

An Audit of Hypertension at University Health Center in Oman

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Abstract

Objectives: To audit the documentation of medical care provided to hypertensive patients and to evaluate the management of hypertension in a primary healthcare center, Family Medicine Staff Clinic, Sultan Qaboos University (SQU) in Oman.

Methods: An audit of electronic medical records (EMR) was carried out during 2007 and 2008 on a representative sample of 150 patients, selected randomly using a simple randomization method. The mean age of the patients was 54.8 +/- 9.9 years. The majority were Omanis; 53.3% were female, 46.7% were male. All patients' records were reviewed for proper recording in a pre designed structured form. Re-auditing was done in 2008. McNemar's test was used to compare data in 2007 with data in 2008.

Results: Age, gender, blood pressure recording, renal function tests, and lipid levels were sufficiently recorded (>75%) in the computer system. Histories of pertinent symptoms and smoking history were poorly recorded (<1%). Fifty-five percent of the hypertensive patients were sufficiently controlled (BP<140/90). There were significant differences between 2007 and 2008 with respect to documentation and recording of pertinent symptoms ($p<0.001$) and renal function tests ($p=0.026$).

Conclusion: Conducting an audit of EMR is essential to evaluate clinical performance and to determine what changes should be made to improve quality of care. There was significant improvement in documentation of pertinent symptoms in the second audit.

Keywords: Hypertension; Medical audit; Primary Health Care; Cardiovascular diseases; Blood Pressure; Humans; Clinical audit; Oman.

Introduction

Hypertension (HTN) is a major public health problem worldwide associated with high morbidity and mortality rates.¹

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The majority of cases are asymptomatic and, therefore, go unrecognized and untreated, leading to a high risk of coronary artery disease, heart failure, renal failure, cerebrovascular disease, and retinopathy.^{1,2,3,4} Evidence shows that the number of death and disability cases resulting from coronary heart disease and cerebrovascular disease is increasing rapidly in developing countries and are expected to rank as number one and four, respectively, as the major causes of the global burden of disease by the year 2020.^{4,5} The prevalence of HTN in industrialized countries is approximately 24%, whereas most surveys in less developed countries report a lower prevalence.⁴ In Oman, the crude prevalence of hypertension is 33.1%.⁶ The prevalence of pre-hypertension among pre-diabetic Omani adults is 54.1%.⁷ One study reported that the prevalence of uncontrolled hypertension in a cohort of Omani hypertensive patients was high (73%), and the main risk factors for uncontrolled hypertension were unhealthy lifestyle, obesity, age, family history, and stress.⁸ Data from the Oman National Health Survey, 2000 were analyzed, and 2% of the population were found to have hypertension, high cholesterol, diabetes and overweight/obesity.⁹

Improvement in the management of HTN has significantly decreased cardiovascular mortality in several developed countries.¹⁰ Well organized care can improve the outcome of the hypertensive patients by early prevention of complications.⁴ Because physicians have a direct role in treatment outcomes, physicians' overestimation about hypertension management can contribute to inadequate blood pressure control. Thus, interventions for improving physicians' awareness regarding the management of patients with hypertension are needed.¹¹

A clinical audit of EMR for hypertension was done twice at Sultan Qaboos University Hospital (SQU) Family Medicine Staff Clinic in Oman under the supervision of the Department of Family and Community Medicine to assess the quality of medical care given to hypertensive patients and to assess the improvement in patient care after the first auditing.

Methods

In this retrospective analysis, we investigated the process of care for patients with hypertension during 2007 and 2008. The target population consisted of staff members and their families working at Sultan Qaboos University, coming from different regions of the Sultanate. There was no specific clinic for hypertension.

A total of 300 patients were identified as hypertensive in the registry system. Of these patients, half (150) were randomly selected with the help of a pharmacist in the staff clinic at Sultan Qaboos University Hospital by collecting the medical record number (MRN) for any patient taking antihypertensive medication for a period of 2 months. Hypertensive patients usually attended the clinic every 2 to 3 months for follow-up and were seen by family medicine residents or senior family physicians. The study was approved by the Local Research Ethics Committee.

The indicators for structure, process, and outcome of hypertension care were assessed using the scoring system based on the recommendations by World Health Organization (WHO) and the seventh report of The Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure (JNCVII).¹⁰ For every patient, the MRN number, age, sex and number of visits to the staff clinic for year 2007 were documented. The number of times of blood pressure measurement was taken in year 2007 was documented. The number of documentation of important symptoms, e.g. chest pain, palpitation, dizziness, and shortness of breath in year 2007 was taken. Smoking history documentation in the patient file in year 2007 was checked. The following investigations (serum urea, creatinine, serum potassium, and serum lipid profile) were checked whether or not they were ordered in that year. The results of these investigations were documented as normal or abnormal according to the references which are used in the Sultan Qaboos University biochemistry lab. All of the data were collected from the computer using the Track Care system, which is part of the Hospital Information System. Then the principal investigator documented all the data in a specific form and transferred them into Microsoft Excel, and the data was then analyzed using SPSS version 16. The co-investigator reviewed

the entry of data for some patients to confirm the true entry of the data from the Track care computer system into the SPSS system. The results of this audit were presented as poster presentation in an international conference in Oman. After one year, the whole cycle was repeated again in 2008. The means and percentage of variables were calculated using SPSS version 16. McNemar's test was used to compare data in 2007 with data in 2008. All tests were two sided and a *p* value of <0.05 was considered statistically significant.

Results

One hundred and fifty hypertensive patients were included in the study. The patients' mean age was 54.8 +/- 9.9 years. All patients were Omanis except 10, 53.3% were females and 46.7% were males. Table 1 shows the means and percentages of all the variables in 2007 and 2008. Age, gender, blood pressure recordings, renal function tests, and lipid levels were adequately recorded in the computer system. Histories of important symptoms and smoking history were poorly recorded. Of the hypertensive patients, 56.4% were well controlled (BP<140/90). The last serum creatinine, last serum urea, and last serum potassium were normal in 89.7% to 96.7% of patients in 2007 and 2008. The last serum lipid profile (total cholesterol, low density lipoprotein, high density lipoprotein, and triglycerides) was normal in only 29.7% of patients in 2007, whereas it was normal in 40% of patients in 2008. Table 2 shows the results of McNemar's test which was used to compare two related and dependent variables, as well as the *p*-values. There were significant differences between 2007 and 2008 with respect to documentation and recording of important symptoms (*p*<0.001) and renal function tests in the computer (*p*=0.026).

Table 1: Means % of Variables in 2007 and 2008.

Variable	Year 2007	Year 2008
Age (mean ±SD)	54.8±9.9	55.8±9.9
Age % (<40 yrs)	6	6
Age % (≥40 yrs)	94	94
Sex % male	46.7	46.7
Sex % female	53.3	53.3
Documentation of important symptoms(chest pain, SOB, dizziness) Mean ±SD	0.03±0.16	0.65±1
Number of documentation of important symptoms		
None	97.3	61.4
One	2.7	23.6
Two	0	7.1
Three	0	4.3
Four	0	3.6
Documentation of smoking history		
% Documented	0.7	2.1
% Not Documented	99.3	97.9
Number of visits (Mean ±SD)	9.4 ±3.3	8.3± 3.8
% (1-10)	67.3	73
% (11-20)	32	26.2
%(21-30)	0.7	0.7

Table 1: Means % of Variables in 2007 and 2008

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Variable	Year 2007	Year 2008
Number of blood pressure measurement taken (Mean \pm SD)	4.6 \pm 2.9	3.9 \pm 2.8
% (0)	5.3	9.2
% (1-10)	91.3	88.7
% (11-20)	3.3	2.1
Last systolic blood pressure (Mean \pm SD)	138.6 \pm 18.3	138.9 \pm 17
%<140	57.9	56.2
% \geq 140	42.1	43.8
Last diastolic blood pressure (Mean \pm SD)	81.2 \pm 9.6	80.9 \pm 9.6
%<90	84.3	89.2
% \geq 90	15.7	10.8
Blood pressure last reading (systolic/diastolic)		
%<140/90	56.4	56.2
% \geq 140/90	43.6	43.8
Renal function test		
% Done	75.3	87.1
% Not Done	24.7	12.9
Lipid profile		
% Done	76	86.3
% Not Done	24	13.7
Last serum creatinine		
% Normal	90.2	91.7
% High	9.8	8.3
Last serum urea		
% Normal	90.1	89.7
% High	9.9	10.3
Last serum potassium		
% Normal	96.1	96.7
% High	3.9	3.3
Last serum lipid profile (T. cholesterol, LDL, HDL, Trig)		
% Normal	29.7	40
% One or more: High	70.3	60

Table 2: Percentages of variables and *p* values.

Variable	Year 2007	Year 2008	P value
Documentation of important symptoms (chest pain, SOB, dizziness)			
Documentation of important symptoms % within year			
% Documented	2.7	38.6	0.000
% Not documented	97.3	61.4	
Documentation of smoking history			
% Documented	0.7	2.1	0.250
% Not documented	99.3	97.9	
Number of visits			
% \leq 10 visits	67.3	73.0	0.222
% > 10 visits	32.7	27.0	
Number of blood pressure measurement			
% \leq 10 times	96.7	97.9	1.000
% >10 times	3.3	2.1	

Table 2: Percentages of variables and *p* values*-continued*

Variable	Year 2007	Year 2008	P value
Blood pressure last reading (systolic/diastolic)			
% <140/90	56.4	56.2	1.000
% ≥140/90	43.6	43.8	
Renal function test			
% Done	75.3	87.1	0.026
% Not Done	24.7	12.9	
Lipid profile in last one year			
% Done	76.0	86.3	0.072
% Not Done	24.0	13.7	
Last serum creatinine			
% Normal	90.2	91.7	0.344
% High	9.8	8.3	
Last serum urea			
% Normal	90.1	89.7	0.508
% High	9.9	10.3	
Last serum potassium			
% Normal	96.1	96.7	1.000
% High	3.9	3.3	
Last serum lipid profile(T. cholesterol, LDL, HDL, Trig)			
% Normal	29.7	40.0	0.091
% one or more: High	70.3	60.0	

Discussion

Analysis of data in this audit shows poor documentation of history of important symptoms, e.g chest pain, palpitation, dizziness and shortness of breath, and documentation of smoking history. The factors which can contribute to these results are; 1) a new computer system (Track Care) and perhaps the doctors documented the history but forgot to save it, 2) a busy clinic and no time to write in the computer, 3) lack of knowledge of important symptoms which are essential to ask in any hypertensive patient, and 4) smoking history may have been documented several years back, but the doctor may have neglected to document it again. The lipid profile was poorly controlled, and the factors which could have contributed to these result are; 1) poor compliance of patients of statins, 2) inadequate dose of statins, 3) unhealthy life style, and 4) poor knowledge of the doctor of the importance of primary prevention of hyperlipidemia. Blood pressure last reading was normal (<140/90) in 56% of patients, which is lower than in some studies which reported a range between 63% and 71.3% of patients with blood pressure <140/90.^{12,13,14}

Other studies showed a lower rate (16%-44%) of blood pressure control in patients with blood pressure <140/90.^{4,15,16,17} Our analysis showed that the blood pressure measurements increased from 96.7% in 2007 to 97.9% in 2008. Another study done in Italy showed that the blood pressure recordings increased from 62% to 70% in the years 2004 to 2006.¹⁸ Some studies revealed a drop in blood pressure measurements from 89.1% to 85.3%.¹⁹ There

was a significant increase in performing renal function tests, from 75.3% in 2007 to 87.1%, ($p=0.026$). Some studies showed yearly improvements in electrolyte testing, from 28% to 62%.²⁰

One of the limitations of this study is that our sample may not be representative of the whole country so these results cannot be generalized to other clinics in Oman. We did not include in the auditing whether patients visited only the primary healthcare center or also secondary or tertiary healthcare centers. Another limitation could have been that only one reading for blood pressure was taken, which is the last reading, and this may not have been enough. Probably taking two to three readings and then taking the average would have been more conclusive. Electrocardiogram (ECG) results were not included in the auditing, because the computer Track Care system was new and in almost all patients it was hard to trace the ECG, especially in 2007. Also, entering data from the Track Care computer system to the SPSS system may have exposed us to observer bias and inter-observer bias.

Conclusion

Conducting an electronic chart audit is essential to evaluate clinical performance and to determine what changes should be made to improve the quality of care. There was a significant improvement in documentation of pertinent symptoms in the second audit.

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