Medical Surveillance on the Staff of UiTM Pahang

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ABSTRACT

The phase one of structured and continuous medical surveillance programme was conducted on all staff of Universiti Teknologi MARA (UiTM) Pahang. The main objectives of the surveillance are to inculcate a healthy lifestyle and monitor the health risks among the staff of UiTM. A total of 325 staff (65%) participated in this programme. It was held at the Medical Unit of UiTM Pahang from 5th to 26th June 2007. The findings reveal that 47 participants (14%) were obese while 154 (48%) were overweight. A total of 210 participants (64.6%) had the cut off point of systolic pressure 140mmHg or more and diastolic pressure 90 mmHg or more. Diabetes with fasting glucose 7.9mmol/l or more was detected in 15 participants (6.6%). 67 or 45% of the participants were found to have elevated fasting cholesterol of 5.2 mmol/l or more. 5 participants (17%) were found to have significantly abnormal ECG. All participants detected to have health problems and illness were

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counseled and treated accordingly, and some were referred to the appropriate disciplines for further management.

Keywords: *chronic disease, healthy lifestyle, medical surveillance, prevalence*

Introduction

Globally, many countries irrespective of their stage of economic development and demographic transition, face an increasing burden of chronic diseases such as coronary artery disease, hypertension, cancer and diabetes mellitus. In 1999, chronic diseases were estimated to be responsible for almost 60% of deaths in the world and 43% of the global burden of disease (World Health Organization, 2000). In Malaysia, chronic diseases are becoming the major causes of hospital admission and death. For examples, deaths due to coronary artery disease increased from 32.7% to 38.3% during 1965 to 1989 (Zainal et al., 2002, p 5), prevalence of diabetes mellitus has been steadily increased from 2% in 1982 to 8.3% in 1996 (Institut Kesihatan Umum, 1997) and chronic diseases are accounted for 71% of all deaths in 2002 (The Impact of Chronic Disease in Malaysia, n.d.).

To curb this increase, there is an urgent need to implement a medical surveillance system to gather information on the magnitude of the problem and identify those who are at risk so that structured prevention and treatment programmes can be developed. Quantified goals should be established within a given timeframe so that assessment of progress towards these goals can be evaluated.

Malaysia has taken the initiative to conduct its first NCD (non-communicable disease) Surveillance in 2005/2006 whereby a broad range of information on the socio-demographic status and NCD risk factors of people aged 25-64 years was gathered by using the WHO Stepwise Approach (STEPS) (Malaysia non-communicable disease surveillance 2005/2006, n.d.).

The Survey

The Medical Unit of Universiti Teknologi MARA (UiTM) Pahang has also taken the step to organise a structured medical surveillance

programme among its staff during the semester break in June 2007. Among the objectives of this programme are to:

i. assess and promote health awareness among the staff of UiTM Pahang,
ii. determine the prevalence of chronic medical diseases and their risk factors,
iii. identify health problems among the staff of UiTM Pahang,
iv. to advise, counsel, treat and/or refer staff detected to have risk factors and/ or health problems so that their level of health is improved, and
v. to promote a healthy lifestyle by means of one to one consultation, various booklets and poster exhibitions.

Methodology

The medical surveillance was conducted at the Unit Kesihatan (Medical Unit) UiTM Pahang. All staff were invited to participate in the programme through e-mail and/or letter of invitation. Although a designated period of time was allocated to different groups of staff (as shown in Table 1), they were welcome to participate in the survey at any time during office hours during the semester break in June 2007.

Table 1: Groups of Staff and their Designated Time for Medical Surveillance

Staff Group	Designated Time
Transportation	5/6 - 8/6/2007
Non-academic	11/6 - 15/6/2007
Academic	18/6 - 22/6/2007

Data was collected by using a structured continuous medical surveillance form comprising of socio-demographic data, occupational history, past medical and family history of coronary artery disease, hypertension and diabetes. All participants were screened for height, weight, basal metabolic rate (BMI), visual test and blood pressure. Screening for diabetes, coronary artery disease and/or hyperlipidaemia were carried out selectively if any of these criteria was found to be present:

For Diabetic Screening

i. Any symptom of diabetes mellitus (polyuria, polydipsia, lethargy, weight loss)
ii. Obesity (BMI > 30)
iii. Family history of diabetes
iv. History of gestational diabetes
v. History of hypertension
vi. Age >35 years old

For Coronary Artery Disease and Hyperlipidaemia Screening

i. Age >45 years old
ii. History of hypertension and/or diabetes
iii. Family history of coronary heart disease
iv. Obesity (BMI >30)
v. Anyone who has symptoms of heart disease (chest pain at rest or exertion associated with shortness of breath)
vi. Present and chronic cigarette smoker

Participants who had any of the criteria above were requested to fast overnight so that fasting glucose and/or total cholesterol could be checked accurately the following morning. Electrocardiograph (ECG) is performed to screen the coronary artery disease. Data were collected and analysed by using 'tally' system and Microsoft Excel in the computer.

Results

The data show that only 65% or 325 of the total UiTM staff volunteered in the medical surveillance programme. The socio-demographic data reveal that all the participants were ethnically Malays except for one. The following section reports the findings of the survey under six different areas of examination.

Body Mass Index (*BMI*)

Table 2 shows the Body Mass Index of the participants.

Table 2: Body Mass Index of Participants

BMI Level	Condition	Number of Participants
<18.5	Underweight	10 (3%)
18.5-24.9	Desirable	114 (35%)
25-29.9	Overweight	154 (47%)
>30	Obese	47 (14)

From the table, it can be seen that a total of 201 participants (62%) were detected to be either obese (47 or 14%) or overweight (154 or 48%). Only 114 or 35% of the participants had an ideal BMI. Meanwhile, 11 or 3% of the participants were underweight.

Blood Pressure

Table 3 shows the status of hypertension among the participants.

Table 3: Status of Hypertension of Participants

Hypertension	Systolic (mmHg)	Diastolic (mmHg)	Number of Participants
Normal	<140	<90	115 (35.4%)
Stage 1 (Mild)	140 - 159	90 - 99	192 (59.1%)
Stage 2 (Moderate)	160 - 179	100 - 109	12 (3.7%)
Stage 3 (Severe)	180 - 209	110 - 119	4 (1.2%)
Stage 4 (Very Severe)	≥ 210	≥ 120	2 (0.6%)

The data show that 35.4% of the participants were normotensive whilst the majority of them (64.6%) were hypertensive at different stages. 192 (59.1%) participants were found to have Stage 1 Hypertension, 12 (3.7%) were in Stage 2 Hypertension and 6 (1.8%) were in Stages 3 or 4 Hypertension.

Fasting Blood Glucose Level

Table 4 shows the fasting blood glucose level among the participants.

Table 4: Fasting Blood Glucose of Participants

Fasting Glucose Level	Reading (mmol/l)	Number of Participants
Low Blood Glucose	<3.9	11 (4.9%)
Optimal	4.0-7.8	200 (88.5%)
Sub-optimal	7.9-11.0	12 (5.3%)
High Blood Glucose	>11.1	3 (1.3%)

As can be seen from the table, the majority of the staff (88.5%) had optimal fasting blood glucose level. 5.3% or 12 staff were detected to have sub-optimal reading and 1.3% were found to have high blood glucose level. A few of the staff (4.9%) were noted to have low blood glucose level yet they did not show any feature of hypoglycaemia. Therefore, it was regarded as a normal variant.

Fasting Serum Cholesterol Level

Table 5 shows the serum cholesterol level among the participants.

Table 5: Serum Cholesterol Level of Participants

Reading (mmol/L)	Fasting Cholesterol Level	Number of Participants
< 5.2	Desirable	83 (55%)
5.2 - 6.2	Moderately Elevated	46 (31%)
6.2 - 7.8	Highly Elevated	19 (13%)
> 7.8	Severely Elevated	2 (1%)

The data reveal that 67 (45%) participants were detected to have high serum cholesterol level, 46 (31%) were moderately elevated, 19 (13%) were highly elevated, i.e. 6.2-7.8 mmol/L, and 2 (1%) were having severely elevated fasting serum cholesterol level (>7.8 mmol/L). The majority of the participants (55%) were having normal fasting cholesterol level.

Electrocardiogram (*ECG*)

30 participants were screened for coronary artery disease by means of ECG reading. The data reveal that 11 participants (36.7%) were found to have abnormal ECG reading, out of which 5 were significantly abnormal and warranted appropriate referral for further investigation. The other 6 were either variant or not significantly abnormal ECGs. The rest (19 or 63%) were found to have normal ECG reading.

Visual Defect

The screening of vision was performed by using Snellen chart on all participants. The results show that the majority of the participants (99.1%) had normal reading of 6/6, 6/6. 3 participants had reading of Snellen chart more than 6/12, 6/12. This was because 2 of them forgot to bring along their spectacles and another participant was in the process of getting new spectacles with appropriately adjusted power.

Discussion

Health awareness is crudely measured by the percentage of participants in the medical surveillance programme. The response rate of 65% in UiTM Pahang is lower compared to the response rate for Malaysia NCD Surveillance 2005/06 which was 84.6%. Although all staff had been informed about the programme either by e-mail or letter of invitation, there quite a number of them were not able to participate due to their work commitment during the designated period of the programme.

Overweight and Obesity

The prevalence of overweight among the participants of UiTM Pahang (48%) is higher compared to the national level (31.6%). However, the prevalence of obesity is about the same. It is 14% for UiTM Pahang compared to 16.3% for the whole Malaysia. It is estimated that 3.8 million and 2 million adults aged 25-64 years are found to be overweight and obese, respectively. The World Health Organization (WHO) projections indicate that, globally, in 2005, approximately 1.6 billion adults (aged 15 years and above) were overweight and at least 400 millions adult were obese (Overweight and Obesity, 2006).

Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health. Body Mass Index (BMI) is a simple index of weight-for-height that is commonly used in classifying overweight and obesity in individuals. It is defined as the weight in kilograms divided by the square of the height in metres (kg/m2). BMI provides the most useful population-level measure of overweight and obesity as it is the same for both sexes and for all ages of adults. However, it should only be considered as a rough guide because it may not correspond to the same degree of fatness in different individuals.

Table 6: Health Risks Associated with Increasing BMI

Metabolic syndrome	30% of middle-aged people in developed countries have features of metabolic syndrome
Type 2 diabetes	90% of type 2 diabetics have a body mass index (BMI) of >23 kg m^{-2}
Hypertension	▪ 5 × risk in obesity ▪ 66% of hypertension is linked to excess weight ▪ 85% of hypertension is associated with a BMI >25 kg m^{-2}
Coronary artery disease (CAD) and stroke	▪ 3.6 × risk of CAD for each unit change in BMI ▪ Dyslipidaemia progressively develops as BMI increases from 21 kg m^{-2} with rise in small particle low-density lipoprotein ▪ 70% of obese women with hypertension have left ventricular hypertrophy ▪ Obesity is a contributing factor to cardiac failure in >10% of patients ▪ Overweight/obesity plus hypertension is associated with increased risk of ischaemic stroke
Respiratory effects	Neck circumference of >43 cm in men and >40.5 cm in women is associated with obstructive sleep apnoea, daytime somnolence and development of pulmonary hypertension
Cancers	10% of all cancer deaths among non-smokers are related to obesity (30% of endometrial cancers)
Reproductive function	▪ 6% of primary infertility in women is attributable to obesity ▪ Impotency and infertility are frequently associated with obesity in men
Osteoarthritis (OA)	Frequent association in the elderly with increasing body weight – risk of disability attributable to OA equal to heart disease and greater to any other medical disorder of the elderly
Liver and gall bladder disease	▪ Overweight and obesity associated with non-alcoholic fatty liver disease and non-alcoholic steatohepatitis (NASH). 40% of NASH patients are obese; 20% have dyslipidaemia ▪ 3 × risk of gall bladder disease in women with a BMI of >32 kg m^{-2}; 7 × risk if BMI of >45 kg m^{-2}

The fundamental cause of obesity and overweight is an energy imbalance between calories consumed on one hand, and calories expended on the other hand. Global increases in overweight and obesity are attributable to a number of factors including.

i. a global shift in diet towards increased intake of energy-dense foods that are high in fat and sugars but low in vitamins, minerals and micronutrients.
ii. a trend towards decreased physical activity due to increasingly sedentary nature of many forms of work, changing modes of transportation and increasing urbanisation.

Overweight and obesity can lead to serious health consequences. Risk increases progressively as BMI increases. Risks and diseases associated with increasing BMI are summarised in Table 6 below (Kopelman, 2007).

Hypertension

The prevalence of hypertension among the participants (64.6%) is more than twice of the Malaysian's level which was 25.7%. It is estimated about 3.1 million adults aged 25-64 years have elevated blood pressure. The estimated number of known hypertensives and the newly diagnosed are 1.4 and 1.7 million, respectively. The National Health and Morbidity Survey in 1996 revealed 20% of general population had Stage 1, 8% had Stage 2 and 4% had Stage 3-4 hypertension (Lim et al., 2000). Comparatively 59.1% of the participants had Stage 1, 3.7% had Stage 2 and 1.8% had Stages 3-4 hypertension. The marked difference in Stage 1 hypertension between participants in UiTM Pahang and the general population raises important issues of the level of health awareness among the participants and their commitment to lead a healthy lifestyle. There is, however, a limitation in this data because the diagnosis of hypertension was based on two readings of blood pressure on the same day of medical surveillance. The initial elevated readings were planned to be confirmed on at least three more visits but due to compliance problem, the confirmation of diagnosis could not be made successfully.

Hypertension is defined as systolic blood pressure of 140 mmHg or greater and/or diastolic blood pressure of 90 mmHg or greater, or the taking of antihypertensive medication (Joint National Committee on Prevention, Detection, Evaluation and Treatment of High blood Pressure,

1997). The main aim of identifying and treating hypertension is to reduce the risk of cardiovascular disease and its associated morbidity and mortality (Table 7).

Table 7: Manifestations and Complications of Hypertension

Organ System	Manifestations and Complications
Cardiac	▪ Left ventricular hypertrophy ▪ Heart failure ▪ Coronary artery disease
Cerebrovascular	▪ Transient ischemic attack ▪ Stroke (haemorrhagic or infarct)
Renal	▪ Raised serum creatinine, ▪ Microalbuminaemia or proteinuria, ▪ Renal failure
Retinopathy	▪ Haemorrhage or exudates ▪ Papilloedema

Source: Hypertension Guidelines Working Group, 2002, p. 11).

Non-pharmacological management i.e. lifestyle modification plays an important role in the management of hypertension. It may be the only treatment necessary in Stage 1 hypertension. However, a high degree of motivation is required to sustain the benefits of non-pharmacological treatment. Table 8 below summarises the efficacy of non-pharmacological hypertensive management.

Table 8: Efficacy of Non-Pharmacological Hypertensive Management

Treatment	Intervention	Blood Pressure Reduction (mmHg)
Sodium restriction	Dietary advice- sodium intake (<1.25 teaspoons/day)	8-15 systolic 5- 6 diastolic
Relaxation	Relaxation Techniques	8-15 systolic 5- 6 diastolic
Weight loss	Diet and Exercise	9-27 mean arterial pressure
Exercise	Aerobic Exercise Programme	6-13 systolic 9-12 diastolic

Diabetes

The prevalence of raised fasting blood glucose among the participants of UiTM Pahang is lower compared to the Malaysian general population which is 6.6% and 11.0% respectively. It is estimated about 1.3 million Malaysia adults aged 25-64 years had high blood glucose. The estimated number of known diabetes and the newly diagnosed were 543,385 and 781,798 respectively. The absence of participants in the age group of 57-64 years might be the reason for the prevalence of raised fasting blood glucose among UiTM Pahang participants is almost half the national's prevalence. Another point worth considering is that the data in the present survey just show the percentage of the participants by each fasting glucose category. The well-controlled diabetic participants whose results of fasting blood glucose were within normal range would be categorised under the optimum group. This will lead to a lower prevalence of diabetic cases.

Diabetes is diagnosed if fasting blood sugar is >7.8 mmol/l and have diabetic symptoms or if postprandial blood sugar is >11.1 mmol/l on two separate occasions. Persistent uncontrolled diabetes leads to microvascular and/or macrovascular complications. Microvascular complications include i) Retinopathy which is a leading cause of cataract and blindness, ii) Neuropathy which causes foot ulcers and gangrene, and iii) Nephropathy which is a leading cause of kidney failure. Macrovascular complications are common in diabetes because of accelerated atherosclerosis. They include cerebrovascular, peripheral vascular and coronary artery diseases.

The risk of cardiovascular morbidity and mortality is higher in diabetic patients especially in women and those with proteinuria (even at the stage of microalbuminuria). Therefore, it is important to identify or aggressively treat cardiovascular risk factors where possible. Risk factors include smoking, hypertension, dyslipidaemia (increased triglycerides and LDL-cholesterol with low HDL-cholesterol), obesity and positive family history (The American Diabetes Association, 1997).

Hypercholesterolaemia

The prevalence of hypercholesterolaemia among the UiTM Pahang participants (45%) is lower compared to the general Malaysian population (53.5%). It is estimated about 6.4 million or 1 in 2 adults aged 25-64 years have hypercholesterolemia. The estimated number of known

hypercholesterolaemia and the newly diagnosed are 900,835 and 5.5 million respectively. Again, the prevalence is lower because there is no participants in the age group of more than 56 years old in the present survey.

High levels of total and LDL cholesterol greatly increase the risk of atherosclerosis, coronary artery disease, and stroke. High cholesterol levels following a heart attack increase the chance of a second heart attack. Lowering cholesterol by 1% reduces the risk of coronary artery disease by 2% (Boggs, 2001). The treatment of other modifiable risk factors such as smoking, hypertension, and diabetes will further decreases the risk of complications of hypercholesterolemia.

Conclusion and Recommendation

Medical surveillance is a valuable tool for assessing and managing the health of all staff in an organisation. Health awareness could be promoted widely and appropriate referral could be done for the abnormal cases. Continuous follow up should be planned at regular intervals of time so that the progress of health status of each staff can be monitored. By doing so, it is hoped that the health awareness and healthy lifestyle can be maintained among all staff of UiTM Pahang throughout their service period and beyond.

The relationship between all the risk factors and chronic medical diseases are best described as metabolic syndrome. It is defined as a set of abnormalities in which insulin-resistant diabetes (type 2) is almost always present and includes hypertension, hyperlipidemia (increased serum lipids, predominant elevation of LDL, decrease in HDL, and elevated triglycerides), central obesity, and abnormalities in blood clotting and inflammatory responses (Diabetes, 2005). A high rate of cardiovascular disease is associated with this syndrome. The incidence of metabolic syndrome is increasing rapidly worldwide due to many factors, but the most significant are the increasing incidence of obesity and the prevalence of sedentary lifestyles.

Undoubtedly unhealthy diet and physical inactivity are the two main preventable risk factors to their related chronic diseases. By doing a structured and continuous medical surveillance similar to the present one, it is hopes that at the individual level, each staff can i) achieve energy balance and a healthy weight, ii) limit energy intake from total

fats and shift fat consumption away from saturated fat to unsaturated one, iii) increase consumption of fruits and vegetables, as well as legumes, whole grains and nuts, iv) imit the intake of sugar and salt, and v) increase physical activity – at least 30 minutes of alternate moderate intensity activity on most days.

The Phase 2 of the medical surveillance is planned to be held in the following year to monitor progress of those who have risk factors such as overweight, obesity, elevated fasting cholesterol and glucose levels. They have been advised and counseled about healthy diet and regular exercise. Those who were referred to and on treatment will also be monitored on their compliances and progress. The future plan includes expanding the surveillance programme to the Kuantan and Raub campuses of UiTM Pahang so that all staff can benefit from this continuous medical surveillance.

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