

Screening for Hypertension and Diabetes Mellitus in Rangpur City Corporation Area: A Community Based Cross Sectional Study

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DOI: <https://dx.doi.org/10.47772/IJRISS.2024.807190>

Received: 13 July 2024; Accepted: 29 July 2024; Published: 16 August 2024

ABSTRACT

Background: Increased blood pressure and glucose levels are becoming the primary causes of death and disability in non-communicable diseases (NCDs), which are a significant public health concern. The prevalence of diabetes and hypertension is rising in low- and middle-income countries (LMICs). It is important to identify patients with these conditions early in the disease process. This study aimed to evaluate the health status of participants in a community-based screening program in Rangpur City Corporation.

Methods: A cross-sectional study was conducted to prevent and control of major chronic non-communicable diseases through early identification and proper management of hypertension and diabetes. Convenience sampling technique was adopted to select 7352 respondents. Data were collected through face-to-face interview using a semi-structured questionnaire.

Results: Among 7352 participants, 93.4% were not registered with the Hypertension & Research Centre Rangpur. The age distribution was diverse, with 24.3% over 60 years and 15.5% below 30 years. Women made up 58.7% of the participants. Disease categorization showed 54.2% had no disease, 22.9% had hypertension (HTN), 13.3% had diabetes mellitus (DM), and 9.7% had both DM and HTN. Screening revealed 67.2% had normal blood sugar levels, while 15.9% had prediabetes and 16.9% had diabetes. Blood pressure measurements indicated 73.5% had controlled systolic blood pressure (SBP), with 26.5% having uncontrolled SBP, and 18.81% had uncontrolled diastolic blood pressure (DBP). Among those reporting no DM or HTN, 7.81% were found to have raised blood sugar levels, and 6.48% were newly diagnosed with hypertension, resulting in 7.21% of previously undiagnosed respondents being newly diagnosed with either condition.

Conclusion: Our study focused to find hypertensive patient and diabetic patient who did not know and had uncontrolled DM & HTN. It also draws attention to the potential proportion of undiagnosed cases. More specifically, it calls for additional efforts focused on referral of at-risk patients after detection. This study will help to utilize existing services complemented by innovations needed for a systematic approach to NCD detection and linkage to care at the community level that lends itself to improving early detection, scale-up and measures for sustainability.

Keywords: Community based screening, Diabetes Mellitus, Hypertension, Blood Pressure control.

INTRODUCTION

Globally non-communicable diseases (NCDs) are emerging as a major public health concern¹. The Global Burden of Disease, Injuries and Risk Factors Study 2017 reported a 40% increase in early deaths and disabilities from 1990 to 2017 attributed to NCDs, with the leading risk factors for disability and death being raised blood pressure (BP), smoking and raised blood sugar. Furthermore, while global life expectancy was 73 years, healthy life expectancy (HALE) was 63 years – meaning, on average, 10 years was spent in poor health². Hypertension and diabetes mellitus are closely related³. These two disorders are often jointly present, and the joint presence of the two disorders confers high risks of target organ damage^{4,5} and cardiovascular morbidity and mortality⁶. Since the prevalence of hypertension in the general population is higher than that of diabetes mellitus, it is plausible that only a small portion of hypertension such as the so-called obesity-

associated hypertension is linked to the disease. However, there might be additional factors at work as well. These two disorders may share similar pathogenic pathways or one causes another. Diabetes mellitus increases arterial stiffness and in turn systolic pressure and pulse pressure⁷.

In addition, the use of some antihypertensive drugs, such as the combination of high-dose thiazides and β -blockers,⁸ is associated with an increased risk of diabetes mellitus. Some antidiabetic drugs may induce sodium and fluid retention,⁹ which may also cause a rise in blood pressure. The focus on early diagnosis of type 2 diabetes and hypertension seems to be a good choice for intervention based on the evidence that pre-hypertension and pre-diabetes can be reversed by non-pharmacological and pharmacological measures^{10,11,12}. Health promotion is generally ignored at all levels of care when managing non communicable disease in low- and middle-income countries (LMICs)¹³. In order to stop the progression and complications of the disease, these include early detection as well as care and management. Additionally, the fragmented health system is more likely to focus on treating visible communicable diseases like HIV, TB, leprosy, malaria, and COVID¹⁴. Whether home-based or community-based screening is more appropriate in low- and middle-income countries (LMICs)¹⁵. Our primary aimed to evaluate the health status of participants in a community-based screening program in Rangpur City Corporation.

METHODOLOGY

A cross-sectional study was conducted to prevent and control of major chronic non communicable diseases through early identification and proper management of hypertension and diabetes. Convenience sampling technique was adopted to select 7352 respondents. Data were collected through face-to-face interview using convenience sampling technique and semi structure questionnaire.

Selection criteria

Inclusion Criteria:

- Those who were Mentally and physically active and participated voluntarily
- Obtained informed written consent from the participants

Exclusion Criteria:

- Patients who had an illness such as mental illness
- Was not willing to attend the interview

Data collection

Data collection was conducted at various locations within Rangpur City Corporation over the course of one year. Each respondent was interviewed in a designated area at the campaign site to ensure privacy. After signing the Free Informed Consent Form, participants underwent an interview to complete the Clinical Form, which included questions directly asked to the participant. Additionally, investigations and physical examinations were performed.

Data Management

- Initially data were checked for completeness and correctness in order to exclude missing or inconsistent data.
- Then data were entered into the Software, Statistical Package for Social Science (SPSS version 26).

Data Analysis

- Descriptive statistics was included the computation of the frequency and percentage for qualitative data. Mean and Standard deviation (SD) for quantitative data.

- For all statistical tests, the confidence interval was set at 95% and the p-value at 5% level of significance ($P \leq .05$)

Outcome

The outcome variable was to find uncontrolled hypertension & raised blood sugar level who didn't know to have hypertension & DM. Respondent have systolic blood pressure greater than or equal to 140 mmHg and/or diastolic blood pressure greater than or equal to 90 mmHg classified as uncontrolled hypertension. Blood pressure measured with the patient seated following standard procedures. Calibrated sphygmomanometer was used to measure Blood pressure. Blood sugar was measured by glucometer with a strip & classified >7.1 mmol as prediabetes & >11.1 mmol as diabetes.

RESULTS

There were 7352 Participants in the community-based screening program in Rangpur City Corporation who met the inclusion criteria for this study having 93.4% respondents were not registered in hypertension & Research Centre Rangpur. The respondents' age distribution showed that the largest group was those aged 60 and above with 1790 respondents (24.3%), followed by those aged 40-49 with 1661 respondents (22.6%). The smallest group was those under 30 with 1137 respondents (15.5%). In terms of gender, the majority of respondents were female with 4315 respondents (58.7%), while males made up 3037 respondents (41.3%).

Respondent divided by their registration in Hypertension & Research Centre, Rangpur		
Registration	Frequency	Percentage (%)
Yes	487	6.6
No	6865	93.4
Total	7352	100
Respondents' stratification according to their age group		
Age group	Frequency	Percentage (%)
<30	1137	15.5
30-39	1168	15.9
40-49	1661	22.6
50-59	1596	21.7
≥ 60	1790	24.3
Total	7352	100
Respondents sorting by their sex		
Sex	Frequency	Percentage (%)
Female	4315	58.7
Male	3037	41.3
Total	7352	100

According to the speech of the respondent's disease-wise categorization according to their speech showed that 979 respondents (13.3%) had DM, 1681 respondents (22.9%) had HTN, 710 respondents (9.7%) had both HTN and DM, and 3982 respondents (54.2%) had none. The total number of respondents was 7352. The patient

classification according to their blood glucose level indicated that 4939 respondents (67.2%) had glucose levels below 7.8, 1169 respondents (15.9%) had glucose levels between 7.8 and 11, and 1244 respondents (16.9%) had glucose levels above 11. The total number of respondents was 7352. The patient categorization according to SBP showed that 5401 respondents (73.5%) had systolic blood pressure below 140, while 1951 respondents (26.5%) had systolic blood pressure of 140 or higher. The total number of respondents was 7352. The patient categorization according to diastolic blood pressure indicated that 5968 respondents (81.2%) had diastolic blood pressure below 90, while 1384 respondents (18.8%) had diastolic blood pressure of 90 or higher. The total number of respondents was 7352.

Disease wise categorization according to their speech		
Variables	Frequency	Percentage (%)
DM	979	13.3
HTN	1681	22.9
HTN and DM	710	9.7
None	3982	54.2
Total	7352	100
Patient classification according to their blood glucose level		
Glucose level	Frequency	Percentage (%)
<7.8	4939	67.2
7.8-11	1169	15.9
>11	1244	16.9
Total	7352	100
Patient categorization according to SBP & DBP of Respondents		
Systolic Blood Pressure	Frequency	Percentage (%)
<140	5401	73.5
>=140	1951	26.5
Total	7352	100
Diastolic Blood Pressure	Frequency	Percentage (%)
<90	5968	81.2
>=90	1384	18.8
Total	7352	100

Again, among the respondents who said they have none of DM & HTN by screening we found 132 (7.81%) of the respondents had raised blood sugar level among 1689 patients having DM. And 155(6.48%) respondents were newly diagnosed as hypertensive patients. Combinedly 287 (7.21%) respondents were newly diagnosed among 3982 who were previously undiagnosed.

By screening newly Diagnosed suspicious diabetes & prediabetes patients who didn't know about diagnosis previously		
Variable	Frequency	Percentage
Suspicious diabetes & prediabetes patients	132	3.31
By screening newly Diagnosed hypertensive patients who didn't know about diagnosis previously		
Variable	Frequency	Percentage
Hypertensive patients	155	3.89

DISCUSSION

In our study, we found that 60.2% of respondents (4424) were 50-59 years old and 24.3% of respondents (1790) were older than 60 years. Another similar study regarding early detection, care, and control of hypertension and diabetes in South Africa showed that 51.2% were 30-59 years old and 26.3% were older than 60 years¹⁴.

The present study showed that about three-fifths of participants (4315, 58.7%) were female, and the remaining (3037, 41.3%) were male. A study conducted in South Africa about early detection, care, and control of hypertension and diabetes presented that three-quarters of the participants were female.

Our current study showed that one-fourth (1838, 25%) had uncontrolled SBP, and one-fifth (1470, 20%) had uncontrolled DBP. Another study about screening for diabetes and hypertension in a rural low-income setting in western Kenya utilizing home-based and community-based strategies showed that 6% and 10% had raised SBP (SBP \geq 160 mmHg) in home-based and community-based screening strategies, respectively.

Our ongoing study showed that one-third of the respondents had suspicious diabetes and prediabetes, fractioned into 15.9% (1169) and 16.9% (1244), respectively. A resembling study on screening for diabetes and hypertension in a rural low-income setting in western Kenya utilizing home-based and community-based strategies showed that 23% and 8% of participants had DM in home-based and community-based screening, respectively.

Our running study focused on the fact that 132 (7.81%) and 155 (6.48%) respondents were newly diagnosed as DM and hypertensive patients who were previously unaware of their disease state. Another study about the comparison between newly diagnosed hypertension in diabetes and newly diagnosed diabetes in hypertension showed that 137 hypertensive patients were newly diagnosed with DM, and 155 patients were newly diagnosed as hypertensive who have DM¹⁵.

Early detection, care, and control of hypertension and diabetes in South Africa. : Early detection, care, and control of hypertension and diabetes in South Africa. : Screening for diabetes and hypertension in a rural low-income setting in western Kenya utilizing home-based and community-based strategies. : Comparison between newly diagnosed hypertension in diabetes and newly diagnosed diabetes in hypertension¹⁶.

CONCLUSION

Hypertension and DM are major cause of premature death worldwide. People with high blood pressure & DM may not feel symptoms. The only way to know is screening. Our study focused to find hypertensive patient and diabetic patient who did not know and had uncontrolled DM & HTN. Here we found 7.8% & 6.48 respondents had DM & HTN who were unaware about disease previously. Around two third of the respondents had raised blood sugar level and one fourth & one fifth of the respondents had uncontrolled systolic blood pressure and diastolic blood pressure respectively. It also draws attention to the potential proportion of undiagnosed cases. More specifically, it calls for additional efforts focused on referral of at-risk patients after detection. This study will help to utilize existing services complemented by innovations needed for a systematic approach to NCD detection and linkage to care at the community level that lends itself to improving early detection, scale-up and measures for sustainability.

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