

Out of pocket (OOP) cost of treating hypertension in Karachi, Pakistan

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Abstract: Pakistan is categorized to below to middle income countries where two third of the national annual health expenditure is in the form of out of pocket (OOP) cost. A prevalence based study was conducted to determine the OOP cost treatment of hypertension in Karachi by interviewing 350 hypertensive patients aged >30 years through a validated questionnaire. Hypertension (HTN) was classified into stage 1 and stage 2 and was found to be common in females (53.42%) than males (46.57%). The total costs of stage 1 and stage 2 HTN were calculated to be 217869.7PKR and 17545457.6 PKR respectively. The average treatment cost of stage 1 was observed to be significantly lower ($p=0.006$) than the cost of stage 2 HTN. Moreover; the cost of antihypertensive drugs, physician fees and laboratory tests were considerably different however; no variation was seen in cost of transport and loss of productivity through absenteeism from work. Overall, the present study indicates that the antihypertensive treatment has imposed a high burden on the pocket of common man and this is a major reason for treatment non-adherence. Consequently, it increases the risks of cardiovascular events, morbidity and mortality. Therefore, effective strategic planning is need of time to reduce OOP cost for better control on hypertension in Pakistan.

Keywords: Hypertension, out of pocket cost, Karachi, difference.

INTRODUCTION

During the past centuries industrialization and associated lifestyle have brought non-communicable diseases (NCDs) affecting Asian countries in the same way as they affect Western societies (Jafar, 2006; Gupta, 2004; Kearney *et al.*, 2005). Nearly 80% of the deaths due to NCDs occur in low- and middle-income countries. Among these non-communicable deaths the most attributing deaths are caused by high blood pressure tobacco use and raised blood glucose (diabetes) (Alwan, 2011). High blood pressure (hypertension) is considered to be a major global risk factor of mortality especially in South Asian region including Pakistan, India, Bangladesh and others (Krishnani *et al.*, 2013).

The National Health Survey of Pakistan had revealed that 33 percent of the adult population of Pakistan (> 45 years) is suffering from hypertension while only three per cent of these adults who receive treatment have controlled blood pressure (Reddy and Yusuf, 1998). This greater prevalence of hypertension among adults is mainly due to ageing, increased tobacco use, less physical activity, and inappropriate diet, especially higher daily intake of salt. Hypertension has also been reported to be more prevalent in urban population (>35 years) as compared to the rural one (Safdar *et al.*, 2004; Al-Efan, 2009). In a country where rate of unemployment is 6.7%, the out of pocket (OOP) health expenditure is 56.28% of the total national

health expenditure (Khalid and Sattar, 2016; Akram and Khan, 2007). A common household in Pakistan spends 4.9% of its monthly budget on healthcare which delays the initiation of disease management. Similarly with hypertension, people tend to seek the antihypertensive treatment as delay as possible to avoid the economic burden on their pockets (Bonu S *et al.*, 2009). Therefore, this study aims to determine the cost of treating hypertension from the patient's perspective (out of pocket cost) in Karachi, Pakistan.

MATERIALS AND METHODS

Cost

When measuring direct costs, studies often measure total direct costs (the costs of resources used) rather than net direct costs, which subtracts future medical costs (avoided because of the death of a patient) from total costs. In the present study direct medical, non-medical and indirect costs were calculated to determine the out of pocket cost incurred by high blood pressure. Direct costs included the cost of antihypertensive drugs, cost of physician and cost of laboratory tests. Direct non-medical cost was calculated as the cost of transportation. The indirect cost meant the loss of productivity in event of absenteeism due to HTN.

Perspectives

The choice of perspective depends upon the purpose of the study. The participants and families perspectives

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which eventually determine the burden on individual's pocket can be used in some useful economic evaluations such as cost effectiveness analysis and as a reference for policy makers in resource allocation at national or governmental level (Choi *et al.*, 1997; Aziz *et al.*, 2005) therefore the perspective of this study was the "Patient's Perspective" in this study was used to build an insight for the economic burden of HTN in Karachi.

Sample size calculation, Participants and their inclusion criteria

The sample size was calculated using the following equation

$$n = Z^2 P (1-P) / d^2$$

Presently, prevalence based approach was used to collect the data from 350 hypertensive patients as self-reported outcome report. The data was collected from different out-patient clinics in government and private hospitals and from the physician's personal health clinic from different areas of Karachi over a period of twelve months (2013-2014). The study was approved by Board of Advanced Studies and Research, University of Karachi. Prevalence-based studies are more common than incidence based studies because they need lesser data and fewer assumptions. The participants were recruited through convenient sampling and interviewed using a validated questionnaire. All the participants were above 30 years of age, had diagnosed hypertension, with or without co morbidities, taking antihypertensive medications for at least one year and attending outpatient general clinic at the time of participation in this study. The guidelines recommended for use by the Pakistan Hypertension League (PHL), an affiliate of the World Hypertension League, suggest the same BP thresholds for diagnosing and treating hypertension as JNC-VII guidelines. High blood pressure was defined as SBP 140-159 mmHg and DBP 90-99mmHg (stage 1) and SBP>160 mmHg and DBP >100 mmHg (stage II) (National Health Survey, Chobanian *et al.*, 2003)

Data collection

The questionnaire was designed to collect three different sets of data. Demographic (age, sex, weight, marital status, family composition etc), clinical (drugs, tests, physician) and economic (cost of drugs, tests, physicians, transport, productivity loss) data were recorded when participants were attending an outpatient clinic.

STATISTICAL ANALYSIS

Data was analyzed through descriptive analysis using percentage, mean, standard deviation and median. Independent Sample T-test was performed to determine the differences in cost of treatment for stage 1 and stage 2 hypertension. Statistical Package for Social Science (SPSS V.23 Inc.) was used to run statistical tests. A p-value <0.05 was defined as statistically significant.

RESULTS

Demographic data

Results showed that stage 1 hypertension was more prevalent (38.8%) than stage 2 hypertension (61%). The mean age was 53.5±9.66 and 52.25±12.25 in both groups respectively. Majority of the respondents were females in both stages of HTN however, the most suffering age group was found to be 46 to 60 years. As far as the family composition is concerned a more of the respondents had 6-10 family members (40.7% and 33.81%). The details of demographic data are given in table 1.

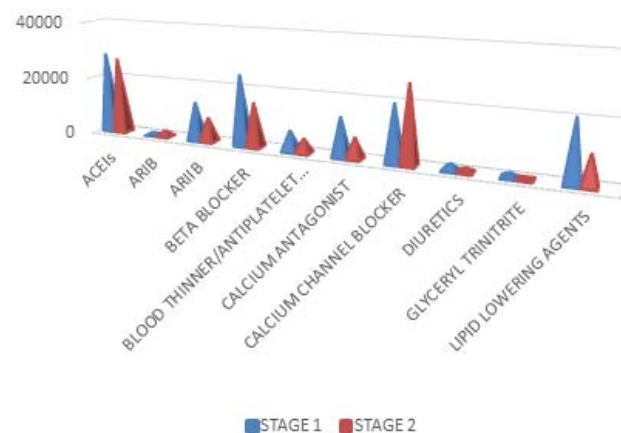


Fig. 1: Comparison of Cost (PKR/Month) of Antihypertensive Medicines used by Stage 1 and Stage 2 Hypertensive Patients

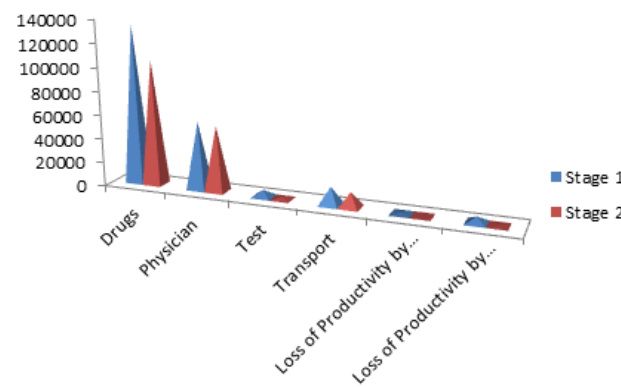


Fig. 2: Comparison of Cost of Treatment of Hypertension (Stage 1 VS Stage 2)

Clinical data

The rate of consumption of antihypertensive medicines is given in fig. 1. It was noted that many of the respondents had developed several other clinical problems once they had hypertension. The main co morbidities with HTN stage 1 and 2 were diabetes (12.32%, 83.45%), renal problems (3.31%, 17.98%), visual problems (11.84%, 56.11%), body pain and lethargy (20.85%, 61.87%), breathing problems and chest pain (8.05%, 45.32%).

Table 1: Demographic characteristics of study participants

Characteristics	Stage 1 N=211	Stage 2 N=139
Age (Mean Years)	53.39 ±10.32	54.69±11.38
30-45 years (mean±SD)	46±21.8	23±16.54
46-60 years	112±53.08	71±51.07
61-75 years	46±21.8	33±23.74
76 years and above	7±3.31	6 ±4.31
Weight (Kg) (mean± SD)	73.25± 20.58	67.66 ±12.55
Systolic BP	131.13±9.59	165.79±16.65
Diastolic BP	98.85±16.46	102.23±14.9
Sex		
Male (n, %)	97(45.97)	66(47.48)
Female (n, %)	114 (54.02)	73 (52.5)
Marital Status (n, %)		
Married	201,(95.2)	130 (93.5)
Widow/divorced	4(1.89)	3(2.15)
Single/Never married	6(2.84)	3(2.15)
Education (n, %)		
No Education/Only Primary	36(17)	30(21.5)
Matric	63(29.8)	20(14.38)
Inter	49(23.2)	28(20.14)
Graduate	40(18.95)	37(26.6)
Master/Postgraduate	23(10.9)	24(17.2)
Occupation Status (n, %)		
Job/Earning through any mode	144(68.24)	100(71.9)
Household Head	100(69.4)	78(78%)
Income Sharing	44(30.5)	22(22%)
Not Earning/Dependent	67(31.75)	39(28.05%)
Family Members (n, %)		
2-5	4(21.32)	35(25.17)
6-10	154(72.98)	100 (71.94)
11 and above	12 (5.68)	4 (2.87)
Duration of Hypertension (years) (n, %)		
1-5	63(29.85)	46(33)
6-10	86 (40.75)	47(33.81)
11-15	62(29.38)	46(33)

Table 2: Hypertension co morbidities

Co morbidities	Number and (%)of Respondents with Co morbidities (A)		Number and (%) of Respondents who developed Co morbidities After Hypertension (B)*	
	Stage 1 N (%)	Stage 2 N (%)	Stage 1N (%)	Stage 2N (%)
Diabetes	49(23.22)	138(99.28)	26(12.32)	116(83.45)
Renal problem	16(7.58)	68(48.92)	7(3.31)	25(17.98)
Visual problem	64(30.33)	100(71.94)	25(11.84)	78(56.11)
Body pain/Lethargy	70(33.17)	119(85.6)	44(20.85)	86(61.87)
Respiratory Problems	30(14.21)	85(61.15)	17(8.05)	63(45.32)

*B=Fraction of (A)

Table 3: Cost of treating hypertension (PKR)

Class of Hypertension	Direct Cost (Sum PKR Per Month)				Indirect Cost (Sum PKR Per Month)		Total Cost of Treatment (PKR Per Month)
	Drugs	Physician	Test	Transport	Loss of Productivity by Absenteeism from work		
					Patient	Caregiver	
Stage 1	134014.7	57110	5555	14890	1100	5200	217869.7
Stage 2	105119.3	54900	2165	12490	0	783.33	175457.6

Table 4: Cost of antihypertensive drugs over the course of consumption

Antihypertensive Drugs	Stage 1 (Sum PKR)	Mean Duration of Use (Years)	Stage2 (Sum PKR)	Mean Duration of Use (Years)
ACEIs	173698.4	6.375 (+ 2.7)	130485.2	6.19(+2.84)
ARIB	1800	4 (+0)	6264	3(+0.81)
ARIIB	47082.6	3.92(+2.8)	27538.2	3.8(+2.56)
Beta Blocker	139787.4	7.3(+3.76)	71515.5	6.48(+4.3)
Blood Thinner/Antiplatelet Aggregator	34233	6(+2.6)	20708.7	6.3(+2.5)
Calcium antagonist	75221.7	6.8(+3.4)	31875	6.3(+3.19)
Calcium channel blocker	75420.9	6.47(+2.7)	92441.28	5.62(+2.5)
Diuretics	11991.3	4.6(+2.3)	8160	5.61(+2.21)
Glyceryl trinities	8065.2	9.5(+0.5)	933	10(+0)
Lipid lowering agents	118770	7.9(+3.11)	507462	5.6(+1.36)

Economic data

The total monthly economic data was recorded from the participants. A wide range of total monthly income was observed (10,000 to 100000PKR). Majority of respondents (76.77%, 72.66%) were earning between 10-50,000 PKR in both stages of HTN. The total monthly cost spent due to hypertension and other diseases share a considerable amount to the total monthly expenses. The total direct and indirect cost includes the cost of treating hypertension (stage 1 and 2) only and do not include the cost incurred by co morbidities of the respondents. The T-test showed no statistical significant difference (p=0.06) between the costs of treating two stages of hypertension. However; the significant difference was observed in the average cost of drugs, consultancy fees and laboratory tests (p= 0.021, 0.023, 0.000 respectively).

DISCUSSION

With the poor social and economic conditions in Pakistan, it is hard for the patients to expend a major amount from their monthly income to obtain treatment for their health problems such as hypertension. As the study scope is to estimate the COI in patients >30 years, therefore, a convenient sample of 350 self-reported hypertensive patients was collected as practiced in past by other researchers (Neal *et al.*, 2000). The average monthly incomes and expense in stage 1 and stage 2 were 47,981.04 and 5,928.06 PKR while monthly expenses were 38,203.79 and 39,964.03PKR. Cost of treatment contributes 2.7% and 3.15% of the monthly expenses and share 2.15% and 2.47% of their monthly income in both groups respectively. Dependency of non-earning individuals on household head or other family members also upturns the healthcare costas noted in the present study. The share of expense of dependents was not supported by the share of income thus increased the burden on pockets of household. Hypertension was mainly diagnosed when the patients had complaints of regular headache (32%, 15.8%) and eyesight problems (16.11%, 23.74%). The mean duration of hypertension was found to be 8.26 ± 3.62 and 7.90 ±3.65 years owing

to a mean total cost(direct +indirect) of 32,8417.3 PKR and 7,927 PKR*. The cost of other health problems also accounts for the economic disease burden and lower health related quality of life (Byford *et al.*, 2000). *It was found that* with progression of hypertension stage in the present study the patients had mostly developed diabetes and had become less physically active due to body pain and frequent lethargy. The respiratory and visual problems had also affected the majority of them while few were suffering from renal problems (table 2). The cost of treatment of these co morbidities (cost of drugs and physicians of stage 1+stage 2) was found to be 36, 59967.9 PKR per month. As a matter of fact the early initiation of hypertension management can avoid the cost of co-morbidities (National Health Survey of Pakistan, 1998). In this study the cost of drugs accounted for 61.51% and 59.91% of the total cost of treatment for stage 1 and stage 2 HTN. Studies have reported that including thiazides in antihypertensive regimen can significantly reduce the cost of treatment. Additionally, their efficacy is comparable with the efficacy of α-blockers, calcium channel blockers and ACE inhibitors for prevention of one or major forms of cardiovascular risks such as heart failure and stroke (Cook *et al.*, 2007). However, the proportion of diuretics in antihypertensive regimen was very low (thiazides 0.28% and loop diuretics 12% in stage 1; 1.71% thiazides and 16.57% loop diuretics in stage 2).

ACE inhibitors were found to be the largest group of prescribed drugs (41.2% stage 1 and 55.3% stage 2) with the sum of 28553.85PKR per month which could be justified by the length of hypertension. In a country like Pakistan, where majority of population live in a low socio economic condition this cost produces a definite burden on patient’s pocket which results in non-compliance or discontinuation of therapy thus worsening the disease condition. Most of the antihypertensive regimen must contain thiazides diuretics but their unavailability as a solo drug due to their lower cost and lesser business to the pharmaceutical industry and health care providers have pushed the patients and their families to suffer from financial constrain by purchasing costly medicines like ACE inhibitors (Handson and Liming, 2001).

Despite the difference between number of individuals in stage 1 and stage 2 hypertension groups, their total costs of treatment were not significantly different ($p=0.06$). However, the average cost drugs, physicians and BP measurement and other tests of treating stage 1 hypertension was significantly lower than stage 2 hypertension (at $p= 0.021, 0.023, 0.000$). This situation demands a careful monitoring and tailoring of the treatment according to individual patient's need. Patients in both groups visit 1.27 ± 0.488 and 1.34 ± 0.56 (minimum 1 and maximum 3) times to the outpatient clinic for their follow up making the cost of physician the next attributing factor to total direct cost.

The indirect cost was calculated in terms of the deduction in salary in case of loss of productive services by the employee due to high blood pressure. This absenteeism could be due to high blood pressure, to visit their physician, for regular BP check-up or any other reason due to high blood pressure. In Karachi, most of the outpatient clinics operate from afternoon to late evening thus majority of the participants and/or their caregivers did not need to make off from their work to visit their physician and/or regular BP checkup. Therefore, majority of the respondents and their caregivers did not need to take a day off from work and did not suffer from a salary deduction. Therefore this indirect cost of treatment was very low accounting only 2.89% and 0.446% of total cost of illness in both groups respectively.

The present study highlights the economic burden due to hypertension on the most urbanized city of Pakistan which does not only have largest population but also generate the main revenue for the country through industrialization. Still the average monthly income is set to the lowest level. The cost paid by a common man suffering from hypertension (OOP) was estimated in this article. This cost was found to be higher in context with the socio-economic situation in Pakistan. The governmental policies do not support a common man to bear his medical expenses and therefore non-compliance and discontinuation of antihypertensive therapy is common leading to worsening the disease. Affordability of the disease treatment has thus, become a hurdle which makes situation even worst in reality than expected. Therefore less than 50% of the individuals who are aware of their disease have controlled blood pressure. Healthier and cost effective choices of drugs should be offered to the people to increase their compliance and adherence to the treatment. The physicians should focus on reducing blood pressure by non pharmacological treatment as first choice and if the disease progress, a drug treatment with low dose thiazide should be initiated while keeping an eye on the disease associated risks (Ashfaq et al., 2007).

CONCLUSION

The out of pocket health expenditure for hypertension management and treatment imposes a heavy economic

burden on patients and their families. Majority of this cost can be saved by early diagnosis, life style modifications, increasing availability of effective medicines in affordable prices and health insurance policies from government. Health awareness programs for general population and the seminars for physicians to update them about current trends India gnosis, treatment and management of hypertension can help to reduce prevalence of hypertension and increase control of high blood pressure.

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