ORIGINAL ARTICLE

Prevalence of Chronic Illness and Health Seeking Behaviour in Malaysian Population: Results from the Third National Health Morbidity Survey (NHMS III) 2006

N M Amal, MPH*, R Paramesarvathy, MPH, G H Tee, MMedSc(PH)***, K Gurpreet, MPH(Epid)***, C Karuthan, PhD******

*Medical Research Resource Centre, Institute for Medical Research, Malaysia, **Department of Health, Kuala Lumpur City Hall, Malaysia, ***Division of Epidemiology, Institute for Public Health, Malaysia, ****University Technology Mara, Malaysia

SUMMARY

The third National Health Morbidity Survey was conducted in 2006 on a nationally representative sample of population in Malaysia in order to obtain community-based data and information on the prevalence of chronic illness. Of 57,500 eligible respondents 56710 (98.6%) participated in the study. Estimated overall prevalence of chronic illness in the Malaysian population within a recall period of one year was 15.5% (95% CI 15.1% – 15.9%). Chronic illness was reported significantly higher among the females, 16.8% (16.3 – 17.3). The most common chronic illness was hypertension (7.9%, 7.6 – 8.2), followed by diabetes mellitus (4.0%, 3.8 – 4.2) and highest reported by the Indians (19.7%, 18.4 – 21.0). Among the respondents who had sought treatment for chronic illness from government health facilities, Malays (65.8%) and those with monthly household income of less than RM400 (76.6%) were the highest. Chinese (44.5%) and those with household income of RM5000 and above (54.3%) were the highest groups who sought treatment from the private health facilities. Most of the respondents reported mild illness was the main reason for not seeking treatment for their chronic illness. It is hoped that the results of this survey will help the Ministry of Health Malaysia to enhance health programmes and planning resource allocation in order to improve health status of the population.

KEY WORDS:
NHMS III Malaysia, Epidemiology of chronic illness, Cross-sectional study, Hypertension, Diabetes mellitus

INTRODUCTION

Chronic illnesses are the largest cause of death in the world. In 2002, four leading chronic illnesses namely cardiovascular disease, cancer, chronic lung diseases and diabetes mellitus caused 29 million deaths worldwide[1]. Diabetes mellitus is expected to affect 350 million people worldwide by 2030[2]. Cardiovascular diseases in particular, which mainly due to ischaemic heart disease and stroke are important causes of worldwide preventable morbidity and mortality[3,4]. Previous study shows that several chronic illnesses such as hypertension, diabetes mellitus and coronary artery disease are highly prevalent in the United States5. The USA National Health Interview Survey of 87,500 people of all ages conducted in 2009 indicates that the Americans are less healthy than 10 years ago which, 67% of Americans reported excellent or good health compared with 69% in 1997. More Americans than ever are obese, with only 19% in 1997 increased to 28% in the first half of 2009; diabetes mellitus increasing from 5% to 9% and asthmatic attacks rose from 3.9% to 4.4%[6]. In another study conducted among children in the USA, the prevalence of chronic health conditions increased from 12.8% in 1994 to 26.6% in 2006 particularly for asthma, obesity, and behavior and learning problems[7].

The population of Malaysia has doubled in the 18 year period between 1975 -2005 from 12.3 – 26.7 million and an increase of 8.3% to 28.96 million is expected between 2005 – 2010. The Malaysian Population and Census conducted in 2000 shows that urban areas are expected to grow at a higher rate (9.5%) as compared to non-urban (6.1%)[8]. Consistent with these changes there were health transitions both demographically and epidemiologically and hence associated with the changes in prevalence of chronic illnesses. Chronic medical conditions are on the rise among many Malaysians. The prevalence of diabetes mellitus in Malaysia was reported to be 0.65% in 1960, 2-4% in the early 1980s and rose to 8-12% in the mid 1990s[9]. The second Malaysian National Health Morbidity Survey (NHMS II) conducted in 1996 reported the prevalence of diabetes mellitus for adults 18 years and above was 8.3%[10]. The prevalence of hypertension in Malaysia is between 14.0 to 24.1%[11].

Since the data from the previous national survey (NHMS II) was already 10 years old and with expected increasing health problems associated with changes in Malaysian population structure, increasing affluent and aging population, rapid industrialization and urbanization, we conducted another population-based study in 2006. Therefore, the aims of this survey were to provide community-based data and information on the prevalence of chronic illnesses and their health seeking behaviours. The data obtained will help the Ministry of Health Malaysia to review and plan the allocation of resources in relation to these illnesses. It will also help the ministry to implement more effective health programmes to raise the health status of the population.

This article was accepted: 30 March 2011
Corresponding Author: Amal Nasir Bin Mustafa, Institute for Medical Research (IMR), Epidemiology and Biostatistics, Jalan Pahang, Kuala Lumpur, Federal Territory 50588, Malaysia Email: amal@imr.gov.my

MATERIALS AND METHODS

Sampling and design

The NHMS III used the sampling frame of the Department of Statistics, Malaysia in which the country is divided into contiguous geographical areas called Enumeration Blocks (EBs). These EBs constituted the sampling frame for the survey. A two-stage stratified sample design was used. At the first stage, the sample unit was the EB, while the second stage, the sample unit was the Living Quarters (LQ). All households and persons within a selected LQ were included in the study. To ensure the representativeness of the population at the state and national levels, the selection of EBs was carried out independently within each state and within urban or rural areas in each state.

A total of 2,150 EBs (4.1%) were identified from 52,880 EBs for the whole country of which 1711 (79.6%) from Peninsular and 439 (20.4%) from Sabah and Sarawak. It was selected randomly by the Department of Statistics, Malaysia to ensure the representativeness of the samples. A total of 17,251 LQs were identified for this study. An LQ was considered as non-response after minimum of unsuccessful three visits including empty households and they were not replaced.

Data collection

A cross-sectional community survey with the sample size of 57,500 was conducted throughout Malaysia between April to August 2006. Structured questionnaire was used to collect information on chronic illness. Trained personnel conducted face-to-face interviews in 4 languages (i.e. *Bahasa Malaysia, English, Mandarin and Tamil*). The questions were back translated to avoid biasness. The questionnaire was piloted in two areas namely Klang to represent urban areas and Banting district for rural. Interviewers selected for each household were based on their fluency in the languages.

A survey respondent was the unit for analysis. A respondent was defined as a permanent resident who was present at the selected LQ at the first visit of data collection and had been in that particular LQ for at least 4 weeks including foreigners. For those aged below 13 years, the child's parent or guardian responded on behalf of the child, while those aged 13 years and above were required to answer the questionnaires themselves.

Chronic illness is operationally defined as any illness which is of long duration, slow progress and long continuance[12]. In this study the duration of one year from the date of interview was used. The respondents were asked on long standing illness for the duration of one year from the date of interview. If the response was negative, then the list of common chronic illnesses was read.

Data Analysis

Data analysis was performed using SPSS (Version 17). Descriptive statistics were reported. Estimates obtained from the survey were derived using a complex ratio estimation procedure that ensures that the survey estimates conform to an independently estimated distribution of the total population by pre-determined variables. Computation of standard errors was incorporated to provide a range of estimates within a confidence interval of 95%. Population estimates were expressed in prevalence rates. The data were then adjusted to reflect the annual experience of the total Malaysian population. Proportions were used to estimate utilization of government, private, alternative medicine and other health facilities. Proportions were also used to estimate and report reasons for use and non-use of the facilities and seek treatment.

RESULTS

A total of 17,251 LQs were identified during the study of which 15,519 (90%) were successfully visited during the survey period while another 1,732 visits (10%) were unsuccessful. Among the main reasons were empty LQs 589 (3.4%), locked 308 (1.8%) and demolished 226 (1.3%).

Table I shows the distribution of the respondents and non-respondents in the sample population by their socio-demographic characteristics and geography. Of 57,500 eligible respondents of all ages, a total of 56,710 (98.6%) responded to the study. Majority of the respondents (55.4%) were children and young adults aged 29 years and below. Female respondents (52.9%) were slightly more than males (47.1%). More than half of the respondents were Malays (57.3%). About thirty two percent had secondary education. Majority of the respondents were from a monthly household income of RM1,999 and below. About 58% of the respondents lived in urban areas.

The estimated prevalence of reported chronic illness in the general population was 15.5% (95% confidence interval, CI 15.1 – 15.9). The most common chronic illness reported within the last one year was hypertension (7.9%, 7.6 – 8.2), diabetes mellitus (4.0%, 3.8 – 4.2), asthma (3.4%, 3.2 – 3.6) and heart disease (1.2%, 1.1 – 1.3) (Table II).

Among those who had chronic illness, Indians reported significantly higher prevalence (19.7%, 18.4 – 21.0) compared to Malays (15.9%, 15.4 – 16.4) and Chinese (15.5%, 14.7 – 16.4). Female respondents reported significantly higher prevalence of chronic illness (16.8%, 16.3 – 17.3) than males (14.2%, 13.7 – 14.6). Respondents from urban area reported higher prevalence of chronic illness (15.6%, 15.1 -16.2) compared to rural areas (15.4%, 14.7 – 16.0).

Prevalence of chronic illness was significantly higher among those with household income less than RM400 (19.4%, 17.9 – 20.9) compared to other groups with higher household income. Prevalence of chronic illness was also reported highest among the respondents with secondary education (31.8%, 30.9 – 32.7) compared to primary (25.4%, 24.6 – 26.3), no education (17.7%, 17.0 – 18.4) and tertiary (5.6%, 5.2 – 6.2). Prevalence of chronic illness was highest among the unemployed (31.6%, 30.0 – 33.3) (Table III).

The survey revealed that Malays were the highest (65.8%) visited government health facilities for treatment compared with Indians (61.2%) and Chinese (45.8%). The Chinese were the highest (44.5%) sought treatment from private hospitals and clinics combined compared with Indians (32.2%) and Malays (26.6%). It was also observed that more females visited government health facilities for their chronic illness (64.1%) compared to males (61.1%). Respondents with no formal education (29.6%, 26.7 – 32.5) and primary educated

(32.8%, 30.6 – 35.0) were the biggest groups sought treatment at Government Health Centres. However, bigger percentage of respondents with secondary (28.2%, 26.1 – 30.3) and tertiary education (41.0%, 35.6 – 46.5) sought treatment at Private Clinic.

Table IV shows the distribution of household income and utilisation of health facilities. Respondents with monthly household income of less than RM400 were the highest group (76.6%) who had sought treatment for chronic illness from government health facilities combined including university hospitals and the lowest (38.2%) among those with income of RM5000 and above. Those with income of RM5000 and above were the highest group (54.3%) who sought treatment from the private health facilities and lowest (15.7%) among those with income less than RM400. There was no significant difference between all income groups toward seeking treatment from pharmacy which ranging from 1.3% (0.3 – 2.2) among less than RM400 to 3.2% (1.3 – 5.0) among those with income of RM5000 and above.

Most of the respondents reported that mild illness was the main reason for not seeking treatment for their chronic illness. The practiced of self-medication was reported by almost all respondents for their reason for not seeking treatment.

DISCUSSION

This survey revealed that the prevalence of chronic illness for Malaysia was 15.5%. Hypertension was reported to be the highest prevalence and followed by diabetes mellitus, asthma and heart disease. The patterns were almost similar with developed countries[1,5]. The prevalence of chronic illness was significantly higher among the females. Respondents aged 61 and above both females and males reported the highest prevalence of chronic illness. The prevalence of chronic illness was significantly higher among the Indians. The survey also revealed that chronic illness was reported to be higher among respondents from urban area even though it was not significantly different from rural area.

Table I: Distribution of the respondents and non-respondents in the sample population by socio-demographic characteristics, NHMS III, Malaysia, 2006

Category	Number of Respondents	%	Number of Non-Respondents	%	p-value
Total	56,710	98.6	790	1.4	
Age Group (yrs)					<0.001
0 - 4 yrs	5,995	10.6	67	8.5	
5 - 9	6,717	11.8	71	9.0	
10- 19	11,132	19.6	191	24.2	
20 - 29	7,622	13.4	103	13.0	
30 - 39	7,230	12.7	78	9.9	
40 - 49	7,422	13.1	80	10.1	
50 - 59	5,598	9.9	119	15.1	
60 and above	4,954	8.7	73	9.2	
Missing	4,954	8.7	73	9.2	
Gender					>0.05
Male	26,709	47.1	380	48.1	
Female	30,001	52.9	410	51.9	
Ethnic Group					
Malay	32,494	57.3	417	52.8	
Chinese	10,251	18.1	158	20.0	
Indian	4,415	7.8	67	8.5	
Other Bumiputras	7,092	12.5	113	14.3	
Others	2,458	4.3	35	4.4	
Educational Level					<0.001
None	11,244	19.8	186	23.5	
Primary	15,071	26.6	248	31.4	
Secondary	18,235	32.2	36	4.6	
Tertiary	3,378	6.0	55	7.0	
Unclassified	8,782	15.5	265	33.5	
Household Income (RM)					>0.05
<400	4,650	8.2	61	7.7	
400 - 699	8,563	15.1	142	17.9	
700 - 999	6,578	11.6	103	13.0	
1000 - 1999	15,271	26.9	194	24.6	
2000 - 2999	8,563	15.1	101	12.8	
3000 - 3999	4,310	7.6	55	7.0	
4000 - 4999	2,042	3.6	32	4.1	
5000 and above	4,594	8.1	54	6.8	
Unclassified	2,139	3.8	48	6.1	
Locality					>0.05
Urban	32,734	57.7	428	54.2	
Rural	23,976	42.3	362	45.8	

Table II: Prevalence of chronic illness by type of disease, NHMS III, Malaysia, 2006

Chronic disease	Frequency	Total Estimated in population	Estimate (%)	95% CI	
				Lower	Upper
Hypertension	4,463	1,664,755	7.9	7.6	8.2
Diabetes mellitus	2,206	841,528	4.0	3.8	4.2
Stroke	137	53,016	0.3	0.2	0.3
Arthritis	433	159,808	0.8	0.7	0.9
Tuberculosis	136	47,499	0.2	0.2	0.3
Asthma	1,907	716,672	3.4	3.2	3.6
Kidney failure	193	69,841	0.3	0.3	0.4
Thyroid disease	192	71,020	0.3	0.3	0.4
Heart disease	665	251,622	1.2	1.1	1.3
Anaemia	146	52,329	0.3	0.2	0.3
Blood disorders	54	20,713	0.1	0.1	0.1
Migraine	389	144,290	0.7	0.6	0.8
Cancer	159	60,963	0.3	0.3	0.3
Backache	146	52,916	0.3	0.2	0.3
SLE+	23	8,737	0.1	0.1	0.1
Parkinson's disease	14	5,723	0.1	0.0	0.1
Skin disease	189	68,636	0.3	0.3	0.4
Total	8,764	3,277,808	15.5	15.1	15.9

SLE+ = Systemic lupus erythematosus

Footnote:
As the findings of this survey were obtained from a single sample survey, differences observed could be contributed by chance alone. Lower and upper limits of 95% confidence interval (95% CI) are used to explain the probability of chance and in describing the precision of the responses within the groups of interest.

Table III: Prevalence of chronic illness by occupation, NHMS III, Malaysia, 2006

Occupation	Total Estimated in Population	Prevalence (%)	95% CI	
			Lower	Upper
Senior official & Manager	59,515	23.2	20.0	20.0
Professionals	160,851	18.0	16.5	19.7
Technical & Associate	230,210	22.5	20.9	24.2
Clerical Workers	124,759	17.5	15.7	19.5
Service Workers & Shop	397,566	18.3	17.3	19.4
Skilled Agricultural & Fishery	183,268	20.0	18.4	21.7
Craft & Related Trade Workers	101,936	13.1	11.5	14.8
Plant, Machine Operator & Assembler	127,181	17.8	16.1	19.7
Elementary Occupations	100,179	17.3	15.4	19.5
Housewife	844,096	27.8	26.7	28.9
Unemployed	459,389	31.6	30.0	33.3

Chronic illness which is long lasting illnesses such as asthma, cancer, diabetes mellitus, cardiovascular diseases and mental illness impose a great burden to the community. A previous study reported that about 35% of population in a community has been diagnosed with at least one chronic disease. Cardiovascular diseases (CVD) were reported to be among the most prevalent chronic diseases in the community (27%), asthma 15%, cancer 8% and diabetes 7%[13]. Another study reported that roughly about 14 percent of adults between the ages of 18 and 65 experienced a disability that limits their functional activity level. In addition as many as 31 percent of children have special health care needs due to chronic illness or functional limitations[14].

Coronary artery disease has been the leading cause of mortality in Malaysia since the early 1980s[15,16]. This is perhaps a reflection of the increasing prevalence of risk factors for coronary artery disease in the country over the years. Surveys conducted in the 1980s revealed that the prevalence of hypertension was 14% in the state of Selangor[17] and 14.4% nationally from the first national health and morbidity survey (NHMS I) conducted in 1986[18]. The NHMS II10 conducted in 1996 revealed that hypertension was present in 29.9% in adults age 30 years and above. The same survey also showed that 8.3% of Malaysians above 30 years old are diabetics compared to only 6.3% in 1986[8]. Meanwhile this study shows that both hypertension and diabetes ranked first and second among all chronic diseases reported in the population. These chronic conditions are the two most important risk factors for coronary artery disease.

As for utilization of health services, socio-economic status (SES) of the population such as household income, level of education and occupation were the main factors for visiting either government or private health facilities. This study revealed that those from the lower education and income groups were the main users of services provided by government health facilities and the private health facilities were mostly visited by those with higher income. Previous research have shown that health care utilization is determined by three types of factors namely predisposing traits, which include demographic, social and attitude/belief; enabling characteristics such as income, insurance and accessibility to a regular source of care; and perceived and

Table IV: Distribution of household income and utilisation of health facilities, NHMS III, Malaysia, 2006

Household Income (RM/month)	Place seek Treatment	Prevalence (%)	95% CI	
			Lower	Upper
<400	Government GH+	8.7	6.2	11.2
	Government DH++	27.3	23.0	31.6
	Government HC++	40.6	36.0	45.1
	University hospital	1.4	0.2	2.6
	Private Hospital	2.1	0.9	3.4
	Private clinic	13.6	10.6	16.6
	Pharmacy	1.3	0.3	2.2
400 - 699	Government GH+	11.6	9.5	13.8
	Government DH++	28.0	24.7	31.3
	Government HC++	35.6	32.1	39.1
	University hospital	0.8	0.2	1.4
	Private hospital	2.7	1.5	3.9
	Private clinic	15.6	13.0	18.1
	Pharmacy	2.6	1.4	3.6
700 - 999	Government GH+	14.7	11.7	17.7
	Government DH++	24.6	21.2	28.1
	Government HC++	31.6	27.8	35.5
	University hospital	1.1	0.2	2.1
	Private hospital	2.8	1.4	4.1
	Private clinic	18.6	1.4	4.1
	Pharmacy	1.8	0.8	2.8
1000 - 1999	Government GH+	14.0	12.0	16.0
	Government DH++	23.0	20.5	25.5
	overnment HC++	28.9	26.2	31.5
	University hospital	1.2	0.6	1.7
	Private hospital	4.7	3.5	6.0
	Private clinic	22.9	20.6	25.2
	Pharmacy	2.6	1.7	3.4
2000 - 2999	Government GH+	15.8	13.1	18.6
	Government DH++	19.3	16.4	22.2
	Government HC++	23.0	19.9	26.1
	University hospital	1.9	0.9	2.9
	Private hospital	5.3	3.4	7.2
	Private clinic	29.1	25.8	32.3
	Pharmacy	2.3	1.3	3.3
3000 - 3999	Government GH+	17.1	13.3	20.8
	Government DH++	13.9	10.3	17.6
	Government HC++	19.3	15.3	23.2
	University hospital	2.0	0.7	3.4
	Private hospital	4.1	2.2	6.0
	Private clinic	37.1	2.2	6.0
	Pharmacy	3.2	1.5	4.8
4000 - 4999	Government GH+	14.9	10.0	19.9
	Government DH++	11.9	7.6	16.1
	Government HC++	18.2	12.5	23.9
	University hospital	2.2	0.3	4.2
	Private hospital	10.4	6.1	14.7
	Private clinic	38.3	32.1	44.6
	Pharmacy	1.8	0.0	3.5
5000 and above	Government GH+	13.3	9.6	17.0
	Government DH++	8.4	5.4	11.3
	Government HC++	13.4	9.8	17.1
	University hospital	3.1	1.4	4.7
	Private hospital	13.3	9.9	16.8
	Private clinic	41.0	35.8	46.3
	Pharmacy	3.2	1.3	5.0

GH+ = General hospital, DH++ = District hospital, HC+++ = Health centre

objectively measured illness levels[19,20,21]. This survey revealed that more people from the lower SES groups visited government health facilities for treatment of their chronic illnesses. Chinese reported visited Private Clinic more frequently compared to other races. This pattern of more people went for private compared to government health facilities was also seen in NHMS II[10].

As for the reasons given by respondents with chronic illness at different levels of house income on why they did not seek treatment, most of them consistently reported that mild illness was the main reason and followed by the illness is already cured. However, the need to utilize must be distinguished from the demand for health services. Needs on the other hand refer to two categories – those that are felt and those that are unfelt. Of those who have felt needs, a major proportion would pose demand, while some would not[22].

The transition will further lead to higher demands for health services as the treatment of these chronic diseases are leading to growing economic costs[23]. Differences in health status have been noted between different social groups in the population and between different geographical areas in this study. This was also observed in a previous study conducted in England[24]. This information will help to provide a basis for health policy makers and health planners for ensuring future investments in health keep pace with the faster growing needs of both urban and non-urban population.

This type of study has its own limitations. Information was gathered by self reporting, including that information about their children's health and subject to recall bias. Therefore, in the case of the medically attended conditions, diagnostic precisions are limited by the respondent's memory of the diagnostic terms mentioned by the doctors hence influenced by his perceptions. Furthermore, if an illness has not been medically attended to, a proper and accurate diagnosis is substantially lacking. The household survey requires the use of numerators to gather information. There will be the problem of respondents not being at home at the time of interview, therefore requiring the enumerator to do follow-up visits. Other problems include the possible refusal of respondents to be interviewed and the inability to trace them as identified by the sample.

CONCLUSION

The NHMS III revealed the presence of considerable discrepancies on prevalence of chronic illness and utilization of health facilities by different socio-economic groups. It is hoped that the results will help the Ministry of Health Malaysia to enhance the existing health programmes in the country. It will also help the government to properly plan for health facilities and continue to provide comprehensive health care services for the needs and therefore further improve the health of the Malaysian population.

ACKNOWLEDGEMENTS

The authors would like to thank the Director General of Health Malaysia for his permission to publish this paper. We also would like to thank all staff of Ministry of Health Malaysia and field enumerators for their contribution and commitment to ensure the success of the project. This survey was funded by Ministry of Health Malaysia [Project code: P42-251-170000-00500(005000099)].

REFERENCES

1. World Health Organization. The World Health Report 2003 – Shaping the Future. Geneva, Switzerland: World Health Organization; 2003.
2. Wild S, Roglic G, Green A, Sicree R, King H. Global prevalence of diabetes: estimates for the year 2000 and projections for 2030. Diabetes Care 2004; 27: 1047-53.
3. Khoo KL, Tan H, Liew YM. Serum lipids and their relationship with other coronary risk factors in healthy subjects in a city clinic. Med J Malaysia 1997; 52: 38-52.
4. Hennekens CH. Increasing burden of cardiovascular disease. Current knowledge and future directions for research on risk factors. Circulation. 1998; 97: 1095-102.
5. Wilper AP, Woolhandler S, Lasser KE, *et al*. A national study of chronic disease prevalence and access to care in uninsured U.S. adults. Ann Intern Med. 2008; 149: 170-6.
6. Tanne JH, Americans are less healthy than 10 years ago, shows national survey. BMJ 2010; 340: c606.
7. Lowry F. Prevalence of chronic illness in US kids. JAMA 2010; 303: 623-30.
8. Malaysian Population and Census Report, Department of Statistics, Prime Minister Department, Government of Malaysia, 2000.
9. Mustafa BE. Diabetes epidemic in Malaysia. Med J Malaysia 2004; 59(3): 295-96.
10. The Second National Health Morbidity Survey (NHMS II). Ministry of Health Malaysia, 1998.
11. The National Health Morbidity Survey (NHMS II) Conference 1997. Report of the NHMS II. Hospital Kuala Lumpur 20-22 November, 1997; 71-80: 114-25.
12. World Health Organization. The Basic Document, 32th Edition. Geneva, Switzerland: World Health Organization; 1982.
13. Hughes-Cromwick P, Mull H and Shaheen M. The burden of Chronic diseases in Fresno: final report. Altarum Ann Arbor USA, WP06-2, 2006.
14. Ronald J Ozminkowwski, Mark W Smith, Rosanna M Coffey, Tami L Mark, Cheryl A Nesluksan and John Drabek. Private payers serving individuals with disabilities and chronic conditions. US Department of Health and Human Services, USA, 2000.
15. Jeyamalar R. Coronary artery disease in Malaysia: a perspective. Med J Malaysia 1991; 46: 1-6.
16. Khoo KL, Tan H, Khoo TH. Cardiovascular mortality in peninsular Malaysia: 1950-1989. Med J Malaysia 1991; 46: 7-20.
17. Kandiah N, Lekhraj R, Paramjothy S, Gill AK. A community-based study on the epidemiology of hypertension in Selangor. Med J Malaysia 1980; 34: 211-20.
18. The First National Health Morbidity Survey (NHMS I), Malaysia, 1986. Ministry of Health Malaysia 1988.
19. Institute for Medical Research. National Workshop on the Integration of Traditional Medicine in Primary Health Care. Kuala Lumpur: Institute for Medical Research, 1999.
20. Haung M.R., Akiyama H, Tryban G, Sonoda K & Wykle M. Self care: Japan and the US compared. Soc Sc Med 1991; 33(9): 1011-22.
21. Hunts P.A & Sultana F. Health seeking behaviour and the meaning of medications in Balochistan Pakistan. Soc Sc Med 1992; 34(12): 1385-97.
22. Bennet F.J. Community diagnosis and health action: A manual for tropical and rural areas. London& Basingstoke: 1988. MacMillan Publishers Ltd.
23. Yach D, Hawkes Corinna, Gould CL, *et al*. The Global Burden of Chronic Diseases - Overcoming impediments to prevention and control. JAMA 2004; 291: 2616-22.
24. Saxena S, Eliahoo J & Majeed A. Socioeconomic and ethnic group differences in self reported health status and use of health services by children and young people in England: cross-sectional study. BMJ 2002; 325: 520 doi:10.1136/bmj.325.7363.520