SOCIO-DEMOGRAPHIC CHARACTERISTICS, NUTRITIONAL STATUS, AND RED MEAT INTAKE ON BLOOD CHOLESTEROL LEVEL AMONG STAFFS IN UNIVERSITI SAINS MALAYSIA, KELANTAN

By

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ABSTRAK

Umumnya, tahap kolesterol darah yang tinggi dikaitkan dengan risiko penyakit jantung. Satu kajian keratan rentas telah dijalankan dengan objektif utama untuk menentukan faktor yang berkaitan dengan tahap kolesterol darah dalam kalangan kakitangan di Kampus Kesihatan, Universiti Sains Malaysia. Seramai seratus orang kakitangan telah mengambil bahagian dalam kajian ini dengan menggunakan persampelan mudah yang melibatkan tiga Pusat Pengajian di USM Kampus Kesihatan. Satu soal selidik yang merangkumi ciri sosio-demografi, sejarah perubatan, pengukuran antropometri, petunjuk biokimia dan pengambilan daging merah telah digunakan untuk mengkaji responden dan seterusnya data dianalisis. Jantina dalam kajian ini terdiri daripada 40 lelaki dan 60 perempuan. Julat umur responden adalah daripada umur 23 ke umur 59 manakala median umur untuk responden adalah 35 tahun. Paras kolesterol darah dibahagikan kepada dua kumpulan iaitu kumpulan sihat (<5.2mmol/L) and kumpulan berisiko/berisiko tinggi (≥5.2mmol/L). Julat umur (18 ke 39) tahun dan julat umur (40 ke 59) tahun mempunyai 59.7% dan 36.8% paras kolesterol darah sihat dengan perkaitan yang signifikan antara julat umur dan paras kolesterol darah (χ^2=4.916, p=0.027). Selain itu, kumpulan BMI yang normal mempunyai 66.7% responden mencapai paras kolesterol sihat manakala kumpulan kurang berat badan, berat badan berlebihan dan obese mempunyai 39.7% mencapai paras kolesterol sihat dengan perkaitan yang signifikan antara BMI dengan paras kolesterol darah (χ^2=7.112, p=0.008). Selain itu, kumpulan tekanan darah sihat mempunyai 60.8% responden mencapai kolesterol darah sihat manakala 40.8% responden

daripada kumpulan hipotensi, pra-hipertensi dan hipertensi mencapai paras kolesterol darah sihat dengan perkaitan yang signifikan antara paras tekanan darah dengan paras kolesterol darah (χ^2=3.987, p=0.046). Di samping itu, kumpulan yang makan daging merah setiap hari atau setiap minggu menunjukkan 65.0% responden mencapai paras kolesterol darah sihat berbanding dengan 51.0% daripada kumpulan yang makan daging merah setiap bulan, kurang makan dan tidak makan mempunyai paras kolesterol darah sihat dengan perkaitan yang signifikan antara permakanan daging merah dan paras kolesterol darah (χ^2=5.229, p=0.022). Oleh itu, penyelidikan di masa depan dan kajian lanjutan diperlukan untuk mendapatkan pemahaman yang lebih jelas mengenai hubungan antara faktor tersebut dengan paras kolesterol darah.

ABSTRACT

In general, high blood cholesterol level is related with the risk of heart diseases. A cross-sectional study was carried out with the main objective of determine the factors associated with blood cholesterol level among staffs in Health Campus, Universiti Sains Malaysia. A total of hundred staffs were recruited in this study by using convenient sampling whereby three schools of USM in Health Campus were included. A questionnaire which includes socio-demographic characteristics, medical history, anthropometric indicators, biochemical indicators and red meat intake was used to survey the respondents and data were analyzed. The gender distribution for this study was 40 male and 60 female respondents. The age range for these respondents was from 23 to 59 years whereas the median age for these respondents was 35 years old. Blood cholesterol level was break into 2 categories which were healthy range (<5.2mmol/L) and slight risk/high risk range (≥5.2mmol/L). Age group 18 to 39 years and age group 40 to 59 years had a total of 40.3% and 63.2% of slightly risk or high risk blood cholesterol respectively with the significant association between age group and blood cholesterol level (χ^2=4.916, p=0.027). Besides, normal BMI group had 66.7% of respondents achieved healthy blood cholesterol level whereas underweight, overweight and obese group had 39.7% achieved healthy blood cholesterol with the significant association between BMI and blood cholesterol level (χ^2=7.112, p=0.008). Furthermore, normal blood pressure group had 60.8% of respondent achieved

healthy blood cholesterol whereas 40.8% of respondents from hypotension, prehypertension and hypertension group had achieved healthy blood cholesterol level with a significant association between blood pressure level and blood cholesterol level (χ^2=3.987, p=0.046). Moreover, daily or weekly red meat intake group shown 65.0% of total respondents had a healthy blood cholesterol level compared to 51.0% of monthly, rare, or none red meat intake group which achieved healthy blood cholesterol level with a significant association between red meat intake and blood cholesterol (χ^2=5.229, p=0.022). Therefore, further investigation and future studies are needed to gain a clearer understanding of the association between these variables and blood cholesterol level.

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LIST OF ABBREVIATIONS

Abbreviations	Terms
AHA	American Heart Association
BMI	Body Mass Index
FFQ	Food Frequency Questionnaire
LDL	Low-lipoprotein
NHMS	National Health and Morbidity Survey
USM	Universiti Sains Malaysia
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

1.1 Introduction

Cholesterol volume which is too much will accumulated in blood vessels and form plaque. Over time, plaque cause narrowing of the arteries that block blood from the heart to other parts of the body. Plaque with thin covering raptured and releasing fat and cholesterol into bloodstream which cause blood to clot and block the flow of blood .

Table 1-1 Total cholesterol level category

Total Cholesterol Level	Total Cholesterol Category
Less than 5.2mmol/L	Desired-normal
5.2-6.2mmol/L	Slightly risk
6.2mmol/L and above	Highly risk

(Source: Mayo Clinic)

Cholesterol levels are measured in millimole of cholesterol per liter of blood. The desirable total cholesterol level is less than 5.2mmol/L. According to National Health And Morbidity Survey conducted by Institute of Public Health in year 2011, 6.2 million

of adults which is 35.1% of total adults who aged 18 years and above have hypercholesterolemia. From that, 8.4% are known to have hypercholesterolemia and 26.6% are previously undiagnosed with hypercholesterolemia. The prevalence of hypercholesterolemia in Kelantan was higher than the national prevalence. Kelantan was conducted a population based cross sectional study in 2006 which a total of 1946 subjects in Kelantan aged 18 years and above underwent blood cholesterol measurement. Throughout the cross sectional study, the prevalence of hypercholesterolemia was significantly lower in the urban area compared to rural areas. The mean total cholesterol level in Kelantan had been calculated throughout the study and it was 4.81mmol/L which is 186.0 mg/dl (Ahmad Faris Bin Hj. Awang, 2008).

The aim of this study is to determine the consumption of the red meat associated with blood cholesterol level. The major focus will be on the blood cholesterol level which affected by anthropometric indicators, biochemical indicators and dietary pattern

1.2 Problem statement

The anthropometric measurement is important to determine blood cholesterol level. The anthropometric measurement which consists of body mass index (BMI) is important in the association of red meat consumption and blood cholesterol level. Body mass index is a good predictor of hyperlipidemia (Kawada, 2002). The individual that practice vegetarian diet tend to have lower risk of cardiovascular disease and the mortality from cardiovascular disease to be lower among vegetarians in large prospective studies (Phillips, 2005). The comparison in BMI between vegetarian and meat-eater show that the meat eater has the higher BMI than those vegetarian (Williamson et al., 2005). This has been found in both men and women and in all age groups which show that the vegetarians have lower level of obesity compared with meat-eaters (Key et al., 1999).

On the other hand, biochemical data which is blood pressure measurement is also important in determining the blood cholesterol level. The normal blood pressure will indicate the lower blood cholesterol level and reduce the risk of chronic disease such as cardiovascular disease. High blood pressure which is 140/90 mmHg or higher will increase number of low-density-lipoprotein in our body.

For dietary pattern, meat and meat product are important to us as they contribute a number of essential nutrients such as protein, long-chain omega 3 fatty acids, iron, zinc, selenium, vitamin D and vitamin B12. Some of the nutrients above are more bioavailable

in meat than other food sources (Williamson et al., 2005). Meat has great potential for delivering important nutrients into the diet. However, the consumption of meat could lead to increased intake of cholesterol and saturated fatty acids which are thought to have an adverse effect on cardiovascular health (R. Brown, 1982). The meat contains the fat which originated from the inter-muscular fat (between muscles), intramuscular fat (within muscles) and subcutaneous fat (below skin). The type of red meat, the cut and the degree of trimming determine the fat content of red meat. It is insufficient to reduce the risk of disease by reducing the meat consumption unless the complete dietary balance is addressed (McAfee et al., 2010). The calculation of overall fatty acid composition of the diet is more important than the calculation for meat content fat alone when investigating the contribution of fat intake from meat consumption (McAfee et al., 2010)

In conclusion, all aspects need to be counted in order to determine the association between red meat consumption and blood cholesterol level. The anthropometric data, biochemical data and dietary pattern are important fields to determine the blood cholesterol level.

1.3 Significant of Study

Malaysians suffering from hypercholesterolemia had increased drastically from 20.7% in 2006 (NHMS III) to 35.1% in 2011. Data on blood pressure level and dietary factors can also be identified from this study.

Furthermore, the factors (socio-demographic characteristics, anthropometric indicators, biochemical indicators and red meat intake) contributing to blood cholesterol level among staffs in Health Campus, Universiti Sains Malaysia can be identified, hence enable for the better understanding on proper management in slightly risk or high risk blood cholesterol level.

1.4 Research Objectives

1.4.1 General Objective

To determine socio-demographic characteristics, nutritional status and red meat intake associated with blood cholesterol level among staffs in Health Campus, Universiti Sains Malaysia.

1.4.2 Specific Objectives

1. To determine the socio-demographic characteristics, medical history, anthropometry indicators (BMI), biochemical indicators (blood pressure level), and red meat intake among staffs in Health Campus, Universiti Sains Malaysia.
2. To identify the blood cholesterol level of staff in Health Campus, USM.
3. To determine the association between socio-demographic characteristics, medical history, anthropometry indicators (BMI), biochemical indicators (blood pressure level), and red meat intake with blood cholesterol level.

1.5 Hypothesis

1.5.1 Null hypothesis

1. There were no significant differences in mean socio-demographic characteristics, medical history, anthropometry indicators (BMI), biochemical indicators (blood pressure level), and blood cholesterol level between male and female respondents.
2. There were no significant association between socio-demographic characteristics, medical history, anthropometry indicators (BMI), biochemical indicators (blood pressure level), and food intake with blood cholesterol level.

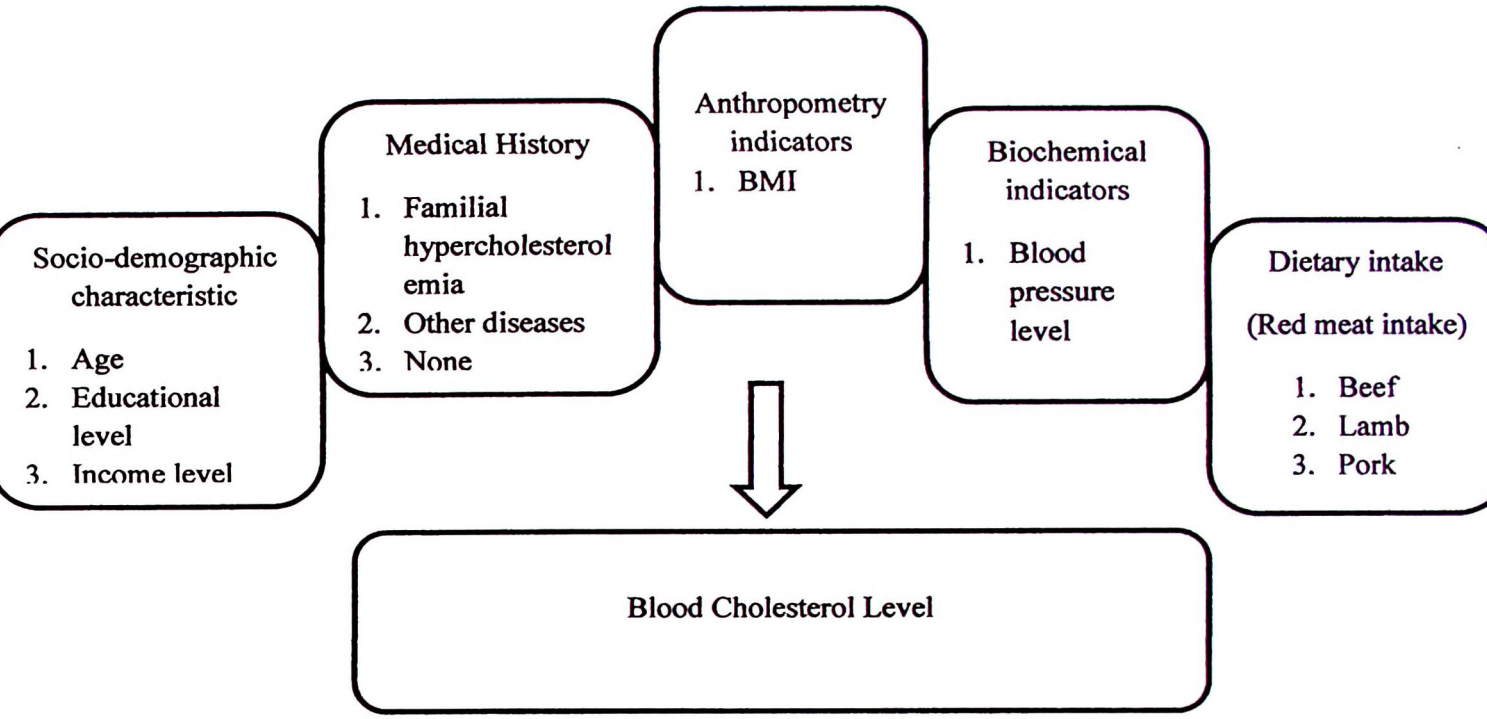
1.5.2 Alternate hypothesis

1. There were a significant differences in mean socio-demographic characteristics, medical history, anthropometry indicators (BMI), biochemical indicators (blood pressure level), and blood cholesterol level between male and female respondents.
2. There were a significant association between socio-demographic characteristics, medical history, anthropometry indicators (BMI), biochemical indicators (blood pressure level), and food intake with blood cholesterol level.

1.6 Research Questions

1. What is the nutritional status of staffs in Universiti Sains Malaysia?
2. What are the relationship between socio-demographic characteristics, medical history, anthropometry indicators (BMI), biochemical indicators (blood pressure level), and food intake with blood cholesterol level?
3. What are the factors determining the blood cholesterol level among staffs in Universiti Sains Malaysia?

1.7 Conceptual Framework



Source: (Khor, 2012; Tan, Dunn, Samad & Feisul, 2011)

Figure 1-1 Conceptual framework

This is the conceptual framework for the study. In this study, socio-demographic characteristics, medical history, anthropometric indicators, biochemical indicators and red meat intake were determined the association with blood cholesterol level.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Nowadays, chronic diseases or also called as non-communicable diseases arise and become one of the killer diseases in Malaysia. According to Statistics on Causes of Death that based on death records from National Registration Department top chronic diseases that cause death in Malaysia are cardiovascular diseases, stroke, cancer, respiratory diseases and chronic kidney disease (Qin, 2013).

2.2 Risks to Health

2.2.1 Cardiovascular Disease

Cardiovascular disease is a leading cause of mortality and morbidity in developed and developing countries including Malaysia (WHO, 2000). The incidence of atherosclerosis is associated with the level of circulating cholesterol and level of saturated fats in the diet with such the higher serum cholesterol levels and higher level of saturated fatty acids lead

to the higher the incidence of atherosclerosis and higher level of cholesterolaemia (Keys et al., 1950). Saturated fatty acids increased low-density lipoprotein (LDL) cholesterol levels in the plasma and thus increase cardiovascular disease risk while polyunsaturated fatty acids decrease LDL cholesterols (Whitney & Rolfes, 2007). People consumes more meat have been found to possess both higher intakes of cholesterol and low-density lipoprotein cholesterol and triglycerides than vegetarians, vegans or moderate or low meat consumption (Li et al., 1999).

Recently, it is well recognized that different fatty acids have different effects on blood cholesterol levels, some beneficial and some adverse. Therefore, it is important to consider the fatty acid profile of a food (Williamson et al., 2005). The main saturated fatty acids (SFAs) present in red meat are palmitic acid and stearic acid. Myristic acid which is thought to increase cholesterol level more potently than palmatic acid is present in minor amount in red meat. The stearic acid appears to be no effect in cholesterol levels although it is one of the SFAs. Meat contains small amount of long chain omega 3 poly unsaturated fatty acids (PUFAs) such as eicosapentaenoic acid (EPA), docosapentaenoic acid (DPA) and docosahexanenoic acid (DHA) which have potential benefits in relation to heart health especially in those who have already had heart attack in few studies (Williamson et al., 2005).

The fat content of meat can be modified through preparation methods and cooking. For example, the consumer can reduce the amount of fat by trimming the fat off meat and this definitely decrease the amount of fat content from the red meat. Besides, grilling or dry-frying can result in fat losses compared to those meat sitting in the fat used for frying or deep frying which will increase the fat content from meat product (Clausen & Ovesen, 2005).

The foods that replace meat in a vegetarian diet such as legumes, soy product, nuts and vegetables; are actually protective against cardiovascular disease (Williamson et al., 2005). There is some laboratory studies shown that the different types of fatty acids in diet may influenced the blood cholesterol level such as blood level of LDL-cholesterol are lowered when some SFAs are replaced by MUFAs, PUFAs and carbohydrate (Williamson et al., 2005).

Some cohort studies have shown an association between high meat intake and increased cardiovascular disease risk but most of these combined meat intake from all sources and the different types of meat have not been distinguished such as lean, untrimmed and processed meat.

In summary, dietary fats have the effects on blood cholesterol levels which being regarded as an important influence on cardiovascular disease (Williamson et al., 2005).

2.2.1.1 Hypertension

Hypertension can be defined as blood pressure exceeds 140mm Hg / 90 mm Hg which measured while at rest. Meanwhile in Malaysia, 32.7% of adults which is 5.8 million people with 18 years and above have hypertension according to National Health and Morbidity Survey in year 2011. Out of the 32.7% adults, 12.8% are known to have hypertension while 19.8% are previously undiagnosed with hypertension.

Table 2-1: Hypertension according age group

	NHMS I (1986)	NHMS II (1996)	NHMS III (2006)	NHMS 2011
Age Group	≥25 years	≥30 years	≥30 years	≥18 years
Hypertension	14.4%	32.9%	42.6%	32.7%

(Source: National Health and Morbidity Survey, 2011)

Based on the National Health and Morbidity Survey conducted among 1986 to 2006, we can see hypertension in adult group increasing from year to year.

Hypertension is an important modifiable risk factor for cardiovascular disease stated by Nor Azian Abd Aziz. Long term elevation of blood pressure will leads to hypertension while long term of hypertension leads to increase the chance of stroke, heart attack, arterial aneurysm and kidney failure (Decker & Park, 2010). Lean meat has a lower content of sodium compare to meat products and processed meats which the

sodium is added to the processed meat to enhance and modify the flavor and contribute to the preservative of the product (Matthews & Strong, 2005).

2.2.2 Diabetes Mellitus

Diabetes mellitus is a common disease causing significant mortality and morbidity which is a serious debilitating and deadly disease that has now reached epidemic proportions and the prevalence rates are expected to go even higher in the foreseeable future (Mafauzy, 2006).

Table 2-2: Diabetes according to age group

	NHMS I (1986)	NHMS II (1996)	NHMS III (2006)	NHMS 2011
Age Group	≥25 years	≥30 years	≥30 years	≥18 years
Diabetes	6.3%	8.3%	14.9%	15.2%

(Source: National Health and Morbidity Survey, 2011)

High intake of sugar among Malaysians is one of the contributing factors to the high incidence of diabetes which also causes obesity. Diabetes prevalence rate in Malaysia has risen much faster than expected and almost doubling in magnitude over the last decade. National Health And Morbidity Survey in year 2011 stated that 2.6 million of adults which is 18 years and above have diabetes. 7.2% are known to have diabetes and 8.0% are previously undiagnosed with diabetes.

There are many studies that demonstrated that diabetes mellitus is an independent risk factor for cardiovascular disease and it further increases the effects of other common risk factors such as hypertension and hypercholesterolemia (Almdal et al., 2004). The Health Professionals Follow-up Study had shown the large cohort of male participants that frequently consume processed meat was associated with a higher risk of type 2 diabetes; however, there was no significant association with red meat. There are some results of cohort studies suggest that the frequent consumption of processed meat may increase the risk of developing type 2 diabetes; however, there is less evidence that show the relation between type 2 diabetes and red meat intake (Williamson et al., 2005).

2.3 Nutritional Status and Dietary Pattern

2.3.1 Nutritional Status

In developed and developing countries, the prevalence of obesity is increasing and it is estimated that more than 1.1 billion adults worldwide are overweight, and 312 million of them are obese. In Malaysia, data from National Health and Morbidity Survey which conducted in 2011 show that 33.3% adults (5.4 million) are pre-obese and 27.2% adults (4.4 million) are obese.

Table 2-3: Overweight and obesity according to NHMS

	NHMS II (1996)	NHMS III (2006)	NHMS 2011
Overweight (BMI 25-30kg/m^2)	16.6%	29.1%	33.3%
Obesity (BMI > 30kg/m^2)	4.4%	14.0%	27.2%

(Source: National Health and Morbidity Survey, 2011)

According to the National Health and Morbidity Survey, we can see number of overweight and obesity from year 1996 to year 2011. The number of obesity increase almost 2 fold from 2006 to 2011 and this show the seriousness of obesity in Malaysia. The risk of obesity among Malaysian adults is higher among women and those with lower education and family history of illness such as hypertension, diabetes, and cardiovascular disease. Based on a national survey, obesity prevalence was significantly higher in females. Besides, Malays and Indians have higher prevalence compared with Chinese (Khor, 2012).

Individual socio-demographic such as ethnicity, gender, education level and health-lifestyle such as family history of illness and smoking status characteristics are found to be important determinants of obesity risks in Malaysia (Tan et al., 2011).

2.3.2 Dietary Pattern

Education, race, age and gender are the various factors on the meat selection and consumption behaviors (Daniel et al., 2011). The proportion of red meat with white meat consumed both at home and away from home is affected by consumer's knowledge and awareness of diet and health according to previous reports. On the other hand, pattern of meat intake and overall consumption different within the population according to various demographic factors, reflecting cultural, social, regional and financial influences on diet (Daniel et al., 2011). The demand of meat usually would be increased with economic growth but at the highest levels of socio-economic status, individual intake has tended to level off and even decline. By the age and education increasing, awareness of health and adoption of dietary practices for preventing or management of chronic disease cause the lower meat intake, particularly red and processed meat.

There is some studies show that the lower education and lower occupation independently contribute to determining differences in dietary habits. From the studies, we found that the men from lower socioeconomic position tend to consume less fish and vegetables but more carbohydrates, table sugar and alcohol. On the other hand, women from lower socioeconomic groups tend to consume less fish and vegetables but more meat, table sugar and carbohydrates. Educational level determines the occupation and jointly with occupation they determine the income level. The health-related behaviors can be predicted by education and occupation. The occupation level is a measure of social prestige which determines the differential exposure to environmental risk factors and to

psychological stress. For example, the people with higher educational level may have broader knowledge about diet and health and will probably choose healthier meals at restaurants with colleagues who might also be more predisposed towards healthier habits (Galobardes et al., 2001). In conclusion, education helps individuals to choose healthier lifestyles by improving their knowledge of the relationship between health behaviors and health outcomes (Tan et al., 2011). Respondents that came from lower occupational status consume higher energy intakes, higher contributions of energy from total, saturated and monounsaturated and refined sugars and a higher density of cholesterol in the diet (Smith & Baghurst, 1992).

Meat is being defined in variety of studies and not all studies define the same. Red meat is defined as the meat which is red in color when raw and not white in color when cooked. In general, red meat refers to beef, veal, pork and lamb which are in fresh, minced and frozen state. People might misunderstand and categorized the processed meat as one of the red meat however according to the definition; the processed meat includes meat that has been preserved by methods other than freezing such as salting, smoking, marinating, air-drying or heating. The examples of processed meat are ham, bacon, sausages, hamburgers, salami, corned beef and tinned meat (Linseisen et al., 2002).

Meat contributes a significant portion of the normal diet which 15% to daily energy intake, 40% to daily protein intake and 20% to daily fat intake (Daniel et al., 2011). The consumption of red meat associated with high biological value protein and important micronutrients which are essential for good health throughout life. The adequate amount of meat together with carbohydrate, plenty of fruits and vegetables and

moderate amounts of milk and dairy food contribute to the healthy balanced diet (Williamson et al., 2005) .

On the other hand, despite the presence of a number of potentially protective nutrients such as selenium, omega-3 fatty acid and vitamin B, meat is normally related with the risk of heart disease with its relatively high fats and high content of saturated fatty acids (Williamson et al., 2005). The consumption of red meat associated with high biological value protein and important micronutrients which are essential for good health throughout life.(Li et al., 1999). The level of cholesterolemia is related to the level of saturated fat in the diet (Kritchevsky et al., 1954).

CHAPTER 3

METHODOLOGY

A study titled "Effect of red meat consumption on health among staffs in Health Campus, Universiti Sains Malaysia. Procedures and methods for data collection are listed below.

3.1 Study design & sampling

This was a cross-sectional analytical study designed to identify factors associated with blood cholesterol level among staffs in Health Campus, Universiti Sains Malaysia. The data collection was conducted from 3rd March 2015 until 11st March 2015. USM Health Campus is selected to be the study location because the study sample is adequate and convenient to carry the measurements. The work flow of the recruitments of subjects was shown in the Figure 3.1.

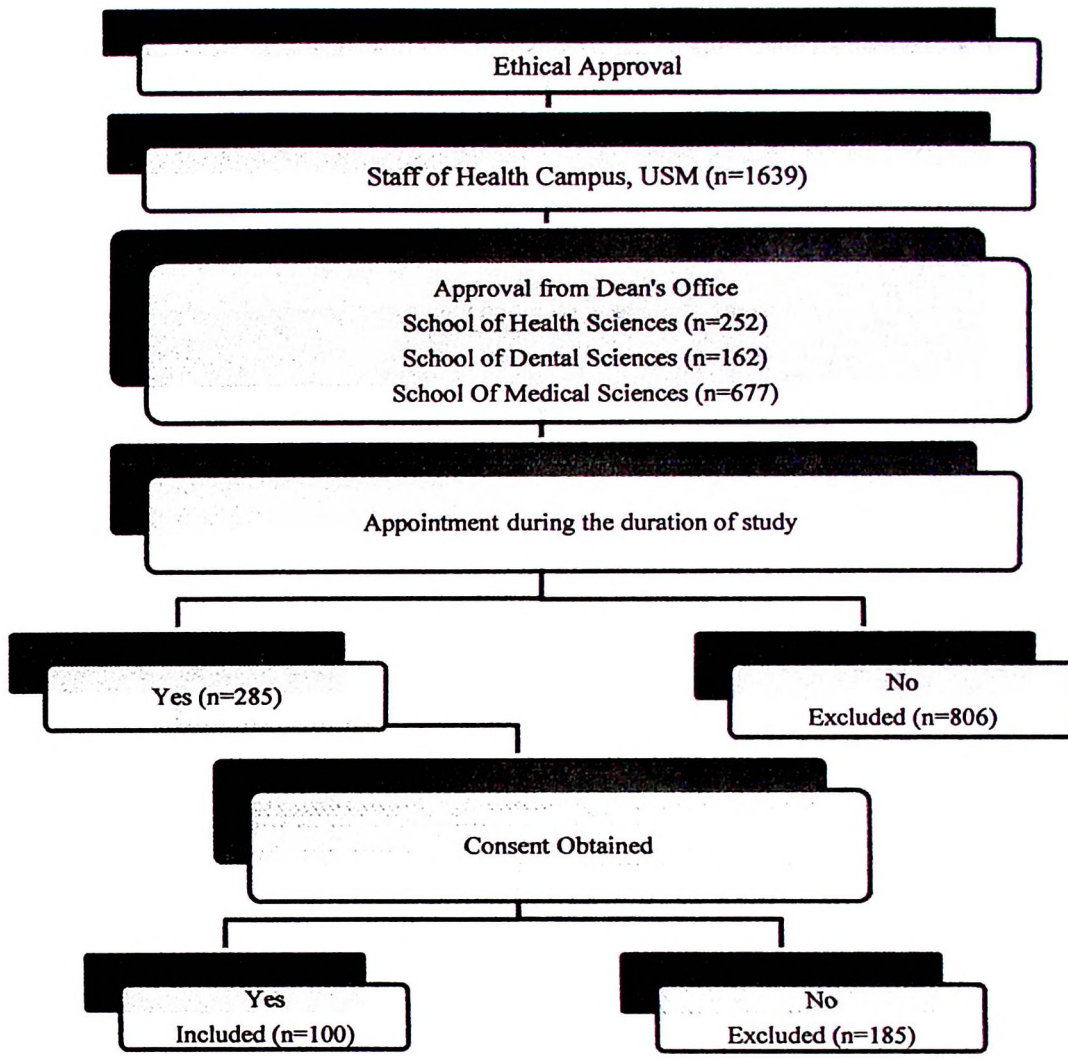


Figure 3-1: Flow of subject recruitment

3.2 Study location

All subjects were recruited from USM Health Campus, Kelantan. The School of Health Sciences, School of Dental Sciences and School of Medical Sciences were chosen as the site of investigation. There were around 1091 staffs at these three schools during the data collection.

3.3 Subjects

The staffs' name lists are acquired from the Public Relation Officer in Health Campus. Subjects who fulfilled the inclusion criteria were listed and convenient sampling was used to recruit the subject into the study. Application letters to conduct this study were sent to Dean's office of 3 schools (Appendix A). Besides, ethics approval was obtained from the Human Research Ethics Committee USM (HREC) (Appendix B). The study subjects were given both oral and written explanation through the subject information sheet and written explanation through the subject information sheet and written informed consent was obtained from each subject before enrollment into the study.

The inclusion criteria for the study subjects were as below:

- Aged 18-59 years old
- Physically and mentally healthy
- Agreed to join this research

The exclusion criteria for the study subjects were as below:

- Vegetarian
- Not staff of Health Campus, USM

3.3.1 Sample size calculation

Sample size is calculated according to the formula (Krejcie and Morgan, 1970)

$$S = \frac{X^2 NP(1-P)}{d^2(N-1) + X^2 P(1-P)}$$

S = Required sample size

X^2 = The table value of chi square for 1 degree of freedom at the desired confident level (3.841)

N = The population size

P = The population proportion (assumed to be 0.50 since this would provide an adequate sample size)

d = The degree of accuracy expressed as a proportion (0.05)

Based on the number of respondent from School of Health Science, School of Medical Sciences and School of Dental Sciences, the sample size calculated is 285 with a confidence interval of 95%

$$S = \frac{X^2 NP(1-P)}{d^2(N-1) + X^2 P(1-P)}$$

$$= \frac{(3.841)(1091)(0.50)(1-0.50)}{(0.05^2)(1091-1)+(3.841)(0.50)(1-0.50)}$$

$$= 284.3$$

Hence, with rounding, 285 staffs from these 3 schools are recruited in this study. The ratio of each school and gender are calculated.

Table 3-1: Total number of staffs in 3 schools

	Male	Female	Total	Proportion
School of Health Sciences	98	154	252	23%
School of Medical Sciences	332	345	677	62%
School of Dental Sciences	67	95	162	15%
Total	497	594	1091	100%