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The Potential Role of Nursing Students in the Implementation of Community-Based Hypertension Screening Programs in Sudan

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Abstract

Introduction: Hypertension (HTN), diabetes mellitus (DM) and chronic kidney disease (CKD) are important health problems worldwide, and it is possible to reduce their burden through effective HTN screening and treatment programs. It may be feasible to incorporate such programs in the community outreach activities of nursing and medical schools in Sudan.

Methods: Village inhabitants in the Northern state of Sudan were invited to attend a free clinic for screening of hypertension as well as for follow up and treatment of persons with previously diagnosed hypertension. Fourth year nursing students from the National Ribat University were asked to record demographic data and blood pressure measurements for the attendants of the clinic.

Results: A total of 389 adults were screened, their mean age was 41±15 years and 83.8% of them were females. Family history of HTN, DM and CKD was reported by 52.7%, 40.4% and 12.9% respectively. Personal history of HTN, DM and CKD was reported by 28.5%, 17% and 6.4% respectively. The overall prevalence of HTN was 39.6%. Among persons previously diagnosed as hypertensive, 80.2% were on antihypertensive medication but only 48.6% had blood pressure < 140/90 mmHg. Among the 278 persons with no personal history of HTN, 19.1% had blood pressure ≥ 140/90 mmHg. Variables significantly and independently associated with the presence of HTN were family history of HTN (OR: 6.4, P: 0.005), less than 10 years of formal education (OR: 3.5, P: 0.000) and age ≥ 40 years (OR: 2.4, P: 0.005).

Conclusion: With proper coordination, nursing and medical students can effectively contribute to the implementation of hypertension screening programs.

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Introduction

Non-communicable disease such as hypertension (HTN), diabetes mellitus (DM) and chronic kidney disease (CKD) constitute a heavy burden on patients and health systems alike. HTN, in particular, accounts for one in every third deaths worldwide [1]. It increases the risk of stroke, myocardial infarction, congestive heart failure, sudden cardiac death, peripheral vascular disease and renal insufficiency. Premature mortality from these complications could be prevented, to a considerable extent, by the effective control of HTN [2].

It has been shown in limited although extremely important programs that is feasible to reduce the burden of CKD in poor countries and among under privileged communities. The Kidney Help Trust of Chennai, India, has embarked in a screening program in an area of 25,000 people. All those who were positive for high blood pressure were treated with inexpensive anti-hypertensive drugs. Excellent blood pressure control was achieved and the annual cost of the program was well within the limit of Indian government health expenditure [3]. Among Australian Aborigines a very successful targeted program of detection and treatment of renal and cardiovascular diseases has been conducted from 1995 to 2000. After an average of 3.4 years of follow-up with ACE inhibitor treatment the incidence of ESRD was reduced by 63% and the non-renal death by 50% [4].

KHDC is the acronym of a program developed by the Research and Prevention Committee of the International Society of Nephrology for detection and management of CKD, HTN, DM and CVD [5]. It is an early detection and intervention program for emerging countries that would be implemented according to the particular needs, organization facilities and economic imperatives of the given country. It and may target a whole community or a targeted section of it. Trained personnel including social workers, nurses, medical staff and students will be responsible for collecting the general information on the subject's demographic data, risk factors for non-communicable diseases as well as family and medical history in a special form. They will also measure blood pressure (BP), weight, height, waist and hip circumferences and record it.

Nationwide data for the status of HTN in the adult population of Sudan is not available. Many universities organize community outreach programs as part of their medical and nursing students training programs. With proper organization at the national level, it may be possible to incorporate screening programs such as the KHDC into these activities. To explore this potential, we asked fourth year nursing students from the National Ribat University to fill the KHDC screening form and check the BP for the attendants of a temporary free clinic they set up in a village in February 2011. The village itself is a small village with about 1000 residents in the Northern State of Sudan, and the clinic was part of a community outreach program organized by the National Ribat University. Similar programs are organized by the National Ribat University in different villages each year and include, in addition to free clinics, a variety of health education campaigns.

Methods

In February 2011, village inhabitants in the Northern state of Sudan were invited to attend a free clinic for screening of hypertension as well as for follow up and treatment of persons with previously diagnosed hypertension. All adults who attended the clinic were invited to participate in the current survey. Nursing students were asked to fill the KHDC Screening Form-1 which contained general information on the subject's demographic data, diet, smoking, alcohol consumption and physical activity as well as data about family and medical history for kidney disease, high blood pressure, diabetes and cardiovascular disease and, if any, current treatment. Students then checked the subject's weight and height and recording this information in Screening Form-2. Blood pressure measurement was taken twice, five minutes apart, and the average was also recorded in Screening Form-2. Hypertension was defined as systolic blood pressure >140 mmHg or diastolic blood pressure >90 mmHg or and/or concomitant use of antihypertensive medications.

Statistical analysis was done using SPSS for windows version 17 (SPSS Inc. Chicago, IL, USA). Binomial regression analysis was used to evaluate risk factors for the diagnosis of hypertension among the study population. P value < 0.05 was considered significant.

Results

The study included 389 subjects, 154 of whom (39.6%) were found to be hypertensive. The demographic and life style characteristics of surveyed subjects are shown (Table-1). A prior diagnosis of HTN was reported by 111/389 subjects (28.5%). Among persons previously diagnosed as hypertensive, 80.2% were on antihypertensive medication but only 48.6% had blood pressure < 140/90 mmHg. Among the 278 persons with no personal history of HTN, 19.1% had blood pressure ≥ 140/90 mmHg. Family history of HTN and DM was very frequent among surveyed subjects (Table-2).

Variables significantly associated with the presence of HTN were family history of HTN, less than 10 years of formal education and age ≥ 40 years (Table-3).

Discussion

The prevalence of HTN appears to be affected by ethnicity and geographic area. In the United States, the national health and nutrition survey (NHANES III) estimated that the age-adjusted prevalence of HTN was 32% in the non-Hispanic black population and 23% in the non-Hispanic white and Mexican-American populations [6]. The age and sex adjusted comparative prevalence of HTN as assessed in sample national surveys in the 1990s, was reportedly 28 and 44% in North America and Europe respectively [6].

In recent surveys of HTN in Tunisia, Jordan and Zambia the reported prevalence of HTN was 30.6%, 32.2% and 34.8% respectively [7-9]. In a previous report from Sudan, the prevalence of HTN was 27% among 426 inhabitants of two police housing-complexes in Khartoum [10]. The higher prevalence of HTN in the current survey (39.6%) is expected due to its nature as a clinic based survey since subjects with personal history of HTN are likely to be more motivated to come to the clinic. In the previously mentioned community based surveys conducted in Jordan, Tunisia and Sudan the rate of newly diagnosed HTN was 14-19% [7, 8, 10]. These figures are consistent with our findings, and indicate that such screening programs are worthwhile. The reported rates of treatment among aware patients in Tunisia and Jordan are 84.8% and 63.3% respectively, and the control rates are 24.1% and 39.6% respectively [7, 8]. We found similar treatment rate in the current surveys (80.2%) and a higher rate of blood pressure control (48.6%).

Table 1: demographic, life style and anthropometric characteristics of the study population (N = 389)

Characteristics	
Age in years (mean ± SD)	41 ± 15
Gender (male/female)	63/326
Marital status (unmarried/married)	69/320
Education (%)	
None	36.8
1-5 years	12.1
6-9 years	20.4
> 10 years	30.7
Work (%)	
None	51.3
Laborer/farm	11.0
Office	10.4
House	27.3
Vegetable intake (%)	
None	4.5
Once a week	47.2
2-3 times a week	35.8
Everyday	12.5
Smoking (%)	
Yes, current	8.0
Yes, former	4.8
No	87.2
Alcohol intake (%)	
No	98.3
Once a month	1.4
Once a week	0.0
Once a day	0.3
Physical activity (%)	
No	51.3
< 30 min/day	26.9
30-60 min/day	14.0
> 60 min/day	7.7
Body mass index (%)	
< 18 kg/m^2	6.2
18-24.9 kg/m^2	65.8
25-29.9 kg/m^2	20.2
≥ 30 kg/m^2	7.8
Blood pressure (%)	
< 140/90 mmHg	60.4
≥ 140/90 mmHg	39.6

The highly significant association between low educational level and HTN in the current study is not surprising. Increasing research indicates that the incidence and prevalence of HTN are highly associated with social class as best measured by education and occupation [11]. The reported prevalence of HTN in a large national survey in China was 29.7%, 18.8% and 15.8% among participants with 0-6 years, 7-9 years and ≥ 0 years of formal school education respectively [12]. In the previously mentioned report from Tunisia, prevalence of HTN was significantly higher among the less educated [8]. Low levels of education may be associated with unhealthy diet and increased alcohol consumption. It is also possible that increased educational attainment is associated with increased health awareness.

The findings of this survey suggest that age ≥ 40 and family history of HTN are excellent criteria for targeted screening programs in Sudan. Among screened subjects aged ≥ 40 years with family history of hypertension, every fourth person was found to have high blood pressure. In contrast, only one out of 10 screened persons aged < 40 years without family history of hypertension was found to have high blood pressure.

Conclusion

The current study highlights the need for a community-based HTN screening program in Sudan, especially in rural areas. With proper coordination, nursing and medical students can effectively contribute to the implementation of such programs.

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Table 2: Prevalence of family history, medical history and present treatment for various chronic medical conditions among surveyed persons (N=389)

	Family history	Personal history	Present treatment
Chronic kidney disease	12.9	6.4	5.1
Diabetes mellitus	40.4	17.0	13.6
High blood pressure	52.7	28.5	22.9
Heart attack or stroke	7.5	3.1	1.8

Table 3: Binomial regression analysis of risk factors for diagnosis of hypertension among surveyed persons (N = 389)

Variable	OR	95% CI	P value
Age ≥ 40 years	2.4	1.3-4.5	0.005 *
Male gender	1.7	0.7-4.2	0.2
Education < 10 years	3.5	1.8-7.0	0.000 *
Vegetable consumption < 3 times per week	0.9	0.5-1.6	0.6
Smoking history	2.3	0.8-6.3	0.1
Alcohol consumption	3.9	0.3-52	0.3
Exercise < 30 minutes per day	1.2	0.6-2.4	0.6
Overweight/obesity	0.8	0.4-1.5	0.5
Family history of high blood pressure	6.4	3.4-12	0.005 *

* Statistically significant

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