

ORIGINAL ARTICLE

COST ANALYSIS OF HYPERTENSION MANAGEMENT IN AN URBAN PRIMARY MEDICAL CENTRE KUALA LUMPUR

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ABSTRACT

Hypertension is one of the commonest health problems in Malaysia and its cases are on a rise. In conjunction with the above statement, it is predictable that the cost of healthcare services will further increase in the future. Therefore, cost study is necessary to estimate the health related economic burden of hypertension in Malaysia. A cross sectional study was carried out to quantify the direct treatment cost of hypertension. Three hundred and ninety one hypertensive patients' data from Bandar Tasik Selatan Primary Medical Centre in year 2010 were collected and analysed. The direct treatment costs were calculated. The result showed that out of 391 hypertensive patients, 12.5% was diagnosed hypertensive without any co-morbidity, 25.3% with 1 co-morbidity dyslipidemia only; 4.3% with diabetes mellitus type 2 only; 0.5% with chronic kidney disease only and none with ischaemic heart disease. Patients with 2 co-morbidities (dyslipidemia and diabetes mellitus type 2) were 42.2%; with 3 co-morbidities (diabetes mellitus type 2, dyslipidemia and chronic kidney disease) was 4.3%. The mean cost of direct treatment of hypertension per visit/ year was RM289.42 \pm 196.71 with the breakdown costs for each component were medicines 72.2%, salary 14.6%, laboratory tests 5.0%, administration 4.4% and radiology tests 3.8%. Dyslipidemia is by far the commonest co-morbidity among hypertensive patients. Direct costs of treating hypertension are mostly dependent on present of co-morbidity and numbers of drugs used. Thus, the annual budget could be calculated precisely in the future especially for drugs.

Key words: Cost Analysis, Hypertension, Primary Medical Centre.

INTRODUCTION

A workshop on hypertension in the Asian Pacific Region held in Beijing on November 15, 2007, reported that Cardiovascular and Cerebrovascular diseases are the most common cause of death in the developed world. They also reported that hypertension and non-optimal blood pressure levels are the most important contributors to cardio- and cerebro-vascular disease¹. Hypertension is a silent disease in which among hypertensive's, only 33% of sufferers are aware of their hypertensive status, 31% had been treated and only 23% currently remained on antihypertensive treatment^{2,3}. The prevalence of hypertension across the region is between 20 to 35%^{1,2}. The incidence of hypertension has been increasing throughout the years. Hypertension Study Group revealed their finding from National Health Morbidity Survey 1996 (NHMS II) that 33% of Malaysian adult age 30 or older had hypertension². In our Clinical Practice Guidelines, the Management of Hypertension foreworded by the Director General of Health Malaysia mentioned that The Third National Health and Morbidity Survey 2006 showed that the prevalence of hypertension among adults 30 years old and above was 43%, a relative increase of 30% from that of 10 years earlier³. This alarming health issue had raised the awareness of the nation and the government as well.

Knowing that hypertension had become a serious health problem in Malaysia, projections were done for the purpose of better future medical planning and management. The estimated number of hypertensive patients will rise from 3.5 million in year 2002 to 8.1 million in year 2020 for people over 30 years old. This means that there will be an increase from 39% to 68% of the population who are at risk of hypertension in the future¹. Hypertensive is a common problem in patient with co-morbidities than those without co-morbidities^{3,4,6}. Prevalence for hypertensive patients with diabetes and high cholesterol is 50.3% and 40.5%, respectively⁴. The prevalence of hypertension with common co-morbidities among hypertensive patients attending primary healthcare (PHC) centres in Riyadh was diabetes mellitus 38.4%, followed by dyslipidemia 19.6%, bronchial asthma 11.0% and renal diseases 4.7%⁵. It is documented in many literature that hypertension prevalence increased by age and women tend to have a greater risk of high blood pressure than men^{1,2,5,6,7}.

These diseases impose a major burden socially and economically on the individual, family, community and governments¹. The economic impact of hypertension and its complications is enormous. The economic impact of hypertension and its complications is enormous. Non optimal blood pressure is responsible for 14% of deaths worldwide

¹. In 2001 the direct global health costs were estimated to be more than USD400 billion. The real costs are much higher with disruption of work, family life and social breakdown. In the poorest countries the costs are borne mainly by the individual and family. Substantial further costs are those of the complications and their management (stroke, heart attack)¹. The total health care costs of treating hypertension and its complications are estimated to be quite significant. In US, Hodqson reported his study finding in 1998 that US spent USD108.8 billion in health care attributed to hypertension with 12.6% of total national spending that could be allocated to diagnoses, including USD22.8 billion for hypertension, USD29.7 billion for cardiovascular complications, and USD56.4 billion for other diagnoses⁸. The average amount spent per hypertensive condition was USD3,787⁸. Sanjeev reported his study finding that the total incremental annual direct expenditures for hypertension patients in US were estimated to be more than USD54.0 billion in 2001 with mean incremental annual direct expenditures for an individual with hypertension was USD 1,131⁹. Many studies found out that the prescription medications constitute more than 50% of the overall treatment expenditure^{8, 9}.

The progressive up-surging numbers of hypertensive patients had inevitably increased the burden of healthcare services. Therefore, government must arm itself with the information of the actual cost of hypertension treatment for better healthcare management and in order to allocate sufficient healthcare funds in national allocation planning. Besides that, diseases treatment cost are also needed for the development of the 1 Care concept that currently Ministry of Health Malaysia is working on. In conjunction with the issue above, we aim to calculate the direct treatment cost of hypertension from the provider perspective in an urban area as an example.

MATERIALS AND METHODS

Study Design

A cross sectional study was conducted to determine the direct treatment costs from the provider's perspective of treating hypertensive patients with and without complications. The study was carried out in an urban area in Kuala Lumpur, Malaysia. This clinic actually received numbers of patients per annum. Universal sampling was used for this study. However, after considering the inclusion criteria of patients diagnose with hypertension and followed up throughout the year 2010 in this clinic and exclusion criteria of incomplete patients' medical record, a total number of 391 hypertensive patients with or

without co-morbidities were considered for this study.

Data Collection

Three types of data for each patient visits in year 2010 was obtained from patients' medical record. A standardised economic evaluation form prepared by a Health Economic Research Fellow from UNU-IIGH was used in this study. Every patient's medical records that fulfill inclusion and exclusion criteria were reviewed. The data such as demographic data (age and sex), clinical (primary diagnosis, secondary diagnosis, primary procedure, secondary procedure and blood pressure readings) and related cost drivers activities including economics cost of drugs, laboratory tests, radiological tests, health care workers salary and administration cost were collected. The common laboratory tests that were included in this study were renal profile, liver function test, lipid profile, full blood count, fasting blood glucose, HbA1c, Oral Glucose Tolerance Test (OGTT) and random blood sugar whereas the common radiological tests were electrocardiogram, fundus camera, chest x ray, vision test and kidney ureter bladder ultrasonography.

Cost Analysis Method

This study calculated the direct cost of patient treatment in outpatient setting within 6 month period. Macrocosting or top down costing was computed into the economic excel template modification of Clinical Cost Modeling (CCM) software developed by Unit Case-mix of UKMMC was used. Five component of cost calculated in this study were administration cost, salary, drugs, laboratory and radiology cost. Every patient's medical record was reviewed which focus on the resource utilization on these five component of cost. Using CPG as guideline, assumption that there were 2 visits within 6 months was made. Charge list of the clinic for drugs, laboratory and radiology per item was used to calculate the amount of the cost drug, laboratory and radiology cost. Administration cost was calculated by using total administration cost was allocated to the clinic and then divided with total patient proportionally to get cost administration per patient visit. Salary of personnel who's working an average in five years was taken as reference. Salary staff for patient Hypertension was calculated by dividing total salary with the total number of patient hypertension proportionally.

Data Analysis

A variety of a descriptive statistics such as mean, standard deviation, minimum and maximum were calculated to determine the total direct treatment costs and its component. Prevalence of hypertension without co -morbidity and with co-

morbidity was calculated by using frequencies statistics. Data was analyzed by using SPSS-Window version 13. Results were presented as mean values, standard deviation (SD), minimum, maximum, frequency and percentage.

RESULTS

There were 391 patients’ medical records considered in this study. 44.8 % of patients were male and 55.2 % were female. Two patients were less than 35 years old (0.5%); 18 patients were between 35-44 years old (4.6%); 62 patients were between 45-54 years old (15.9%) and 309 patients were equal or more than 55 years old (79.0%). The mean age of hypertensive patient was 63.6 years.

Table 1: Percentage of hypertensive patients’ without co-morbidity and with co-morbidities

Components	Diagnosis	Frequency (%)
Without co-morbidity	Hypertension	49 (12.5)
With 1 co-morbidity	Diabetes Mellitus Type 2	17 (4.3)
	Dyslipidaemia	99 (25.3)
	Ishaemic Heart Disease	0 (0.0)
	Chronic Kidney Disease	2 (0.5)
	Diabetes Mellitus Type 2, Dyslipidaemia	165 (42.2)
With 2 co-morbidities	Diabetes Mellitus Type 2, Ishaemic Heart Disease	0 (0.0)
	Diabetes Mellitus Type 2, Chronic Kidney Disease	1 (0.3)
	Dyslipidemia, Ischaemic Heart Disease	20 (5.1)
	Dyslipidemia, Chronic Kidney Disease	5 (1.3)
	Ischaemic Heart Disease, Chronic Kidney Disease	0 (0.0)
With 3 co-morbidities	Diabetes Mellitus Type 2, Dyslipidaemia, Ischaemic Heart Disease	15 (3.8)
	Hypertension, Diabetes Mellitus Type 2, Dyslipidaemia, Chronic Kidney Disease	17 (4.3)
	Hypertension, Diabetes Mellitus Type 2, Dyslipidaemia, Chronic Kidney Disease, Ischaemic Heart Disease	1 (0.3)

Table 1 represented the hypertensive patients without co-morbidity and with co-morbidities. The hypertensive patients without co-morbidity was 12.5%; with 1 co-morbidity (Dyslipidaemia) was 25.3%; with 2 co-morbidities (Diabetes Mellitus Type 2 and Dyslipidaemia) was 42.2%; with 3 co-morbidities (Diabetes Mellitus Type 2, Dyslipidaemia, Chronic Kidney Disease) was 4.3%; with 4 co-morbidities (Hypertension, Diabetes Mellitus Type 2, Dyslipidaemia, Chronic Kidney Disease, Ischaemic Heart Disease) was 0.3%.

the breakdown costs for each component were medicines 72.2%, salary 14.6%, laboratory tests 5.0%, administration 4.4% and radiology tests 3.8%. Table 3 showed the estimated direct treatment costs per patients’ visit for six month duration (in financial year 2010) for hypertensive patient without co-morbidity and with co-morbidities. The mean total direct treatment cost for hypertensive patient without co-morbidity was RM128.73; with 1 co-morbidity (Dyslipidemia) was RM178.64; with 2 co-morbidities (Diabetes Mellitus Type 2, Dyslipidemia) was RM364.50.

Table 2 showed the mean cost of direct treatment of hypertension per visit/ year was RM289.42 with

Table 2: The mean total direct treatment cost of hypertension per patient’ visit with its breakdowns

	RM ± SD	(%)
Drugs	215.63 ± 191.72	(72.2)
Laboratory tests	15.14 ± 11.77	(5.0)
Radiological tests	11.34 ± 44.15	(3.8)
Salary	43.47 ± 0.00	(14.6)
Administrative costs	13.02 ± 0.00	(4.4)
Total cost	289.42 ± 196.71	(100)

DISCUSSION

This study revealed that hypertension is higher among older age group more than 55 years old. This result is consistent with many other studies which showed that hypertension tends to affect patients of older age group above 45 years old.³⁻⁷

The study found that the percentages of hypertension among female are higher than male. This roughly represents the prevalence of hypertension in Malaysia in which female had higher prevalence of hypertension than male.

Similar to this study, most of the studies also showed that women have a higher prevalence of hypertension than men^{3-7,9}. Qais Qlefan et al gave a possible reason that women are more frequent users of health care, and hence, they have an earlier detection of high blood pressure and initiation of treatment if compared with men¹⁰. This statement is also supported by Juvenal Soares Dias da Costa et al¹¹. However, in contrast to other study, after adjustments for age, hypertensive patients among Vietnamese people remained considerably higher among the men (18.1%) than the women (10.1%)¹².

Table 3: Estimated Direct Treatment Costs per Patient Visit for Six Month Duration (in year 2010-RM) for hypertensive patient without co-morbidity and with co-morbidities.

Direct costs	Mean ± SD		
	Hypertension	Hypertension and dyslipidemia	Hypertension, Diabetes Mellitus Type 2, Dyslipidemia
Drugs	60.59 ± 54.39	108.11 ± 89.66	286.88 ± 187.86
Laboratory test	11.48 ± 11.15	13.57 ± 10.70	16.73 ± 12.44
Radiological test	6.25 ± 9.42	6.81 ± 9.62	16.24 ± 64.25
Salary	43.47 ± 0.00	43.47 ± 0.00	43.47 ± 0.00
Administration	13.02 ± 0.00	13.02 ± 0.00	13.02 ± 0.00
Total	128.73 ± 55.36	178.64 ± 91.83	364.50 ± 194.08

This study revealed that the hypertensive patients with 2 and above co-morbidities are more than hypertension patients with one co-morbidity and without co-morbidity. According to a study conducted in Cameroon in year 2007, there was 56.4% of hypertensive patients having one co-morbidity and 30.7% having several co-morbidities¹³. This might suggest that hypertensive patients are having more co-morbidities with the passing of time. Factors contributing to this trend may need a further study¹³.

The study also found out that Diabetic Mellitus and Dyslipidemia are the most common co-morbidities. This finding is consistent with The Second National Health Morbidity Survey (NHMS II) finding, hypertensive patients with diabetes and high cholesterol is 50.3% and 40.5%, respectively and study done at primary healthcare (PHC) centres in Riyadh, hypertensive patients with diabetes mellitus 38.4% and dyslipidemia 19.6%. Combination of hypertension with dyslipidemia and diabetes will increase the risk of cardio and cerebro-vascular disease. Dr Bruce Neal from the George Institute in Sydney, Australia in his proceeding during a workshop on hypertension in the Asian Pacific Region held in Beijing on November 15, 2007 revealed that hypertension accounts for one third of stroke and one fifth for heart attacks¹.

The study showed that the breakdown costs for each components of total direct treatment cost of hypertension were highest for drugs. Direct costs of treating hypertension are mostly dependent on present of co-morbidity and numbers of drugs used. Reports by Micheal A. Fischer shared the similar findings where nearly a quarter of total hypertensive treatment was antihypertensive medication costs¹⁴. The more co-morbidities that hypertensive patients have, the higher the treatment costs will be. Thus, the annual budget could be calculated precisely in the future especially for drugs.

There are a few limitations in this study. Due to time constraint, we only managed to select 391 hypertensive patients for this study. Besides that, patients with incomplete medical records were being excluded from this study. Only the first four co-morbidities with the highest prevalence were being considered in this study. The other co-morbidities were excluded from this study because of insignificant prevalence.

CONCLUSION

Most of the hypertensive patients present with co-morbidities. As the hypertension treatment cost the highest on drugs, the presence of co-

morbidities will increase the overall hypertension treatment cost. This generates an economic burden for Malaysia.

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