PUBLIC HEALTH RESEARCH

Food Label Reading and Understanding among Obese Adults: A Population Study in Malaysia

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ABSTRACT

Received	10 April 2014
Accepted	17 July 2014
Introduction	Food labeling regulation has been implemented to enable consumers, including those with chronic diseases to make healthy informed choices before purchasing pre-packaged foods. The purpose of this study is to determine the prevalence of obese adults in Malaysia who practice reading food labels. It explored types of labels read and understanding of the information.
Methods	Findings presented in this study were captured from the secondary analysis of National Health and Morbidity Survey's (NHMS, 2006) food label study which focused only on obese adults (BMI > 30 kg/m^2) aged 18 and above. This nation-wide cross sectional study was conducted from April to August 2006 using an interview-based questionnaire. Complex data analysis was done using Stata version 12.0.
Results	There were 4565 obese respondents with the mean age of 33 ± 9.7 $(18 - 60$ years old). About 54.7% completed high-school and 9.9% were higher degree holders. Prevalence of obese adults who claimed to read label was 80.5% (95%CI: 79.3, 81.6). Findings showed significant results in reading and understanding labels among all age group categories, Malay, Indian and other Bumiputras, all education categories and married respondents. Expiry date was the highest percentage being read (74.5%), followed by fat content (15.3%), vitamin (11.8%) and carbohydrate (10.9%).
Conclusions	The obese population in Malaysia claimed to read and understand the food label but did not focus on specific macronutrients related to their health condition. Findings can be used to implement effective education programmes targeting the relevant groups to instill an awareness to read, understand and use the label information as one of the means in combating obesity.
Keywords	Obese - use of food label - understand food label - nutrition labeling - Malaysia.

INTRODUCTION

Obesity is a chronic disease affecting both developed and developing countries either among the children or adult population[1]. WHO has reported about 1.6 billion population aged more than 15 years old were overweight and at least 400 million were obese[1]. Malaysia National Health and Morbidity Survey 1, (NHMS 1, 1996) revealed that obesity among adults in Malaysia was 4.4%[2]. The statistic increased in the Malaysia Adult Nutrition Survey (2003) which resulted in 12.0%[3]. NHMS 3 (2006) and NHMS (2011) then reported the rise of obesity to 14.0%[4] and 15.1%[5] respectively.

Urbanization increases the availability of foods, changes meal pattern and reduces physical activity due to easy access to services and use of non-laborious equipment in the house. Over consumption of energy compared to expenditure is said to be one of the main contributing factors in the increase in the obesity prevalence[6]. In addition, diets rich in fat, high calorie density, low in fibre and high in sodium are linked with increased risks of chronic non-communicable diseases such as type 2 diabetes, hypertension, cardiovascular disease and hyperlipidemia. The continued acceleration of obesity has increased the need to re-evaluate the policy, programme and further formulate practical intervention strategies to curb the obesity problem.

Lifestyle modifications which include an optimal diet, is one of the effective prevention methods for weight management. The World Health Organization (WHO) has proposed nutrition labelling as one of the ways in providing factual information to assist the consumer in making healthier food choices[6]. In an effort to enable consumers to make healthful dietary choices at the point of purchase, Ministry of Health has gazetted and enforced Regulations on Nutrition Labelling since 2005, updated it on 2007 and latest was published on December 2010[7]. Food label (FL) will state the name of the product, net weight, name and address of the manufacturer, ingredients, additives, expiry dates and nutrition information. Nutrient content of the food product will be declared on the food packaging and made known as a nutrition information panel[8,9]. FL is one of the sources where consumers aimed at searching for nutrient information apart from health professionals, printed media, internet, friends, relatives, colleagues, and electronic media[10-12]. It provides support in a weight reduction programme which guides food selection[11-15] and has been associated with lower intake in energy, fat, cholesterol, sugar and an increase in fibre intake[16]. However, to use FL efficiently for consumers with diet-related health problems, some basic knowledge on types of nutrients and their nutritional properties, understanding on dietary recommendations related to their specific health problem and some numeracy competence are needed[15]. About 78.0% of the Malaysian population reported reading FL when buying or receiving foods and limited information is available on how obese people use and understand the FL. Thus this study aimed to explore the usage and understanding of FL by the obese adult population in Malaysia and provided information on types of labels read by this group. The association of socio-demographic variables with the use and understanding of the FL were further evaluated. The findings from this study will help the relevant authority to plan public strategies to promote use of FL in making informed dietary choices among the obese population.

METHODS

Study design and sampling
This FL study was part of the component of the NHMS 2006 which was conducted cross-sectionally in the Malaysian population. It provides community based data to enable the Ministry of Health, Malaysia to review health priorities, programme strategies, activities and planning for allocation of resources. The NHMS 2006 used a two-stage stratified sampling design proportionate to population size throughout all states in Malaysia. The first stage was selection of the Enumeration Blocks (EBs) and followed with the selection of Living Quarters (LQ) within the selected EB. The sampling frame was provided by the Department of Statistics, Malaysia. A total of 2,150 EBs consisting of 17,200 Living Quarters (LQ) were selected using a probability proportionate to size (PPS). Commencement of this study has been approved by the Medical Research and Ethics Committee, Ministry of Health Malaysia (research approval reference NMRR-09-824-4684). Data collection was conducted from April to end of August 2006. Findings presented in this FL study were captured from the secondary analysis of NHMS 2006's data in which only obese adults aged 18 and above were included. Obesity was defined as body mass index (BMI) of $\geq 30 \text{ kg/m}^2$.

Data collection
Data collection was done via face to face interview using bi-lingual (Malay and English) questionnaires which have been pre-tested, validated and finalized by the NHMS 2006 Research Committee. Trained data collectors obtained informed consent from the respondents prior to conducting the interview. The questionnaire included data on socio-demographic characteristics namely gender, age, ethnicity, marital status, occupational, household monthly income, educational level and residential area (urban or rural).

Anthropometric measurements comprising of weight and height were performed by trained data collectors. Body weight was measured in light indoor clothing without shoes using Tanita weight

scale (TANITA 318, Japan). Height was measured without shoes using SECA portable meter (SECA 206, Germany). All measurements were taken twice and the average value was used for data analysis. Based on the weight and height measurement, BMI was computed as weight (kg) divided by the square of the height in meters (kg/m^2). The respondent was classified as obese if their BMI was $\geq$ 30 kg/m^2 based on the classification recommended by WHO (1998).

Food label reading and understanding was assessed with the following questions; (1) Do you read the FL every time you buy or receive food (where applicable), (2) What kind of information in the nutrition labelling do you read? (More than one answer is accepted) and (3) Do you understand when reading the nutrition labelling every time you buy or receive food? Respondents who reported "yes, always" and "yes, sometimes" were defined as read label and understand the food label. For the purpose of this study, FL was defined as information of nutrient content, including expiry date as printed on the food pack.

Data analysis
Statistical analysis was performed by complex sample analysis using STATA version 12.0. Findings are reported as the weighted estimates of the prevalence, and mean value with 95% confidence interval. The association between socio-demographic variables (age, gender, race, education, marital status and residence) were determined using complex sample logistic regression analysis. The estimate was presented as odds ratio (OR) with 95% confidence interval.

RESULTS

Data of 4565 obese adults aged $\geq$ 18 years with complete information were analysed. The samples consisted of 67.8% female (n=3097) and majority ofthe respondents were Malays, 62.6% (n=2690). The other main ethnicities of Chinese (n=580) and Indian (n=479) represented the distribution of 13.5% and 11.1% of the total respondents, respectively. Participants aged 40 – 49 years old constituted about 27.7% of the obese adults who responded, followed by the 30 – 39 years old, 21.9%. Secondary school leavers dominated by 47.6%, followed by primary school, 35.3%, no education, 8.8% and tertiary educated 8.3%. Almost 85.0% of the respondents were married and 60.0% lived in the urban area. The socio demographic distributions of the respondents are shown in Table 1.

Table 1 Socio-demographic characteristic of respondents and responses on reading and understanding of food label

Characteristics	Total respondent	Read Labels (Always & Sometimes)			Understanding Labels (Always & Sometimes)		
		Prevalence	95% CI		Prevalence	95% CI	
			Lower	Upper		Lower	Upper
Age (year)							
18 – 29	837	87.6	85.1	89.7	95.5	93.8	96.8
30 – 39	1003	82.5	80.0	84.8	93.7	91.9	95.2
40 – 49	1266	78.1	75.7	80.3	94.0	92.4	95.3
50 – 59	969	69.8	66.9	72.7	93.3	91.2	94.9
$\geq$ 60	490	42.7	38.3	47.2	88.7	83.9	92.2
Gender							
Male	1468	85.1	83.2	86.8	94.4	93.0	95.6
Female	3097	78.3	76.8	79.8	93.5	92.4	94.4
Race							
Malay	2690	85.1	83.8	86.4	93.4	92.3	94.3
Chinese	580	66.4	62.4	70.2	94.2	91.4	96.1
Indian	479	79.1	75.2	82.5	93.7	90.7	95.7
Other Bumis*	412	72.6	68.0	76.7	96.8	93.9	98.3
Others	134	70.6	62.3	77.8	94.5	87.3	97.7
Education							
None	400	28.7	24.4	33.4	84.3	76.3	89.9
Primary	1602	73.5	71.2	75.6	92.1	90.3	93.5
Secondary	2157	92.3	91.1	93.4	94.4	93.3	95.4
Tertiary	375	95.9	93.4	97.5	98.4	96.5	99.3
Marital Status							
Not Married	627	86.0	83.1	88.5	95.0	92.8	96.6
Married	3552	81.6	80.3	82.9	93.7	92.7	94.6
Divorcee	105	74.1	64.9	81.6	90.9	82.0	95.6
Widow/widower	264	55.2	49.1	61.6	92.2	86.3	95.6
Residence							
Urban	2738	82.5	81.0	83.9	94.1	93.0	95.0
Rural	1827	76.7	74.7	78.6	93.2	91.7	94.4

* Bumis: Indigenious groups
** Total respondent does not tally secondary to missing values

Food label reading among obese

This study showed that Malaysian obese adult population claimed to read label at the prevalence of 80.5% (95% CI: 79.3, 81.6). Prevalence of reading labels was significantly higher among males (85.1%, 95% CI: 83.2, 86.8) compared to females (78.3%, 95% CI: 76.8, 79.8). The prevalence of reading FL by sociodemographic characteristics is shown in Table 1. According to the multiple logistic regression analysis (Table 2), age, race, education and marital status were significantly associated with the likelihood of reading FL. Obese respondents aged 18 – 29 years old reported the highest likelihood of reading the FL (OR 4.82) and the rate decreased as the respondents get older, as compared to the respondents aged more than 60 years old. Malays were 2.47 times more likely to read FL, followed by the Indians by1.59 times and other Bumiputras, by 1.45 times, as compared to the Chinese ethnicity. The likelihood of reading FL increased with the increase in academic achievement, as compared to the non-educated respondents. The tertiary educated respondents were 33 times more likely to read FL, followed by the secondary achievers by 17 times and primary achievers by 5 times. Married respondents were 1.64 times more likely to read FL, as compared to the widow / widower.

Table 2 Estimated crude and adjusted odds ratio for reading and understanding of food label (n= 1,750; N=1,697,703)

Variables	Reading FLs				Understandings FLs			
	Crude OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value	Crude OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value
Age (year)								
18 – 29	11.88 (8.82, 16.01)	0.001[a]	4.82 (3.19, 7.33)	0.001[a]	9.46 (7.14, 12.53)	<0.001[a]	3.87 (2.71, 5.53)	<0.001[a]
30 – 39	8.21 (6.24,10.80)	0.001[a]	3.12 (2.23, 4.34)	0.001[a]	6.35 (4.95, 8.15)	<0.001[a]	2.49 (1.87, 3.33)	<0.001[a]
40 – 49	5.37 (4.24, 6.79)	0.001[a]	2.45 (1.86, 3.24)	0.001[a]	4.79 (3.82, 6.01)	<0.001[a]	2.28 (1.77, 2.96)	<0.001[a]
50 – 59	3.32 (2.62, 4.19)	0.001[a]	2.00 (1.52, 2.64)	0.001[a]	3.11 (2.47, 3.91)	<0.001[a]	1.92 (1.49, 2.48)	<0.001[a]
≥ 60[b]	1		1		1		1	
Gender								
Male	1.58 (1.34, 1.87)	0.001[a]	1.02 (0.83, 1.24)	0.878	1.48 (1.27, 1.74)	<0.001[a]	1.02 (0.85, 1.22)	0.833
Female[b]	1		1		1		1	
Race								
Malay	2.89 (2.36, 3.55)	0.001[a]	2.47 (1.91, 3.18)	0.001[a]	2.27 (1.88, 2.77)	<0.001[a]	1.87 (1.49, 2.36)	<0.001[a]
Chinese[b]	1		1		1		1	
Indian	1.91 (1.44, 2.52)	0.001[a]	1.59 (1.15, 2.21)	0.006[a]	1.71 (1.30, 2.24)	<0.001[a]	1.45 (1.06, 1.97)	0.019[a]
Other Bumis*	1.33 (0.99, 1.79)	0.052	1.45 (1.02, 2.05)	0.036[a]	1.38 (1.04, 1.84)	0.027[a]	1.53 (1.12, 2.11)	0.007[a]
Others	1.22 (0.80, 1.84)	0.354	1.04 (0.63, 1.72)	0.872	1.20 (0.81, 1.78)	0.366	1.09 (0.68, 1.73)	0.722
Education								
None[b]	1		1		1		1	
Primary	6.87 (5.38, 8.79)	0.001[a]	5.24 (4.00, 6.86)	0.001[a]	6.47 (5.00, 8.37)	<0.001[a]	5.12 (3.88, 6.76)	<0.001[a]
Secondary	29.91 (22.79, 39.23)	0.001[a]	16.95 (12.47, 23.06)	0.001[a]	20.82 (15.95, 27.17)	<0.001[a]	12.92 (9.61, 17.36)	<0.001[a]
Tertiary	58.70 (32.81, 105.04)	0.001[a]	32.83 (17.76, 60.69)	0.001[a]	50.47 (30.62, 83.19)	<0.001[a]	30.87 (18.17, 52.44)	<0.001[a]
Marital Status								
Not Married	4.99 (3.54, 7.03)	0.001[a]	0.79 (0.48, 1.26)	0.320	4.33 (3.11, 6.00)	<0.001[a]	0.86 (0.56, 1.31)	0.476
Married	3.61 (2.76, 4.73)	0.001[a]	1.64 (1.15, 2.33)	0.006[a]	3.09 (2.36, 4.04)	<0.001[a]	1.47 (1.05, 2.05)	0.023[a]
Divorcee	2.33 (1.39, 3.89)	0.001[a]	1.77 (0.98, 3.18)	0.058	1.99 (1.22, 3.28)	0.006[a]	1.47 (0.83, 2.61)	0.186
Widow/ widower	1		1		1		1	
Residence								
Urban	1.43 (1.21, 1.68)	0.001[a]	1.21 (0.99, 1.46)	0.055	1.39 (1.18, 1.61)	<0.001[a]	1.15 (0.96, 1.38)	0.129
Rural[b]	1		1		1		1	

n=1750, Adjusted Wald Test for all parameters: $F_{(91,742)}=0.67$, p<0.001

[a]Significant differences were set at p<0.05
[b]Reference categories for all categorical predictors are Age(≥ 60); Gender (Female); Race (Chinese); Education (None); Marital Status (Widow/widower); Residence (Rural)

The prevalence of understanding FL by socio-demographic characteristics is shown in Table 1. The Malaysian obese adult population reported to understand FL at the prevalence of 75.3% (95% CI: 73.9, 76.6). According to the multiple logistic regression analysis (Table 2), age, race, education and marital status were significantly associated with the likelihood of understanding FL (Table 3). Obese respondents aged 18 – 29 years old reported the highest likelihood of understanding the FL (3.87 times) and the odd decreased as the respondents get older, as compared to those aged more than 60 years old. Malays were 1.87 times more likely to understand FL, followed by other Bumiputras, by 1.53 times and the Indians by 1.45 times, as compared to the Chinese ethnicity. The likelihood of understanding FL increased with the increase in academic achievement. The tertiary educated respondents were almost 30.87 times more likely to understand FL, followed by the secondary achievers by 12.92 times and primary achievers by 5.12 times, as compared to the non-educated respondents. Married respondents were 1.47 times more likely to read FL, as compared to the widow / widower.

Types of label information read by the obese respondents are shown in Figure 1. Expiry date was the most popular information read by the adult obese population in Malaysia with 74.6% of respondents. Respondents put less attention on the information of fat and carbohydrate / sugar which contribute to daily energy. Another 8.7% and 7.6% of respondents read on information on food additives and salt, respectively. Total energy information was the least popular type of information read with only 7.0% of respondents. Analysis showed that there was only one obese respondent who read all informations in the label.
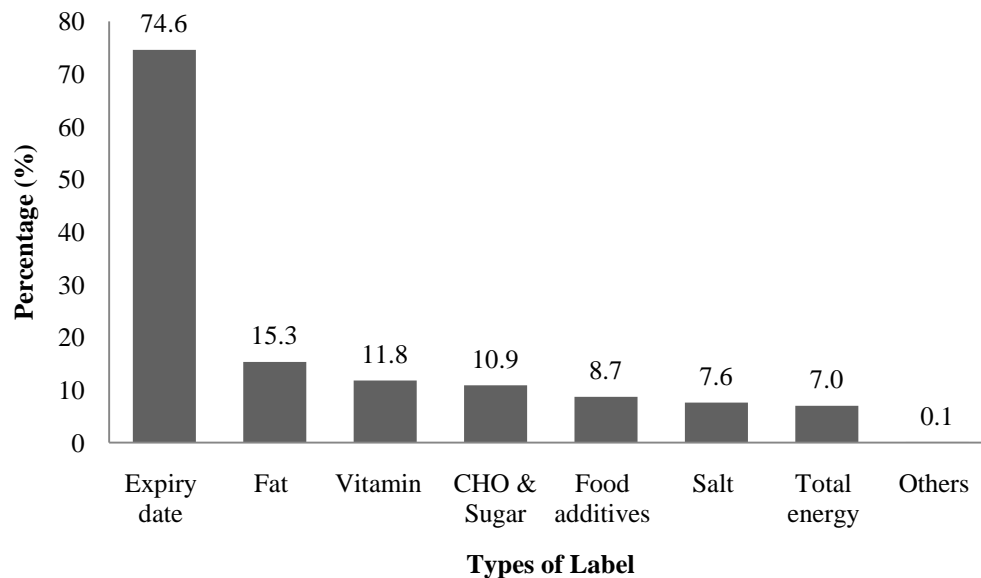

Figure 1 Types of FL read by obese respondents

DISCUSSION

Based on the finding, Malaysian obese adults reported a positive attitude towards FL as shown in the high prevalence of reading FL. Our finding that eight out of ten obese respondents read the FL replicates the result of a population study in US[17]. This indicated that overweight / obese respondents and individuals with excess weight showed interest to read FL[16,18]. Findings from another study involving respondents with chronic diseases including overweight and obese conditions reported they read and checked FL for specific nutrients more frequently compared to normal weight respondents[19]. They might have seen health care practitioners and received advice on diet control. Hence, awareness on the specific diet recommendations given by the health care provider will spark them to check FL in order to control their dietary intake and disease condition[18]. The finding on the positive behaviour in reading label among the obese population provides useful information for the policy maker and health

authority to plan for future nutrition intervention programmes. Use of FL has been associated with a decline in body weight among consumers[12]. Hence awareness on the importance of reading labels can help in providing informed food choices and guiding in selecting appropriate foods related to their health condition.

This study showed that obese Malays exhibited strong interests in reading labels compared to other ethnicities. Hence the obese Indians and Chinese should be the targeted group in public education campaigns in instilling the interests to read FL. This finding is in parallel with a study done in Singapore where the Malays showed the most interest in reading labels[20].

Interestingly, obese males read FL significantly more than obese females, inconsistent with most findings[13,15-17]. A possible explanation for this might be due to awareness on diet and disease relation and motivation to lose weight that stimulate males to read labels deliberately[15,19]. Females consistently read labels due to the role of purchasing groceries and preparing meals to the family without concern to the diet and disease association[15,16].

This study is similar with another study in finding that respondents with higher academic achievements will put more effort to read FL[16].. This could be due to educated respondents achieved larger knowledge on nutrition through their reading and academic exposures. This is in line with most studies portraying that respondents with higher academic qualifications showed the intellectual ability to interpret information, and significantly read labels compared to the lower achievers[16,19].

Prevalence of reading of FL has been inversely associated with age where the older generation were less likely to read FL. This explained the difficulty to read the small-print FL information panel caused by visual impairment of the elderly[21]. Furthermore, the elderly were also less engaged with shopping activity due to physical inactivity.

The understanding of FL among the obese population is significantly associated with socio-demographic characteristics namely age, ethnicity (Malay, Indian and Other Bumiputras), academic achievement and marital status (married). The younger age group understood the FL better than their older counterparts[13, 22]. This might explain that the younger respondents were exposed comprehensively to nutrition knowledge and dietary guidelines in the national education curriculum compared to the older generations in the previous school curriculum. High academic achievers, as expected, reported higher understanding of the information on the FL as a consequence of intellectual capability as evidenced by various studies[16,19,22,23,24]. A study on the

understanding of the Malaysian Dietary Guidelines (MDG) in 2010 showed that more than half of the respondents did not recognise the health messages presented in the MDG[25]. Unfamiliarity with the key messages in the MDG concluded that respondents were not aware of the basic nutrition information that has been disseminated by the Ministry of Health. Lack of knowledge on basic nutrition has been explained further in the consumer survey on the front-of-pack nutrition packaging by the AFIC study in China and Malaysia[11]. In this situation, the respondents will not be able to examine the right nutrient information on the label and apply it to their own health condition.

A study in the US reported almost one-third of their obese adults in the population read all nutrient information of the FL, as compared to only one respondent in this study[13]. The low prevalence of reading all information of the FL in Malaysia can be explained due to the unfamiliarity to the nutrient information and figures[16]. Hence certain nutrient information which was unfamiliar will not be read by the respondents.

Expiry date was the most popular information read by the adult obese population in Malaysia. This is parallel with other studies[17,23,24]. Reading the expiry date will only provide information on safety of food but does not guide respondents in choosing a low calorie food. Therefore, it would not help them to reduce weight. Some possible causes for this situation is lack of knowledge on the technical terms and negligence of certain nutrient information that they perceived as not important to their health[16]. This study demonstrated that total energy and salt were the least common information read by the respondents compared to other seven nutrients printed on the FL. Fat and carbohydrate / sugar information also were not prioritised as being important by the respondents. Hence the information was not used by the respondents in aiding them to correctly select the right food to reduce weight. This situation was in contrast with the European consumers who looked in detail for calories, fat and sugar information before choosing packaged foods[17,26,27].

Systematic review studies in European countries reported that consumers claimed to read FL. However, this may be an over-report to suit socially desirable expectations where the respondents might want to present a good image of them during commencement of the study. Hence, they comply to acceptable values and answer to what they think the researcher expects[13,17,27]. A self-reported study might produce an over reporting result of 50% compared to an observational study[28]. As this is a self-reported study which did not involve a real situation of reading nutrition labels during purchase, it may not represent the real situation of reading labels among the obese

population. The level of nutrition knowledge and competence in understanding information were not assessed. Thus, the results might show high scores in understanding compared to the actual capacity of the respondents. Hence, it may not represent the real figures of understanding labels among the obese population.

CONCLUSIONS

This study showed that the obese population in Malaysia reported to read and understood the nutrition label but did not concentrate on macronutrients related to their health condition. Types of labels read have not been prioritized to the macronutrients that contribute calories. Therefore, this is important information for the policy makers to instill awareness and to plan obesity intervention programmes among the relevant socio-demographic characteristics such as ethnicities, education levels, residential areas and genders among the obese population in Malaysia. More nutrition research projects implementing an objective approach are needed to discover the actual readers and their level of understanding of the label.

ACKNOWLEDGEMENT

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