

# A Community Based Non Communicable Disease Prevention Intervention among Urban Slum Population in Surat City

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## Abstract

**Background:** Non Communicable Diseases have been identified among top ten global threats by WHO. The role of Screening in Ice berg disease is pre-established. In India, Community Based Assessment Checklist is used to identify high-risk people for Non-Communicable Diseases.

**Methods:** A cross sectional study done among 265 participants from households situated in field practice area attached to Government Medical College, Surat. Data was collected using World Health Organization Stepwise approach to surveillance.

**Results:** Out of total participants 83 (31.32%) were classified high risk (CBAC>4) for Non-Communicable Diseases. Mean age of participants was  $43.79 \pm 9.36$  years. One-tenth 25 (9.4%) of participants were on treatment. Those classified high risk were significantly associated with age ( $p<0.05$ ), education ( $p=0.03$ ), occupation ( $p<0.01$ ). Predictors for Non-Communicable Diseases identified were smoking (aOR=4.7,  $p=0.003$ ), alcohol (aOR= 2.3,  $p<0.001$ ), higher Body Mass Index (aOR= 3.8,  $p=0.03$ ) and higher waist size (aOR= 4.3,  $p<0.001$ ). Sensitivity, Specificity of tool and Area under Curve were found to be 73.3%, 75.8% and 0.72 respectively.

**Conclusion:** To prevent and control Non-Communicable Diseases key behavioral risk factors to be targeted include smoking, alcohol, higher Body Mass Index and waist size which could be due to unhealthy diet & absence of exercise.

**Key words:** Non Communicable Disease, Community Based Assessment Checklist, Risk factors

## Introduction

WHO defines Non Communicable Diseases (NCDs) as a chronic disease of long duration and are

the result of a combination of genetic, physiological, environmental and behavioral factors<sup>(1)</sup>. Government of India has launched a dedicated Programme National Programme for Prevention and Control of

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Cancer, Diabetes, Cardiovascular diseases and Stroke (NPCDCS)<sup>(2)</sup>. Cardiovascular diseases account for most NCD deaths, or 17.9 million people annually, followed by cancers (9.3 million), chronic respiratory diseases (4.1 million), and diabetes (2.0 million including kidney disease deaths caused by diabetes). These four groups of diseases account for over 80% of all premature NCD deaths<sup>(3)</sup>.

Unfortunately, more than half of the people with Hypertension and Diabetes in the country remain undiagnosed<sup>(4)</sup>. India has remained as the diabetic capital of the world<sup>(5)</sup>. According to Indian NFHS-5, 15.6% men and 13.5% women were on medication for diabetes while for hypertension it was 24.0% and 21.3% for men and women respectively<sup>(6)</sup>. Global Health Observatory (GHO) says that most NCDs are the result of four particular behaviours (tobacco use, physical inactivity, unhealthy diet and the harmful use of alcohol) that gives rise to four key physiologic changes (raised blood pressure (BP), obesity, raised blood glucose and raised cholesterol)<sup>(7)</sup>. Global Action Plan for the Prevention and Control of Non Communicable Diseases (NCD) India, mandated to halt the rise of diabetes by 2025 and reduce the prevalence of hypertension by 25% between 2010 and 2025<sup>(8)</sup>.

In India, a Community Based Assessment Checklist (CBAC) is used under NPCDCS to identify high-risk people for Non-Communicable Diseases (NCDs)<sup>(9)</sup>.

According to NFHS-5 Gujarat, 16.9% men and 15.8% women were on medication for diabetes while for hypertension it was 20.3% and 20.6% for men and women respectively<sup>(10)</sup>. Community Medicine department is running a field OPD on regular basis in the slum population under study. Incidental discovery of new cases and iceberg characteristic of NCDs, lead us to plan this study.

## Materials and Methods

A community based cross sectional study was done among 265 participants from July 2023 to September 2023 from households (chosen by systematic random sampling) situated in field practice area attached with Community Medicine Department (chosen by purposive sampling). Due

permission was taken from HREC Government Medical College Surat.

Data was collected using a Community Based Assessment Checklist (CBAC) and World Health Organization (WHO) Stepwise approach to surveillance (STEPS)<sup>(11)</sup> which includes three steps for assessment of risk factors.

Step 1: A predesigned, pretested questionnaire was filled by data collector in digital format in Google form after proper explanation of the study to the participants in a language they can understand and consent form is signed.

Step 2: Anthropometric measurements which includes height, weight and waist circumference was taken.

Step 3: Biochemical testing was done.

Proper explanation of the study to the participants was done in a local language they can understand and consent form was signed.

## Sample size

According to NFHS-5 state factsheet Gujarat, men taking treatment for hypertension is 20.3% and among women is 20.6%. We want to do study for non-communicable disease, among which hypertension shows higher percentage for which population is taking treatment. To maintain generalizability, we have taken higher percentage data. Sample size was calculated using NFHS-5 data taking 20.6 % prevalence, minimum required sample size with 80% power of study and 95% confidence interval is 252. Considering 5% dropout rate 265 was the required sample size.

## Study setting

This study was conducted in households situated in field practice area attached with Community Medicine Department.

## Inclusion criteria:

Population aged more than 30 years residing in the study area.

## Exclusion criteria:

Those not willing to give consent to participate in this study

## Study tool

The questionnaire was divided into two domains assessing “Socio demographic details” and “Risk assessment of Non Communicable Diseases”.

CBAC score more than 4 was taken as high risk for NCD and CBAC score less than 4 was taken as low risk for NCD. Scoring was done according to scores given to particular domain in Community Based Assessment Checklist.

## Data collection and analysis

Informed written consent was taken from the participants and they were allowed to not give the interview midway if they felt uncomfortable or they have any other work. Data collection was done after pilot testing, using a CBAC in digital format by google forms during regular field visits. Systolic and diastolic blood pressure were measured in triplicate using automatic digital blood pressure machine. The average of the second and third measurements was used in the analysis<sup>(12)</sup>. Hypertension was defined as systolic blood pressure  $\geq 140$  mmHg or diastolic blood pressure  $\geq 90$  mmHg. Waist circumference was measured in triplicate to the nearest 0.5 cm and the average of all three was analysed. Capillary blood glucose was measured using glucometer. For the participants who were classified as low risk (CBAC  $\leq 4$ ), we recorded if they had eaten or had anything to drink in the past 8 hr, and then took their blood glucose measurement during the same visit as the surveys. For the participants who were classified as

high risk, we provided a pamphlet with instructions for fasting and then asked to come for a fasting blood glucose on a subsequent morning. In addition, for these participants, we collected information on clinical history and medication use. Diabetes was defined as a fasting plasma glucose of 7.0 mmol/L (126 mg/dL) or higher; or a random plasma glucose of 11.1 mmol/L (200 mg/dL) or higher<sup>(13)</sup>.

Data was exported in Excel form and was checked for completeness and consistency followed by analysis which was done in SPSS trial version 23. Univariate analysis was done including descriptive statistics of mean, standard deviation, frequency and percentage. The variables with association of  $p$ -value  $< 0.2$  were further analysed by Logistic regression to assess independent predictors of Non Communicable Diseases.  $P < 0.05$  was considered to be statistically significant. Privacy was maintained by interviewing in a secluded place and confidentiality was ensured by giving ID number to the participants.

## Results and Discussion

This study was conducted for risk assessment of NCDs among 265 participants of which 31.3% were classified as high risk which is similar with the study conducted by Choudhary N et al.<sup>(15)</sup> in Jammu and Kashmir reported a prevalence of high risk CBAC score of 28%. On the contrary, a study, in Delhi, screened 50 adults attending a medical camp in 2019 and reported a prevalence of high risk CBAC score of 22%<sup>(16)</sup>.

**Table 1: Summary of baseline demographic characteristics of all eligible adults**

Variables	Total (n=265)	Low risk (n=182)	High risk (n=83)	p-Value
<b>Gender</b>				
Male	156 (58.9)	90 (49.5)	66 (79.5)	<0.01
Female	109 (41.1)	92 (50.5)	17 (20.5)	
<b>Age (years)</b>				
30-40	87 (32.8)	67 (36.8)	20 (24.1)	<0.05
41-50	116 (43.8)	83 (45.6)	33 (39.8)	
>50	62 (23.4)	32 (17.6)	30 (36.1)	
<b>Marital status</b>				
Unmarried	08 (3.0)	08 (4.4)	00	<0.05
Married	253 (95.5)	170 (93.4)	83 (100)	
Widow	04 (1.5)	04 (2.2)	00	

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<b>Education</b>				
Illiterate	95 (35.8)	91 (50.0)	04 (4.8)	<0.01
Primary	80 (30.2)	71 (39.0)	09 (10.8)	
Secondary and higher secondary	44 (16.6)	08 (4.4)	36 (43.4)	
Graduate and above	46 (17.4)	12 (6.6)	34 (40.0)	
<b>Occupation</b>				
Employed	106 (40.0)	32 (17.6)	74 (89.2)	<0.01
Unemployed	159 (60.0)	150 (82.4)	09 (10.8)	
<b>Primary cooking fuel</b>				
Unclean	12 (4.5)	09 (4.9)	03 (3.6)	0.629
Clean	253 (95.5)	173 (95.1)	80 (96.4)	

Table 1 depicts that Mean age of participants was 43.79 + 9.36 years. Among total participants 156 (58.9%) were male and 109 (41.1%) were female. Majority (43.8%) of the participants belongs to 41-50 years age group. Almost all (95.5%) participants were married. One-third (35.85) of the participants were illiterate. High risk participants were older, educated and employed in this study. More than half (60%) of the participants were unemployed. Association of

age, marital status, education and occupation with high risk participants was statistically significant which is similar with the study conducted in Punjab by Jaacks et al. and association of gender with risk score was statically significant in this study however it was not significant in the study conducted in Punjab by Jaacks et al.<sup>(14)</sup>it might be due to gender distribution in different geographical area.

**Table 2: Description of baseline non communicable disease risk factors of all participants**

Variables	Total (n=265)	Low risk (n=182)	High risk (n=83)	p-Value
<b>Family clinical history, percentage yes</b>	98 (37.0)			
Hypertension	36 (13.6)	16 (8.8)	20 (24.1)	<0.001
Diabetes	46 (17.4)	24 (13.2)	22 (26.5)	
Heart attack	09 (3.4)	06 (3.3)	03 (3.6)	
Stroke	07 (2.6)	03 (1.6)	04 (4.8)	
<b>Alcohol consumption</b>				
No	195 (73.6)	164 (90.1)	31 (37.3)	<0.001
Yes	70 (26.4)	18 (9.9)	52 (62.7)	
<b>Smoking</b>				
Never	136 (51.3)	135 (74.2)	01 (1.2)	<0.001
Past	75 (28.3)	38 (20.9)	37 (44.6)	
Current	54 (20.4)	09 (4.9)	45 (54.2)	
Physical activity<150 (min/week)	116 (43.8)	68 (37.4)	48 (57.8)	<0.05
Waist circumference 81-100 (cm)	121 (45.7)	73 (40.1)	48 (57.8)	<0.001
Systolic BP (mmHg)	119.63±7.2	118.04±5.5	123.11±9.1	<0.001
Diastolic BP (mmHg)	80.42±3.5	80.04±3.1	81.25±4.1	<0.05
Fasting blood glucose (mg/dl)	95.74 ± 4.6	92.34 ± 6.21	103.94 ± 6.21	<0.001

Table 2 depicts that Alcohol consumption was more common (26.4%). Around less than half (43.8%) of participants reported <150 min of physical activity per week. Compared to participants who were classified as low risk, those who were classified as high risk were significantly more likely to have a hypertension, diabetes, heart attack, or stroke; more likely to use alcohol; smoke and have higher BP.

In this study, presence of family clinical history was significantly associated with high risk which is similar with the study conducted in Punjab. Presence of smoking and alcohol consumption was significantly associated with high risk in this study however, it is significantly associated with absence of smoking and alcohol consumption in study by Jaacks et al.<sup>(14)</sup>. Physical activity <150 (min/week) was significantly associated with low risk which is similar with Jaacks et al's study. Higher blood pressure was significantly associated with high risk participants which is similar with the study conducted in Punjab<sup>(14)</sup>.

In this study, according to clinical history of all identified high risk participants, this study shows that participants having past history of hypertension were 34.9 %; diabetes (32.6%); heart disease (13.3%); Stroke (4.8%); Asthma (9.6%); cancer (2.4%) and others (2.4%). According to history of past 12 months medication use, out of all hypertensive 31.3% were taking medicine, out of total diabetics 25.3% were taking medicine.

The overall prevalence of hypertension among high risk participants in this sample was 34.9% and diabetes was 32.6 %. The estimate for hypertension and diabetes is higher than that estimated for Gujarat using National Family Health Survey data<sup>(10)</sup>. This could relate to differences in the definitions of hypertension and diabetes used in this study and in NFHS and different devices used for measurement of diabetes and hypertension.

**Table 3: Assessment of predictors for high risk score using binomial logistic regression**

Variables	Adjusted Odds Ratio	p-Value
Age (>50 years)	2.8 (1.4-4.7)	0.002
Education (Secondary or higher secondary)	1.7 (0.4-2.9)	0.314
Occupation (Employed)	1.2 (0.5-3.4)	0.528
Smoking	4.7 (2.2-6.8)	0.003
Alcohol consumption	2.3 (1.4-9.7)	<0.001
BMI above normal level	3.8 (1.7-6.6)	0.030
Higher waist size	4.3 (1.8-7.5)	<0.001
Absence of exercise	1.8 (0.6-2.5)	0.230

Table 3 depicts that predictors for Higher NCD Risk score was assessed by putting significant variables into Binary Logistic Regression model. Age more than 50 years (aOR=2.8; p=0.002), Presence of Smoking (aOR=4.7; p=0.003), Presence of alcohol consumption (aOR=2.3; p<0.001), BMI more than 24.9 kg/m<sup>2</sup> (aOR=3.8; p=0.03) and Waist size more than normal limits (aOR=4.3; p<0.001) were established as significant factors raising NCD risk score.

Statistically significant association was seen of CBAC score with BMI (p=0.03) and waist size (p<0.01). Sensitivity and specificity of tool was found to be 73.3% and 75.8% respectively. Area under curve was found to be 0.72 in this study which is higher than the study conducted by Gupta et al. (0.64)<sup>(17)</sup>.

## Conclusion

This baseline study estimate shows that hypertension and diabetes are relatively common among adults. Up till now, diagnosis and treatment rates for these hidden morbidities are low.

In order to prevent and control hypertension and diabetes key behavioral risk factors to be targeted include smoking, alcohol, higher BMI and higher waist size which could be due to unhealthy diet and absence of exercise.

**Ethical Clearance:** Taken from Institutional Human Research Ethics Committee GMCS/STU/ETHICS-3/Approval/11657/23 on 4/5/2023.

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