. Jamilah, M.M. Nor Anita and S. Rashidah, 2003. Dietary Fibers and other factors associated with overweight among women workers in two Electronic Fctories in Selangor. *Malaysian J. Nutr.*, 9: 105-124.

Ministry of Health Malaysia, 2004. Manual key messages and support Healthy Lifestyle campaign Workplace Settings.

- Paeratakul, S., B.M. Popkin, G. Keyou, L.S. Adair and J. Stevens, 1998. Changes in diet and physical activity affect the body mass Index of Chinese adults. *Int. J. Obesity*, 22: 424-431.
- Proper, K.I., E. Cerin, W.J. Brown and N. Owen, 2007. Setting time and socioeconomic differences in overweight and obesity. *Int. J. Obesity*, 31: 169-176.
- Salbe, A.D. and E. Ravussin, 2002. The determinant of Obesity, Claude Bouchard 2000, Physical activity and obesity.
- Stookey, J.D., 2001. Energy density, energy intake and weight status in a large free – living sample of Chinese adults: exploring the underlying roles of fat, protein, carbohydrate, fiber and water intakes. *Eur. J. Clin. Nutr.*, 55: 349-359.
- Tehard, Bertrand, Saris, Wim, H.M., Astrup, Arne, Martinez, J. Alfredo, Taylor and A. Moira, 2005. Comparison of two Physical activity Questionnaires in Obese Subjects: The NUGENOB Study. The American College Of Sports Medicine.
- WHO, 1997. Obesity: Preventing and managing global epidemic Report of WHO consultant, Geneva, 3-5 June 1997.
- WHO, 2000. Obesity. Preventing and managing the global epidemic. Report of WHO consultants, WHO Technical Report, Pages: 894.
- WHO, 2003. Diet, Nutrition and the prevention of chronic diseases. WHO Technical. Report. Ser., Pages: 16.