Hypertension in Juba, South Sudan

A retrospective cohort study of single blood pressure readings among potential blood donors at Juba Teaching Hospital 2010-2012

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Abstract

South Sudan is thought to be undergoing an epidemiological transition with an increasing burden of non-communicable diseases such as hypertension. No current data exist on the prevalence of these diseases. Blood pressure readings of 5660 blood donors during 2010-12 at Juba Teaching Hospital were analysed. Prevalence of hypertension was 19.3%, positively associated with older age and being male. This has implications for public health policy, indicating a need for prevention, screening and treatment to prevent complications of hypertension.

Background

Throughout sub-Saharan Africa, evidence exists that hypertension is prevalent, increasing, under-recognized and under-treated [1]. Complications such as cardiovascular disease, stroke and renal failure are costly both to patients and to health systems that are already under strain. Building a body of data on the prevalence of hypertension in these countries is of fundamental importance for planning preventative interventions and health services. In South Sudan, no such data currently exist.

Although hypertension remains more prevalent in economically developed countries (37.3%) compared to developing nations (22.9%), it is a much bigger problem in developing countries, in terms of actual numbers, awareness, treatment and complications [1]. Prevalence is also rising more rapidly across developing countries where it is estimated that three quarters (1.17 billion) of cases will exist by 2025 [1]. Recent studies from African countries have shown prevalence to be 15-50%, and higher in urban than in rural populations [2].

Although no data exist from South Sudanese populations, a study in Khartoum in 1990 estimated prevalence to be 7.5%, with a positive correlation between blood pressure and age, weight, body mass index and duration of urban residence [3]. More recently, data from the Sudan Household Survey in 2006 and STEPS survey of chronic disease risk factors in Khartoum found hypertension prevalence to be 20.1% and 20.4% respectively [4]. Of concern are the poor rates of knowledge and control of hypertension in sub-Saharan Africa. A systematic review of 25 studies across the region found that less than 40% of people knew they were hypertensive, less than 30% were on treatment and less than 20% of those on treatment had a controlled blood pressure [5]. In Kassala, Eastern Sudan, knowledge of hypertension was poor, compliance with anti-hypertensive drug treatment was 59%, and 36.8% said they could not afford to buy the drugs they were prescribed [6].

A recent article in the Sudan Tribune warned that rising levels of non-communicable diseases and an ageing population will have major implications for health and socio-economic development in the world's newest nation [7]. This study aims to estimate the prevalence of hypertension at Juba Teaching Hospital. These data will inform health-workers, public health officials and policy makers about the extent of the problem, and the need for screening, prevention and control measures.

Method

This is a retrospective cohort study of routine one-off blood pressure readings taken from potential blood donors at Juba Teaching Hospital from January 2010 until March 2012. People are eligible for blood donation if they are aged 18-45, reported feeling well at the time of donation, are not pregnant or lactating, with a haemoglobin of >12g/dl, weight of >50kg and systolic blood pressure of 90-140 mmHg. Blood is also screened for transmissible infections: HIV, hepatitis B and C and syphilis. Screening is performed in the blood bank by laboratory staff and records are kept of screening results for every potential donor who comes to donate. Blood pressure readings are taken prior to donation with a mercury sphygmomanometer. Potential donors are asked to sit quietly while their blood pressure is taken. The reading is then recorded in a book. The results of blood screening for infectious diseases are kept confidential by recording them next to an identification number allotted to each patient, and kept in a separate book.

The records for the time period January 2010 to March 2012 were reviewed and data including age, sex, infection

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screening results, haemoglobin, weight and blood pressure were imported to a Microsoft Excel (Microsoft, Redmond, WA, USA) sheet. No donor identifier information was recorded. Hypertension was classified as a systolic blood pressure >140 and/or a diastolic blood pressure >90. Data were analysed to calculate the prevalence of hypertension within this population and to compare prevalence amongst different age-groups.

Ethical approval was given by the South Sudan Ethics Board for a study analysing infection rates with HIV, hepatitis and syphilis in this cohort. While data were collected for this study attention was drawn to blood pressure readings that were also recorded. Permission was then given for carrying out a sub-analysis on the prevalence of hypertension in the population.

Setting

Juba Teaching Hospital is a 500+ bed tertiary referral hospital in South Sudan's capital city, Juba. The hospital has medical, surgical, obstetrics and gynaecology and paediatric departments. Blood transfusion is often necessary in emergencies for obstetric complications, trauma cases, gastro-intestinal bleeding and for babies with anaemia and decompensated heart failure. Urgent blood transfusions are also frequently requested for patients with severe anaemia (<5g/dl), which is common due to malaria, malnutrition and chronic disease.

South Sudan is urbanizing rapidly. The city of Juba had an estimated population of 250,000 in 2005, which was expected to double over the following 5 years [8]. Urbanization has consistently been found to be associated with rising levels of hypertension throughout sub-Saharan Africa [2].

Population

The people who volunteer for donation are mainly male relatives of patients admitted to the hospital. The majority are from Juba or surrounding areas (anecdotal evidence). A scheme to encourage donors among the 'ex-patriate' community in Juba was in operation since November 2011 which screened 67 donors during the period studied. All ex-patriate donors were normotensive.

Results

Blood bank records from January 2010 to March 2012 recorded that 7556 potential donors were screened for blood donation, an average of 280 per month. Blood pressure readings were recorded from 5660 potential donors (others were not done due to the person being unsuitable for blood donation, or were not recorded). The population screened for hypertension were mostly male (98%), with a mean average age of 31 years (SD 9.13, range 15-75).

Hypertension (BP >140/90) was recorded in 1093/5660 (19.3%) of people screened with one blood pressure reading prior to blood donation

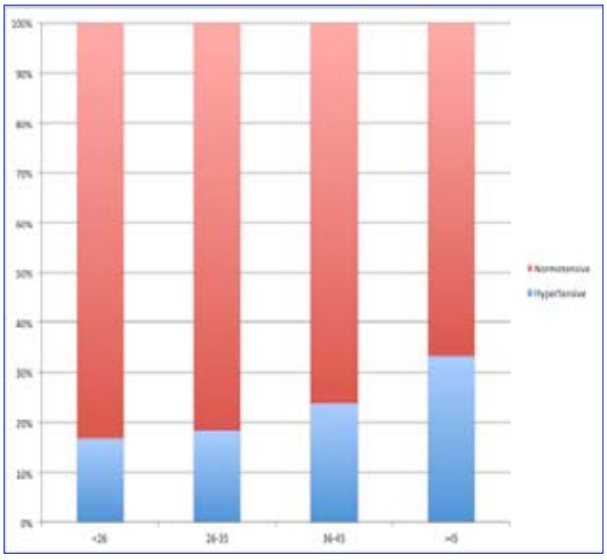

Figure 1. Prevalence of hypertension within different age-groups

Prevalence of hypertension among different age groups was calculated (Figure 1). In donors aged 25 and under, prevalence was 324/1935 (16.7%), in 26-34 year olds 436/2363 (18.5%) and in those aged 35 and over, 346/1359 (25.5%). The mean age of donors with a high blood pressure reading was 31.4 years (SD 8.7) compared to 29.2 years (SD 7.48) with a normal reading. Hypertension was significantly associated with age on Chi-squared testing ($p<0.001$).

Of all donors who had a blood pressure reading (n=5660), 5544 (98%) were male and 114 were female (two donors had no sex recorded and were excluded from the age-analysis). Hypertension was prevalent in 19.5% of the men who were screened and 9.6% of the women. Hypertension was found to be significantly associated with male gender on Chi-squared testing ($p = 0.008$).

Discussion

Hypertension is likely to pose a significant public health problem in South Sudan. The prevalence of hypertension in this cohort (19.3%) was similar to that found in neighbouring Sudan in 2006 (20.1-20.4%) [4], but not as high as that reported in rural Uganda (30.5%, with a 95% confidence interval of 26.6-34.3%) [9]. As found elsewhere in sub-Saharan Africa [5], it is significantly associated with older age and being male.

This is the first report of hypertension prevalence in South Sudan and it is therefore not possible to determine if it is increasing or remains stable. It is likely however, that this relatively high prevalence rate is related to urbanization and the related change in lifestyle within South Sudan, which would suggest that prevalence is increasing.

Although these data give a useful estimate of the prevalence of hypertension in South Sudan, it is a retrospective opportunistic study, which introduces some bias to the sample. For example, the fact that this was a self-selected cohort of people wishing to donate blood means that it is a mainly male and healthy population. Many of those not eligible to give blood (for example, they were underweight or anaemic), will not have been screened for hypertension.

There were also some donors recruited from the largely expatriate NGO community in Juba that could not be excluded since it was not possible to identify them from the donor screening records. However, this is not likely to have influenced results significantly as it was a relatively small number (n=67). Only one blood pressure reading was used, which may have been influenced by anxiety concerning blood donation. Although screening was done in an urban hospital, it is not known whether the donors originate from urban, semi-urban or rural areas. It is also not known what other risk factors (other than age and sex) were associated with hypertension in this population, or the percentage who previously knew they were hypertensive and were on medication.

These would be interesting areas for further research in a prospective multi-centre study using a targeted questionnaire to gain a more accurate estimate, to analyse significant associations and any difference between urban and rural areas in South Sudan. The prevalence of associated risk factors for heart disease such as diabetes and hypercholesterolaemia in South Sudan would also be an important focus of future studies.

Although these data are likely to incorporate some bias as discussed, the results are very concerning. Evidence from Sudan [6] found low levels of screening for hypertension, initiation or continuation of treatment and of treatment success. This was largely due to a lack of awareness and understanding about the risks associated with hypertension, and patients being unable to access or afford medical treatment. A similar situation is likely to exist in South Sudan. Untreated hypertension is associated with risks of heart disease, peripheral vascular disease, stroke, eye disease and renal failure. A study in Kinshasa, Democratic Republic of Congo found more than 10% of the population to exhibit signs of chronic kidney disease and that hypertension was independently associated [10]. These complications of hypertension are already prevalent in South Sudan causing high levels of morbidity and mortality and an increasing financial burden on the health service.

The health sector in South Sudan is currently making a transition from providing an 'emergency response' to conflict and infection-related health problems, to one that provides a more holistic and sustainable service. In doing this, health policy makers must consider the parallel epidemiological transition that is occurring. As has been witnessed in many other sub-Saharan countries [11], South Sudan is likely to be developing a double burden of disease, with infectious diseases remaining the main cause of morbidity and mortality but non-communicable diseases becoming more prevalent. It is imperative that blood pressure screening takes place, that hypertension cases are identified, treated and followed up, and that the population is informed about prevention and risks associated with the condition. Without public health interventions such as these, the problem of hypertension will continue to increase, causing chronic debilitating disease, high mortality rates and a growing financial burden on the health sector in South Sudan.

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