

Research

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Management of Hypertension by Primary Health Care Providers in Khartoum, Sudan

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ABSTRACT

Background: Primary health care is the level where promotive, preventive, curative services are provided at the same place. It is thus the level in which modifiable risk factors for hypertension can be addressed together with treatment of known hypertensive patients.

Objectives: This study addressed the quality of management of hypertension in Public Primary Health Care Facilities in East-Nile locality, Khartoum State, Sudan.

Methodology: A Facility-based cross-sectional study was conducted, in which 26 primary public health centers and 3 rural hospitals were included. All the health care providers—119—in the public health facilities available during the data collection period, using 2 well-structured questionnaires were used. An ethical approval was obtained from the Sudan Medical Specialization Board (SMSB), and verbal consent was obtained from each health care provider prior to the interview. The collected data were analyzed using the Statistical Package for Social Science (SPSS) version 15.

Results: The majority of care providers, (71.4% of the physicians, and 93.5% of other care providers) were not trained on hypertension management. The study revealed marked gaps in the knowledge domain of the other health care providers, such as the standard management of hypertension, the proper measurement of blood pressure; lifestyle modification and serious complications of hypertension.

Conclusions: There is a need for strengthening the management of hypertension at primary care level through training and regular supervision.

KEYWORDS: Hypertension; Primary health care; Primary health care providers; Non-communicable diseases (NCDs).

ABBREVIATIONS: NCDs: Non-communicable diseases; QA: Quality Assurance; PHC: Primary Health Care; DASH: Dietary Approach to Stop Hypertension.

INTRODUCTION

Globally there are one billion hypertensive patients due to prevalence of contributing modifiable risk factors such as unhealthy diet, physical inactivity, tobacco and alcohol use, and hyperlipidemia—which are not addressed well yet, and the number of patients is expected to rise. In the Eastern Mediterranean Region, the prevalence of hypertension averages 26% and it affects approximately 125 million individuals.¹

Hypertension has the highest prevalence among the major non-communicable diseases (NCDs) in Sudan represented a quarter of NCDs.² Hypertension in Sudan is one of the 10 leading diseases treated in outpatients of health facilities and also is one of the 10 leading causes of deaths in Sudan.³

Proper management of hypertension has been associated with about a 40% reduction in the risk of stroke and about a 15% reduction in the risk of myocardial infarction. Thus, with applying standard management of hypertension, we can reduce the major complications that

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lead to morbidity, disability and mortality.⁴ The package of services include training of care providers combined with provision of preventive and curative services as well as an education of patients and their relatives.

Despite the importance of quality, to date there have been few sustained quality assurance (QA) efforts in developing countries.⁵ Many evaluations have focused on measuring changes in mortality and morbidity, or on measuring coverage rates. Few have emphasized the quality of services or the process of service delivery. Primary health care (PHC) level is the first contact of the community with the health system, and high percentage of population use PHC, as it is more accessible and affordable and hence it has a drive to reach vulnerable populations.

In Sudan delivery of care has been based on the PHC approach, with over 2078 PHC centers and 380 rural hospitals, according to Federal Ministry of Health, health map, in October 2012, distributed all over Sudan, supposed to deliver; promotive, protective, curative, and rehabilitative services, but have never functioned as such as mentioned in non-communicable diseases strategy 2010.

The main purpose of this study is to assess the providers competencies and to explore the quality of hypertension management at primary health care facilities in Khartoum, Sudan. Such assessment is highly needed to identify points of weakness within programs that call for strengthening.⁶

METHODOLOGY

A facility-based cross-sectional descriptive study was conducted at 26 public health centers and 3 rural hospitals in East Nile locality, Khartoum State, Sudan.

The study population composed of all the health care providers in the public health facilities available during the study period after their consent had been obtained. They were 119 care providers of various categories: 42 physicians (10 consultants and 32 general practitioners) and 77 non-physicians (12 medical assistants, 51 nurses, 4 midwives and 10 health visitors).

Two well-structured questionnaires were used:

A self-administered questionnaire was used to collect data from physicians, and another questionnaire was used to interview non-physicians providers.

The collected data were analyzed using the Statistical Package for Social Science (SPSS) version 15.

RESULTS

Almost 2/3rd of physicians (61.9%) did not know that hypertension is one of the serious risks for cardiovascular diseases. On the other hand, the majority of them has fair knowledge on sus-

picion of secondary hypertension and has fair knowledge on the classification of hypertension. Nearly all of them identified the serious complications of hypertension.

Almost all (97.6%) physicians agreed on the lifestyle modification as important measure for preventing or delaying the onset of hypertension and its complications. They identified all the risk factors (obesity/overweight, physical inactivity, unhealthy diet, tobacco use, dyslipideamia and alcohol use), and knew the risky groups for developing hypertension. The majority (90%) of physicians have good skills on standard management of hypertension (non-drug treatment or life style modification, and drug treatment), and the same result was found for the investigations needed for hypertension. All of the physicians agreed on referral of the patients to high facility levels and on importance of regular follow-up for hypertensive patients (Table 1).

In Table 2, the majority of non-physicians did not know that hypertension is one of the serious risks for cardiovascular diseases and 96.8% of them did not know the standard cuff size of the devices. Almost all of them did not know the recommended instructions before checking the blood pressure. On the other hand, 78.1% and 93.2% of them identified hypertensive cardiac damage and brain damage as complication respectively, but only 12.3% and 34.2% of them knew hypertensive vascular damage and hypertensive renal damage respectively. However, their knowledge of risk factors varies. Regarding the referral practice, 87.5% of non-physicians agreed on referral of the patients to high facility levels, and 87.5% of them were willing to arrange means of transportation for that. Most of non-physicians agreed with regular follow-up of the patients.

DISCUSSION

The quality of technical care consists in the application of medical science and technology in a way that maximizes its benefits to health without correspondingly increasing its risks. The degree of quality is, therefore, the extent to which the care provided expected to achieve the most favorable balance of risks and benefits.⁷

Proper performance (according to standards) of interventions that are known to be safe, that are affordable to the society in question, and that have the ability to produce an impact on mortality, morbidity, disability, and malnutrition.⁶

Moreover, the aspects for assessment of the quality of the services include suitability for providing the programmed services in reliable manner. Therefore, quality can be measured by the components and dimensions of the health care system.

The activities should be delivered in a manner that integrates attention to the essential health care needs, combining preventive and curative aspects, as well as an educational component.⁸

Training (baseline and in-service), is one of the qual-

Item	Definition of item	Agree	Disagree
Definition of hypertension	<ul style="list-style-type: none"> ▪ Arterial blood pressure with doubling of cardiovascular risk ▪ Systolic blood pressure >140 mmHg or diastolic blood pressure >90 mmHg 	<ul style="list-style-type: none"> ▪ 16 (38%) ▪ 40 (95%) 	<ul style="list-style-type: none"> ▪ 26 (62%) ▪ 2 (5%)
Suspicion of secondary hypertension	<ul style="list-style-type: none"> ▪ Cushing syndrome ▪ Aortic Coarctation ▪ Polycystic kidney ▪ Aortic disease ▪ Renovascular hypertension 	<ul style="list-style-type: none"> ▪ 35 (83%) ▪ 30 (71%) ▪ 35 (83%) ▪ 29 (69%) ▪ 30 (71%) 	<ul style="list-style-type: none"> ▪ 7 (17%) ▪ 12 (29%) ▪ 7 (17%) ▪ 13 (31%) ▪ 12 (29%)
Classification of hypertension	<ul style="list-style-type: none"> ▪ Normal : S<130 D<85 ▪ High-normal S 130-139 D 85-89 ▪ Grade 1: S 140-159 D 90-99 ▪ Grade 2: S 160-179 D 100-109 ▪ Grade 3: S>180 D>110 ▪ Isolated Systolic Hypertension S>140 D<90 	<ul style="list-style-type: none"> ▪ 37 (88%) ▪ 32 (76%) ▪ 40 (95%) ▪ 40 (95%) ▪ 39 (93%) ▪ 24 (57%) 	<ul style="list-style-type: none"> ▪ 5 (12%) ▪ 10 (24%) ▪ 2 (5%) ▪ 2 (5%) ▪ 3 (7%) ▪ 18 (43%)
Risky group for developing hypertension	<ul style="list-style-type: none"> ▪ Pre-hypertensive ▪ Family history of hypertension ▪ Diabetic patients ▪ Hypertension with pregnancy ▪ Individual with risk factors ▪ Age above 40 years 	<ul style="list-style-type: none"> ▪ 27 (64%) ▪ 41 (98%) ▪ 38 (90.5%) ▪ 40 (95%) ▪ 41 (98%) ▪ 33 (79%) 	<ul style="list-style-type: none"> ▪ 15 (36%) ▪ 1 (2%) ▪ 4 (9.5%) ▪ 2 (5%) ▪ 1 (2%) ▪ 9 (21%)
Serious complication of hypertension	<ul style="list-style-type: none"> ▪ Cardiac damage ▪ Vascular damage ▪ Renal damage ▪ Brain damage 	<ul style="list-style-type: none"> ▪ 41 (98%) ▪ 41 (98%) ▪ 41 (98%) ▪ 38 (90.5%) 	<ul style="list-style-type: none"> ▪ 1 (2%) ▪ 1 (2%) ▪ 1 (2%) ▪ 4 (9.5%)
Modifiable risk factors of hypertension	<ul style="list-style-type: none"> ▪ Tobacco use ▪ Unhealthy diet ▪ Alcohol use ▪ Sedentary life ▪ Obesity/overweight ▪ Dyslipideamia 	<ul style="list-style-type: none"> ▪ 36 (86%) ▪ 40 (95%) ▪ 39 (93%) ▪ 36 (86%) ▪ 42 (100%) ▪ 31 (74%) 	<ul style="list-style-type: none"> ▪ 6 (14%) ▪ 2 (5%) ▪ 3 (7%) ▪ 6 (14%) ▪ 0 ▪ 11 (26%)
Treatment of hypertension	<ul style="list-style-type: none"> ▪ Non-drug treatment ▪ Drug treatment 	<ul style="list-style-type: none"> ▪ 38 (90.5%) ▪ 40 (95%) 	<ul style="list-style-type: none"> ▪ 4 (9.5%) ▪ 2 (5%)
Investigations needed for hypertensive patient	<ul style="list-style-type: none"> ▪ Urine for albumin ▪ Renal function test ▪ Lipid profile ▪ X-ray chest ▪ ECG 	<ul style="list-style-type: none"> ▪ 42 (100%) ▪ 42 (100%) ▪ 41 (98%) ▪ 38 (90.5%) ▪ 42 (100%) 	<ul style="list-style-type: none"> ▪ 0 ▪ 0 ▪ 1 (2%) ▪ 4 (9.5%) ▪ 0
Measures to delay/prevent hypertension	<ul style="list-style-type: none"> ▪ Eat healthy diet ▪ Decrease body weight ▪ Regular physical exercise ▪ Stop tobacco use 	<ul style="list-style-type: none"> ▪ 41 (100%) ▪ 41 (100%) ▪ 41 (100%) ▪ 39 (95%) 	<ul style="list-style-type: none"> ▪ 0 ▪ 0 ▪ 0 ▪ 2 (5%)
Methods to prevent hypertension's complications	<ul style="list-style-type: none"> ▪ Lifestyle modification ▪ Continuous medication ▪ Regular follow-up 	<ul style="list-style-type: none"> ▪ 41 (98%) ▪ 42 (100%) ▪ 42 (100%) 	<ul style="list-style-type: none"> ▪ 1 (2%) ▪ 0 ▪ 0
Referral of hypertensive patients to high facility levels	<ul style="list-style-type: none"> ▪ Acceptant for referral ▪ Can arrange transportation if no ambulance 	<ul style="list-style-type: none"> ▪ 42 (100%) ▪ 32 (76%) 	<ul style="list-style-type: none"> ▪ 0 ▪ 10 (24%)
Importance of regular follow-up for hypertensive patients	<ul style="list-style-type: none"> ▪ Ask the patient for regular follow-up ▪ Need health education in every follow-up visits ▪ Need to change the treatment plan in follow-up visits 	<ul style="list-style-type: none"> ▪ 41 (98%) ▪ 36 (86%) ▪ 24 (57%) 	<ul style="list-style-type: none"> ▪ 1 (2%) ▪ 6 (14%) ▪ 18 (43%)

Table 1: Knowledge and practice of physicians at primary health care towards standard management of hypertension.

ity's indicators, in this study the majority of care providers were not trained. This means that the in-service training on hypertension management is limited, and this can affect the competency of the health care providers, and consequently the quality of services provided to hypertensive patients.

For the knowledge of care providers; Most of the physicians, did not know that hypertension is one of the serious risk for cardiovascular diseases. This finding can be counted as negative indicator for the health care providers, and the main reason, most probably, is due to the fact that the study care providers were not subjected to quality comprehensive in-service training on hypertension management.

In addition, most of the physicians have fair knowledge on suspicion of secondary hypertension and the classification of hypertension, serious complications of hypertension, so this can help much in early detection and proper diagnosis and management of hypertension and its complications.

Moreover, the possibility to delay the onset of hypertension and its complications, nearly all physicians, mentioned that, continuous drugs used with regular follow-up could prevent hypertensive's complications.

Lifestyle modification could reduce systolic blood pressure: by 5-20 mmHg/10 kg with weight reduction; 8-14 mmHg by adoption of dietary approach to stop hypertension (DASH);

Item	Definition of item	Agree	Disagree
Definition of hypertension	<ul style="list-style-type: none"> ▪ Arterial blood pressure with doubling of cardiovascular risk ▪ Systolic blood pressure >140 mmHg or diastolic blood pressure >90 mmHg 	<ul style="list-style-type: none"> ▪ 6 (8%) ▪ 68 (88%) 	<ul style="list-style-type: none"> ▪ 71 (92%) ▪ 9 (12%)
Risky group for developing hypertension	<ul style="list-style-type: none"> ▪ Pre-hypertensive ▪ Family history of hypertension ▪ Diabetic patients ▪ Hypertension with pregnancy ▪ Individual with risk factors ▪ Age above 40 years 	<ul style="list-style-type: none"> ▪ 2 (3%) ▪ 68 (94%) ▪ 20 (28%) ▪ 63 (87.5%) ▪ 47 (65%) ▪ 45 (62.5%) 	<ul style="list-style-type: none"> ▪ 70 (97%) ▪ 4 (6%) ▪ 52 (72%) ▪ 9 (12.5%) ▪ 25 (35%) ▪ 27 (37.5%)
Serious complication of hypertension	<ul style="list-style-type: none"> ▪ Cardiac damage ▪ Vascular damage ▪ Renal damage ▪ Brain damage 	<ul style="list-style-type: none"> ▪ 57 (78%) ▪ 9 (12%) ▪ 25 (34%) ▪ 68 (93%) 	<ul style="list-style-type: none"> ▪ 16 (22%) ▪ 64 (88%) ▪ 48 (66%) ▪ 5 (7%)
Modifiable risk factors of hypertension	<ul style="list-style-type: none"> ▪ Tobacco use ▪ Unhealthy diet ▪ Alcohol use ▪ Sedentary life ▪ Obesity/overweight ▪ Dyslipideamia 	<ul style="list-style-type: none"> ▪ 60 (92%) ▪ 36 (55%) ▪ 15 (23%) ▪ 12 (18.5%) ▪ 63 (97%) ▪ 18 (28%) 	<ul style="list-style-type: none"> ▪ 5 (8%) ▪ 29 (45%) ▪ 50 (77%) ▪ 53 (81.5%) ▪ 2 (3%) ▪ 47 (72%)
The standard measurement of blood pressure	<ul style="list-style-type: none"> ▪ Factors affecting the blood pressure ▪ Standard cuff size of the devices 	<ul style="list-style-type: none"> ▪ 1 (2%) ▪ 2 (3%) 	<ul style="list-style-type: none"> ▪ 62 (98%) ▪ 61 (97%)
Investigations needed for hypertensive patient	<ul style="list-style-type: none"> ▪ Urine for albumin ▪ Renal function test ▪ Lipid profile ▪ X-ray chest ▪ ECG 	<ul style="list-style-type: none"> ▪ 47 (77%) ▪ 27 (44%) ▪ 37 (61%) ▪ 13 (21%) ▪ 44 (72%) 	<ul style="list-style-type: none"> ▪ 14 (23%) ▪ 34 (56%) ▪ 24 (39%) ▪ 48 (79%) ▪ 17 (28%)
Measures to delay/prevent hypertension	<ul style="list-style-type: none"> ▪ Eat healthy diet ▪ Decrease body weight ▪ Regular physical exercise ▪ Stop tobacco use 	<ul style="list-style-type: none"> ▪ 41 (61%) ▪ 63 (94%) ▪ 35 (52%) ▪ 62 (92.5%) 	<ul style="list-style-type: none"> ▪ 26 (39%) ▪ 4 (6%) ▪ 32 (48%) ▪ 5 (7.5%)
Methods to prevent hypertension's complications	<ul style="list-style-type: none"> ▪ Lifestyle modification ▪ Continuous medication ▪ Regular follow-up 	<ul style="list-style-type: none"> ▪ 29 (38%) ▪ 76 (100%) ▪ 76 (100%) 	<ul style="list-style-type: none"> ▪ 47 (62%) ▪ 0 ▪ 0
Referral of hypertensive patients to high facility levels	<ul style="list-style-type: none"> ▪ Acceptant for referral ▪ Can arrange transportation if no ambulance 	<ul style="list-style-type: none"> ▪ 14 (87.5%) ▪ 14 (87.5%) 	<ul style="list-style-type: none"> ▪ 2 (12.5%) ▪ 2 (12.5%)
Importance of regular follow-up for hypertensive patients	<ul style="list-style-type: none"> ▪ Ask the patient for regular follow-up ▪ Need health education in every follow-up visits ▪ Need to change the treatment plan in follow-up visits 	<ul style="list-style-type: none"> ▪ 15 (94%) ▪ 13 (72%) 	<ul style="list-style-type: none"> ▪ 1 (6%) ▪ 5 (28%)

Table 2: Knowledge and practice of non-physicians at primary health care towards standard management of hypertension.

2-8 mmHg reduction can be achieved by decreasing dietary sodium and 4-9 mmHg by physical activity.⁹ Most of physicians agreed on the important of lifestyle modification as measure for preventing or delaying of the onset of hypertension and its complications, this because most of them identified correctly all the risk factors of hypertension.

In addition, most of the physicians have good skills on standard management of hypertension, good knowledge on investigations needed, and referral criteria to high facility levels, and they could arrange other means of transportation for referral if ambulance was not available.

In addition, most of the care providers considered that regular follow-up of the patients to assess the efficacy of the prescribed drugs, to detect the effectiveness of the treatment plan, and to raise the patient's awareness on hypertension by continuous health educations is very important procedure for proper management of hypertension.

For non-physicians, most of them could not identify important items for the standard measurement technique of

blood pressure and this result can be considered as a negative indicator for the quality of hypertension management, because proper measurement of blood pressure plays an important role in diagnosis and control of hypertension.¹⁰

On the other hand, big number of them identified only hypertensive cardiac damage and brain damage respectively, but only small group of them knew hypertensive vascular damage-which affects the eyes and hypertensive renal damage respectively.

In addition only small number of them agreed on the important of lifestyle modification as measure for preventing or delaying of the onset of hypertension and its complications, and so on some of the modifiable risk factors (physical inactivity, dyslipideamia and alcohol consumption), these results can be considered as negative indicators, as hypertension can be prevented and control by lifestyle modification through prevention of the risk factors.

However, such difference in the knowledge between physicians and non-physicians partially can be attributed to the

contents and quality of in-service training on hypertension management and partially may be due to the difference on the basic educational training between the two groups of care providers.

In conclusion, the study revealed marked gaps in the knowledge domain of non-physicians, such as the standard management of hypertension, the proper measurement of blood pressure; lifestyle modification and serious complications of hypertension and thus in-service training is recommended for both physicians and non-physicians, and basic training is another important need for non-physicians.

ETHICAL CLEARANCE

An ethical approval was obtained from the Sudan Medical Specialization Board (SMSB), and verbal consent was obtained from each health care provider prior to the interview.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

REFERENCES

1. World Health Organization. Report on the Regional Consultation on Hypertension Prevention and Control (Abu Dhabi, United Arab Emirates, 20-22 December 2003), WHO-EM/NCD/042/E. Cairo, Egypt: Regional Office for the Eastern Mediterranean; 2004.
2. Federal Ministry of Health. Sudan Household Health Survey (SHHS) 2010, chronic diseases results. 2010. Website. <http://www.fmoh.gov.sd>. Accessed September 26, 2016.
3. Federal Ministry of Health. Annual health statistical report 2008. 2008. Website. <http://www.fmoh.gov.sd>. Accessed September 26, 2016.
4. Chobanian AV, Bakris GL, Black HR, et al. Seventh report of the Joint National Committee on prevention, detection, evaluation and treatment of high blood pressure. *Hypertension*. 2003; 42(6): 1206-1252. doi: [10.1161/01.HYP.0000107251.49515.c2](https://doi.org/10.1161/01.HYP.0000107251.49515.c2)
5. Nicholas DD, Heiby JR, Hatzell TA. The quality assurance project: Introducing quality improvement to primary health care in less developed countries. *Qual Assur Health Care*. 1991; 3(3): 147-165. doi: [10.1093/intqhc/3.3.147](https://doi.org/10.1093/intqhc/3.3.147)
6. Roemer MI, Montoya-Aguilar C. Quality assessment and assurance in primary health care. *WHO Offset Publ*. 1988; 105: 1-78. Web site. <http://www.popline.org/node/380816>. Accessed September 26, 2016.
7. Donabedian A. The definition of quality and approaches to its assessment. *Explorations in Quality Assessment and Monitoring*. Ann Arbor, MI, USA: Health Administration Press; 1980: 5-6.
8. Brown LDP, Miller Franco L, Rafeh N, Hatzell T. Quality assurance of health care in developing countries. *Quality Assurance Methodology Refinement Series*. Bethesda, MD, USA: Quality Assurance Project; 1998.
9. US Department of Health And Human Services (National Institutes of Health, National Heart, Lung, and Blood Institute, National High Blood Pressure Education Program). The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. NIH Publication No. 04-5230, 2004. Web site: <http://www.nhlbi.nih.gov/files/docs/guidelines/jnc7full.pdf>. Accessed September 26, 2016.
10. Osman EM, Suleiman I, Elzubair AG. Patients knowledge of hypertension and its control in Eastern Sudan. *East Afr Med J*. 2007; 84(7): 324-328. Web site. <http://www.ajol.info/index.php/eamj/article/view/9587>. Accessed September 26, 2016.