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Prevalence of undiagnosed hypertension and related risk factors in Wad-Medani Alkobra locality in Gezira State, Sudan, 2022

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Abstract

Background: Hypertension is defined as blood pressure $\geq 140/90$ mm Hg. It is emerging as one of the major healthcare challenges in low- and middle-income countries. Hypertension is considered as a silent killer and is the leading risk factor for cardiovascular mortality and accounts for a large proportion of premature deaths in developing countries. Most people with hypertension are asymptomatic and are undiagnosed for years.

Objectives: This study aimed to find out the prevalence of undiagnosed hypertension and related risk factors among adults in Wad Medani Alkobra locality in Gezira State, Sudan.

Methods: A community-based cross-sectional study involving 464 adults in different locations in Wad-Medani Alkobra locality, from June 2022 to August 2022 was performed in collaboration with the Sudanese Society of Hypertension within May Measure Month (MMM) 2022 study. WHO Stepwise Approach to Surveillance (STEPS) questionnaire was used to collect data, and was analyzed by SPSS version 20. Demographics, blood pressure, pulse, and socioeconomic status were measured. Diagnosis of hypertension was defined based on a systolic and diastolic blood pressure of ≥ 140 mmHg and ≥ 90 mmHg, respectively and three readings were obtained. Blood pressure was measured in all women and men aged 15 years and above.

Results: Total number of study population was 464, males were 239 (52%), females were 225 (48%). Mean age was 45 years. 68 were known hypertensive (15%). Of those who are hypertensive, 27 (39%) had high blood pressure. Undiagnosed hypertension in the study population was found to be 10% (39 individual) which equals to 59.1% from the total number of the populations who had HTN (66). The prevalence of HTN (new and old cases) in this study group was 25%. There was positive relation between high blood pressure and old age, diabetes mellitus increased body weight and sex (more common in males), P-value was (,0.00, 0.026, 0.014, 0.033) respectively.

Conclusions: The prevalence of hypertension was high and associated with some modifiable risk factors which should be addressed. Frequent screening and proper treatment is required to prevent complications of this hidden epidemic.

Keywords: Blood Pressure; Prevalence; Undiagnosed Hypertension; Risk factors; Sudan

1. Background

Hypertension (HTN) is defined as blood pressure $\geq 140/90$ mm Hg. It is emerging as one of the major healthcare challenges in low- and middle-income countries. HTN is considered as a silent killer and is the leading risk factor for cardiovascular mortality and accounts for a large proportion of premature deaths in developing countries. It has great

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burden on health services as well as on individuals. Most people with hypertension are asymptomatic and are undiagnosed for years. It is a serious health problem that threatens one fourth of the adult population in some countries. Around 75% of hypertensive patients are aware of their disease, and one fourth to one half of them get proper treatment¹. Globally around 1.13 billion adults had hypertension with a high prevalence in low and middle-income countries where we find a weak health system to diagnose, treat and control hypertension². A proper understanding of the pattern of HTN burden, such as reliable information about the prevalence and related risk factors of hypertension, is crucial in developing effective prevention and control strategies and is also useful for decision-maker to plan for proper health strategies³. Sudan, like some LMICs has significant gaps in the cascade of hypertension care (including screening, awareness, treatment, and control). This results in uncontrolled hypertension, placing a high burden on both patients and healthcare providers and on top of that, the majority of people with hypertension are asymptomatic and in addition there are only few studies in Sudan for the detection of prevalence of undiagnosed hypertension. Undiagnosed and uncontrolled HTN is largely prevalent in low-income and middle-income countries (LMICs), which has low resource setting, and if diagnosed early this will lead to improvement of public health⁴. HTN is the reason of 7% of global disability and is the leading risk factor for mortality due to cardiovascular diseases². It is a major cause of cardiovascular disease and deaths worldwide especially in LMICs and less than 14% of patients with HTN have blood pressure controlled to a systolic and diastolic blood pressure less than 140/90⁵. The overall prevalence of hypertension was 32.3%, with the Latin America and Caribbean region reporting the highest estimates⁶. The incidence of hypertension has been rising in Africa. In Sudan one in four adults has undiagnosed HTN (eight in ten of total HTN)⁷. Undiagnosed high blood pressure is very common among Nuba ethnic group in Northern Sudan⁸. In Africa for achieving better management of HTN, the majority of patients with HTN should be diagnosed, treated and their BP should be controlled⁹. A meta-analysis of 33 surveys conducted in Sub-Saharan Africa by Feven Ataklte et al, published between 2000 and 2013 including over 110 414 participants of mean age 40 years, showed that the prevalence of HTN varied widely across the studies (range 15%–70%), partly because of differences in participant mean ages (31–76 years) and only between 7% - 56% were aware of their hypertensive status before the surveys¹⁰. This study aimed to assess the prevalence of undiagnosed hypertension and related risk factors among people of Wad Medani Alkobra locality, Gezira state, Sudan.

2. Material and methods

A community-based cross-sectional analytic study involving 464 adults in different locations in Wad-Medani Alkobra locality, from June 2022 to August 2022 was performed in collaboration with the Sudanese Society of Hypertension within May Measure Month (MMM) 2022 study. Wad Medani lies on the west bank of the Blue Nile in the centre of Sudan, 85 miles (136 km) southeast of Khartoum. WHO Stepwise Approach to Surveillance (STEPS) questionnaire was used to collect data, and was analyzed by SPSS version 20. Demographics, blood pressure, pulse, and socioeconomic status were measured. Undiagnosed hypertension was defined as having SBP \geq 140 mmHg or DBP \geq 90 mmHg and never taking prescribed medicine or being told by health professionals to lower/control blood pressure. Blood pressure was measured in all women and men aged 15 years and above, according to the protocols of the European Society of Hypertension (ESH) and three readings were obtained. Data was collected by doctors and medical students, (batch 40), from University of Gezira and a workshop about hypertension and the proper way of measurement of blood pressure by automated device was conducted by the supervisor's doctors. Ethical clearance from the faculty of Medicine University of Gezira ethical committee was obtained. Verbal consent will be obtained from each person.

3. Results

Total number of study population was 464, males were 239 (52%), females were 225 (48%). Mean age was 45 years. 68 were known hypertensive (15%). Undiagnosed hypertension in the study population was found to be 10% (39 individual) which equals to 59.1% from the total number of the populations who had HTN (66) and the remaining 40.9% (27) where diagnosed to have HTN before. The prevalence of HTN (new and old cases) in this study group was 25% (figure 1).

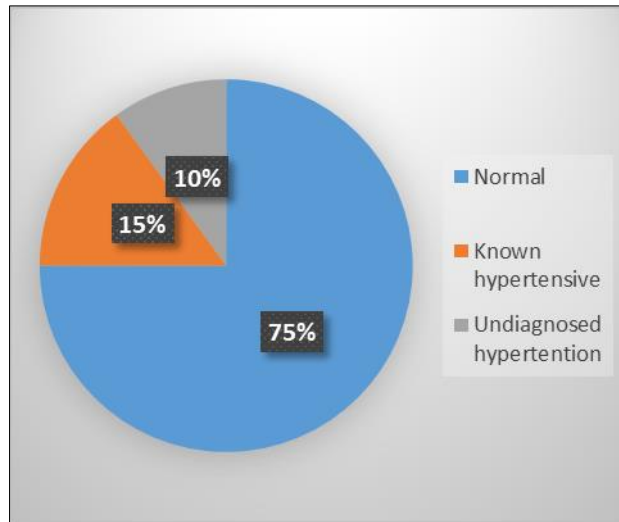


Figure 1 Prevalence of HTN among study population

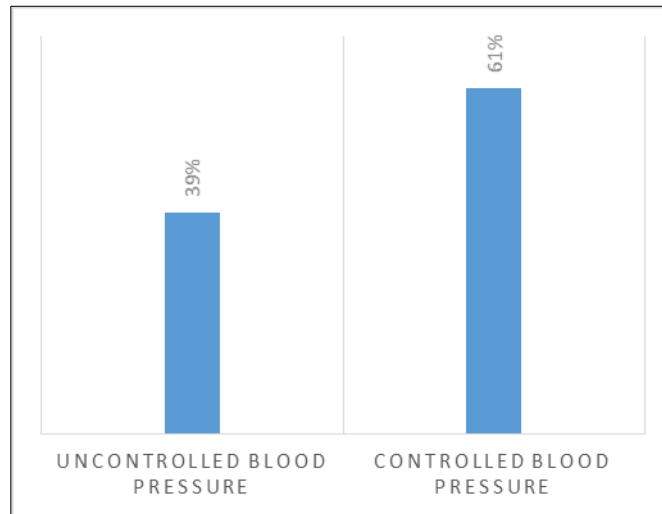


Figure 2 Percentage of uncontrolled hypertension among known hypertensive

Of those who are hypertensive, 27 (39%) had high blood pressure (figure 2). There was positive relation between high blood pressure and old age, diabetes mellitus increased body weight and sex (more common in males), P-value was (,0.00, 0.026, 0.014, 0.033) respectively

4. Discussion

The total number of the population in this prospective community based study was 464 ,of whom 52% were males, 48% were females with mean age of 45 years. It revealed that, the prevalence of undiagnosed HTN was high (10%) with significant association between high blood pressure and old age, diabetes mellitus increased body weight and sex (more common in males), P-value was (,0.00, 0.026, 0.014, 0.033) respectively. This high prevalence of undiagnosed HTN in this study can be explained by the fact that individuals pay less attention to their health status and are more prone to have an undiagnosed medical condition like HTN for long periods of time. It also indicates the importance of regular check-up of blood pressure and whenever they see a doctor for any reason. This result was similar to a community based cross-sectional study performed by Vamsi Krishna Undavalli, H Mp in May 2017 where the prevalence of undiagnosed HTN in villages under the rural field practice (study population was 365 adults) was found to be 10.1% among study population "11". This was unlike the study performed by Sarra O Bushara et al in River Nile State rural areas in Sudan in 2015, where they found the prevalence of undiagnosed hypertension was 38.2% with significant

associations between undiagnosed HTN and increasing age, obesity, illiteracy and diabetes mellitus¹⁰. The associated risk factors for HTN were more or less the same in the two studies as well as the study which was performed by Sufian K Noor et al in Northern Sudan in 2016 in Nuba tribe living in Atbara where the associated risk factors for HTN, included, male sex, age above 45 years, overweight, illiteracy, and alcohol consumption⁸. It was also less than the nationally representative, cross-sectional survey of the noninstitutionalized US population carried out by Hilary K Wall et al revealed that one of three united states adults (around 71 million people) US adults where 36.2% were not aware of having high blood pressure¹⁰. In a study carried out by Sayem Ahmed et al in Bangladesh¹², evidence from a nationwide survey, they found that 978 (59.9% of the total) were undiagnosed among 1685 hypertensive patients studied which was more than the finding of this study. Related risk factors for undiagnosed HTN were, being underweight, poor socioeconomic conditions, and lower educational level. It also showed that old age group (50–64 or above), female sex, had lower risk of undiagnosed HTN¹², unlike the findings in our study.

The prevalence of undiagnosed HTN in our study was also less than the followings studies: A study conducted in India by Anand N Shukla et al showed that the prevalence of undiagnosed HTN in the study population was 26%¹³. A study carried out in Nepal by Md Mehedi Hasan et al, found that, 50.4% of the study population were having undiagnosed HTN¹⁴. A study conducted by Debjyoti Talukdar et al in India among female in the reproductive age and they found that, the prevalence of undiagnosed hypertension was 18.69% and undiagnosed hypertension was associated with age, and increased body mass index¹⁵. Morongwa Bokaba et al in 2021 found that the prevalence undiagnosed HTN among 312 employees in South Africa was 50% and the risk of un diagnosed HTN was significantly associated with age, alcohol and obesity¹⁶. In a study carried out among adults in the Central African Republic by Supa Pengpid, and Karl Peltzer, they found out the proportion of undiagnosed HTN was 69.8% and 30.2% were hypertensive. Male sex and tobacco use were highly associated with HTN¹⁷. In a study conducted by Solomon Berhanu Mogas among adults in urban communities of Southwest Ethiopia, undiagnosed HTN in the study area was 21.2%(194). Age, overweight were the associated risk factors of HTN.¹⁸

The findings of the study that conducted by Demelash Wachamo et al, in southern Ethiopia, was nearly similar to this study where they found that the prevalence of undiagnosed HTN among the respondents was 12.3%. The associated risk factors included were, males, family history of HTN, people who chewed khat, overweight or obese individuals, and people with diabetes mellitus, almost the same risk factors as in this study.¹⁹

The prevalence of undiagnosed HTN in this study was lower than the findings of the study conducted in Sudan by Supa Pengpid, Karl Peltzer from the results of the cross-sectional national STEPS survey in 2016, they found that, the prevalence of undiagnosed HTN was 26.2% (79.2% of total HTN), diagnosed HTN 6.9% and total HTN 33.1%. Diabetes, male sex and older age were positively associated with HTN which was similar to the results of this study²⁰. The prevalence of HTN (new and old cases) in this study group was 25% which was high and was slightly less than the result of the above study by Supa Pengpid, Karl Peltzer from the results of the cross-sectional national STEPS survey in 2016 in Sudan⁷. It was also less than the findings of the results of the study performed by Sufian K Noor et al in Northern Sudan in 2016 in Nuba tribe living in Atbara which revealed high prevalence of HTN (49.4%) among the study population⁸. This could be due to the fact that the prevalence of NCDs including HTN is increasing dramatically in LMICs countries.

A study conducted by Sufian M Khaild et al in 2022 in Sudan among patients with gouty arthritis who attended the largest three tertiary hospitals in Khartoum aiming to detect the prevalence of HTN among these patients, they found that the prevalence was 51% and nearly half of them had uncontrolled HTN. The frequency of undiagnosed hypertension among the participants in this study was found to be 19%²⁰. Another study conducted by Omer Abdelbag et al Nahr AnNil State in Sudan in 2018 showed a high prevalence of hypertension (47.6%) among patients with diabetes. The associated significant risk factors were, older age, male gender, employment, duration of diabetes mellitus, diabetic septic foot, underweight, and obesity²¹.

In this study, it was found that, 39% of those who are hypertensive had uncontrolled blood pressure, this was in contrast to the hospital based study conducted by Saeed M Omar et al at Gadarif Hospital in eastern Sudan where they found that, almost half of the hypertensive patients in follow-up had uncontrolled blood pressure²². The percentage of uncontrolled blood pressure was nearly similar to a study conducted in Nepal by Suresh Mehata from data from nationally representative population-based cross-sectional study where 42% had uncontrolled blood pressure²³. In the carried out by Pascal Geldsetzer et al to assess the state of hypertension care in 44 low-income and middle-income countries: a cross-sectional study of nationally representative individual-level data from 1.1 million adults, they revealed that 39.2% of participants had been diagnosed with hypertension, 29.9% of participants received treatment and only 10.3% of the hypertensive patients had their blood pressure under control²⁴. Akram Al-Makki et al in their study about Hypertension Pharmacological Treatment in Adults: A World Health Organization Guideline Executive

Summary they found that <14% of adults with hypertension have blood pressure controlled despite the availability of cost effective antihypertensive drugs ²⁵. The problem of uncontrolled blood pressure is globally and the reasons for poor control are not fully understood.

In a study conducted by Silvia Palomo-Piñón et al in Mexico from MMM 2019 study, the prevalence of hypertension was 32.4%, which was higher slightly than the results of this study. 29.3% had uncontrolled hypertension which was less than this study. The associated risk factors for high blood pressure, were male sex, age and obesity, which were similar to this study ²⁶.

The associated risk factors of HTN in this study were similar to most of the previous studies mentioned here, and this is in keeping to what is known in the literature regarding the risk factors for HTN and other NCDs.

5. Conclusion

In this study the prevalence of hypertension (both undiagnosed and diagnosed) was found to be high in Wad Medani ALKobra locality with high percentage of uncontrolled blood pressure among the hypertensive participants. High blood pressure in this study was associated with some modifiable risk factors which should be addressed.

Recommendations

- Frequent screening for HTN among population is essential for decision maker to reduce the burden of the disease on the population. and to develop the right strategies for prevention and treatment of this silent killer.
- Identification of people with risk factors for development of HTN especially among men is required to deliver health education and to prevent the development of this noncommunicable disease.
- Early detection and proper treatment is required to prevent complications of this hidden epidemic.

Compliance with ethical standards

Acknowledgments

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Disclosure of conflict of interest

All authors have no conflict of interest.

Statement of ethical approval

Ethical clearance from the faculty of Medicine University of Gezira ethical committee was obtained. Verbal consent was obtained from each person.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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