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Original Research Article

Risk assessment for non- communicable diseases among adult population of area adopted by urban and rural health care training centre of IGGMC, Nagpur: A cross sectional study

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ABSTRACT

Background: NCDs are leading cause of premature deaths worldwide. Global trends suggest that these diseases to a large extent are associated with life styles like- unhealthy dietary intake, physical inactivity, tobacco use, high alcohol consumption and are on the rise. CBAC (Community Based Assessment Checklist) is a simple means of early identifying risk of NCDs in the community. There is a paucity of published literature using CBAC as screening tool. Hence this community based study was undertaken among adult population of area adopted by urban and rural health care training centre of IGGMC, Nagpur to assess the risk of NCDs and serve as a tool for early diagnosis and treatment.

Aim and Objectives: To assess the risk of Non Communicable Diseases using Community Based Assessment Checklist among adult population of area adopted by urban and rural health training centre, IGGMC, Nagpur. To study the risk of NCDs with place of residence and suggest recommendations based on the study findings.

Materials and Methods: A cross sectional community based study was conducted among 376 adults residing in the field practice area of Urban and Rural Health care Training Centre of IGGMC, Nagpur. Data was collected by conducting face to face interview with structured questionnaire which included socio-demographic variable and CBAC questionnaire. Study was conducted from January to May 2022 by using consecutive sampling till sample size was achieved.

Results: Overall risk of NCD was found to be 60.9%. The risk of NCD was 61.2% among rural adults while it was 60.6% among urban adults of adopted field practice area of IGGMC, Nagpur. The risk of NCD was found to be significantly associated with Age (p= 0.000), Gender (p=0.000), tobacco use (p=0.000), alcohol consumption (p= 0.000), Waist circumference (p=0.000) and family history of hypertension, Diabetes mellitus and cardiovascular illnesses (p=0.000). There was no significant association found between risk of NCDs and CBAC variables by place of residence except for waist circumference (p = 0.03)

Conclusion: Overall most CBAC variables were found to have significant association with NCDs risk however no significant difference was observed between CBAC variables and place of residence.

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1. Introduction

Non communicable diseases (NCDs) kill 41 million people each year, equivalent to 71% of all deaths globally.¹ Each year, more than 15 million people die from a NCD between the ages of 30 and 69 years; 85% of these "premature"

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deaths occur in low and middle-income countries.¹ 77% of all NCD deaths are in low- and middle-income countries.¹ In India, Non-communicable diseases (NCDs) contribute to 60% of all deaths. The four major causes of NCD deaths are: Coronary Heart Disease, Stroke, and Hypertension (45%), Chronic respiratory disease (22%), Cancers (12 %), Diabetes (3%)² One of the most serious concerns about Non-Communicable Diseases is that they affect people in the productive years of their life.²

Non-communicable diseases originate from unhealthy lifestyles and adverse physical and social environments. Well-known risk factors include poverty, poor diets like intake of foods rich in fat, salt and sugar; physical inactivity, consumption of tobacco, excessive use of alcohol and stress. The burden of Non-communicable diseases can be reduced through effective preventive measures. Physical inactivity, tobacco use, harmful use of alcohol are the behaviour risk factors that can be modified and should be targeted for NCD control.^{3–6} Screening for NCD risk factors predicts the future risk of the disease in the population. Timely screening, diagnosis and prompt treatment of NCDs are key components to restrict the incidence of NCDs.⁷ Community Based Assessment Checklist (CBAC) score is one such simple screening tool that can be used to assess the risk of NCDs in communities viz. Hypertension, Diabetes and 3 common cancers Oral, breast and cervical cancer.² Hence this study was undertaken in view to assess the risk of NCDs and in turn to serve as a tool for early diagnosis and treatment.

2. Materials and Methods

A cross-sectional study was carried out in month of January 2022 to May 2022 in Urban field practice area of IGGMC, Indora and rural field practice area of primary health care centre, Raipur at Nagpur district.

2.1. Ethical consideration

The study was approved by Institutional Ethics committee (IEC) of Indira Gandhi Government Medical College, Nagpur, Maharashtra, India. Written informed consent was taken from participant before enrolling them in study; Confidentiality of the participant was assured and maintained throughout the study.

2.2. Study area

Urban and Rural field practice area of IGGMC, Nagpur

2.3. Study population

All adults 30 years of age and above, and those who were willing to give consent.

2.4. Exclusion criteria

Already diagnosed case of NCDs i.e Hypertension, Diabetes, Breast cancer, oral cancer and cervical cancer, severely ill patients and who refused to give consent were excluded from the study.

2.5. Sample size estimation

$$= \frac{3.84 \times p(1-p)}{e^2}$$

Where, n = sample size,

p = expected prevalence in proportion of one

e = precision in proportion of one.

level of confidence of 95%

Z Value is 1.96, p= 0.57, e = 5% allowable error.

To calculate values for “p” study conducted by by Kaur MP et al.⁸ in Ambala district, Haryana, India, was used as reference for expected prevalence [57.7%] of adult population having risk of developing NCDs with CBAC score of > 4. Sample size derived was 376, however 188 study participants from rural area and 188 from urban area were included in the study.

2.6. Data collection

A predesigned pretested questionnaire was used to record socio-demographic data and Information about risk of NCDs using Community based assessment checklist² (CBAC) namely Age, Tobacco consumption, Alcohol intake, Waist measurement, Physical inactivity, Family history and questions regarding 3 cancers viz, oral, breast and cervical cancer was recorded and score was given. Individual whose score was 4 and above along with those having any suggestive symptom of respective cancer were identified as having risk of developing NCDs. A preliminary test was conducted to ensure that the questions were clear and understandable. For data collection, house to house survey was done. Eligible respondent was selected from each of the households. Face to face interview technique was used and consecutive sampling method was adopted for selection of study participants till the sample size is achieved.

The questionnaire consisted of two sections:

1. *Section A*) Socio-demographic characteristics details: Name, age, gender, educational level, place of residence, occupation, socio-economic status.
2. *Section B*) Community based assessment checklist which has two parts:

After collecting the data, entry was done in MS EXCEL Version 2020. IBM Statistical Package for Social Sciences version 20 (SPSS V.20.0) software was used for analysis. Socio demographic data was organized and presented by

Risk Assessment CBAC score	Age in yrs- 30-39 : 0 40-49 : 1 ≥ 50 : 2	Waist measurement - Female Male <80 cm 90 cm : 0 81-90 cm 91-100 cm : 1 > 90 cm > 100 cm : 2
	Tobacco consumption - Never : 0 Past/sometimes : 1 Daily : 2	Physical activity- <150 min /week : 0 At least 150 min/ week : 1
	Alcohol intake daily - No : 0 Yes : 1	Family history of HTN, DM, CVDs - No : 0 Yes : 2

Fig. 1: Part A: CBAC risk assessment: NCD risk score -Minimum score being '0' and maximum being 10

Table 1: Part B: Early detection symptoms for oral, breast and cervical cancer

B1: Women and Men	Yes/No	B2: Women only	Yes/No
Difficulty in opening mouth		Lump in the breast	
Ulcers/ patch/ growth in the mouth that has not healed in two weeks		Blood stained discharge from the Nipple	
Any change in the tone of your voice		Change in shape and size of breast	
		Bleeding after menopause	
		Bleeding after intercourse	
		Foul smelling vaginal discharge	

applying principles of descriptive statistics. Chi-square is applied to find the association between the risk factors (alcohol use, physical inactivity, and waist circumference, smoking and family history) and CBAC score.

3. Results

Table 2 Presents distribution of study participants according to socio-demographic characteristics. Out of 376 participants majority were female 51.1% and 48.9% were male. Maximum number of participants 123(32.7%) had completed education up to Intermediate or Diploma while 14(3.7%) were illiterate. Maximum 150(39.9%) belonged to socio economic class II.

Table 3 Shows distribution of study participants as per Community based assessment checklist (CBAC) variables by residence. Most study participants 138(36.7%) belonged to age group 30-39. 54% of study population never used tobacco in lifetime. 99(26.3%) of respondents consumed in past or sometimes, out of these 12 were females whereas 74(19.7%) respondents were daily smokers , out of these

8 were females and all other 172 females were lifetime abstainers. Nearly 28(7.4%) of them were daily drinker all were male on the other hand all the female were lifetime abstainers. No significant difference found between place of residence and CBAC variables – age (p=0.599), tobacco use (p=0.147) and alcohol (0.556). Majority of the study participants from rural area 106(56.38%) had waist circumference 90 cm – 100cm while Least number of participants 8(4.26%) had waist circumference >100 cm. Maximum participants from urban area i.e. 95(50.53%) had waist circumference of 90cm-100cm while 20 (10.64%) had waist circumference >90 cm. Majority participants 299 (20.5 %) performed physical activity less than 150 minutes/week. 149(39.6%) of participants had family history of High Blood pressure, Diabetes and heart diseases while majority227(60.4%) had no family history of NCDs, the difference between CBAC variable viz. physical activity(p=0.201), family history of hypertension (p=0.206) and place of residence was not significant.

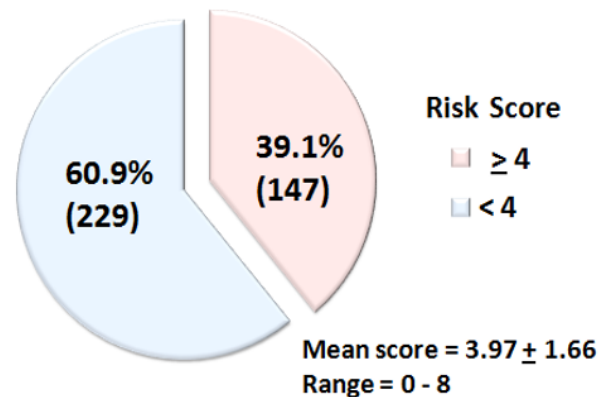


Fig. 2: Risk score of the study participants

Figure 2 depicts that majority i.e 229 (60.9%) of study participants had risk of developing any NCDs with score ≥ 4 while 147(39.1%) of respondents had score less than 4. Mean score was 3.97 + 1.66 range 0 to 8.

Out of 376 study participants 5 were diagnosed to have ulcer in mouth for > 2 weeks as suspected symptom of oral cancer out of which three of them used tobacco daily and two used sometimes, no women had any suggestive symptoms of breast cancer while 3 had foul smelling vaginal discharge.

The risk of NCD with score ≥ 4 was found in 114(60.6%) of urban and 115(61.2%) of the rural participants, the difference between risk score and place of residence was not found to be significant (p = 1).

Table 5 Shows association of NCD risk score with socio-demographic variables. There was significant association found between NCD risk score and socio-demographic variables viz. gender (p=0.000) and education (p=0.042) while no significant association was found between NCD

Table 2: Socio-demographic characteristics of study participants as per residence

Demographics characteristics	Study participants						² df p value
	Urban(n=188)		Rural (n=188)		Total n = 376		
	No	%	No	%	No	%	
Gender							
Male	91	49.5	93	50.5	184	48.9	0.043 1 0.918
Female	97	50.5	95	49.5	192	51.1	
Education							
Professional degree	10	5.3	4	2.1	14	3.7	20.009 6 0.002
Graduate /PG	50	26.6	33	17.6	83	22.1	
Intermediate/ Diploma	55	29.3	68	36.2	123	32.7	
High School Certificate	30	16.0	48	25.5	78	20.7	
Middle School Certificate	18	9.6	17	9	35	9.3	
Primary School Certificate	21	11.2	8	4.3	29	7.7	
Illiterate	4	2.1	10	5.3	14	3.7	
Socio-economic Status							
Class I	54	28.7	49	26.1	103	27.4	10.760 4 0.029
Class II	86	45.7	64	34.0	150	39.9	
Class III	22	11.7	39	20.7	61	16.2	
Class IV	19	10.1	22	11.7	41	10.9	
Class V	7	3.7	14	7.4	21	5.6	

Table 3: Distribution of study participants as per community based assessment checklist (CBAC) variables

CBAC Variables	Risk of NCDs in study participants				Total n=376 (%)	^x ² df p value	
	Urban n=188		Rural n=188				
	No.	%	No.	%			
Age in years	30-39	73	38.8	65	34.6	138(36.7)	1.025 2 0.599
	40-49	53	28.2	61	32.4	114(30.3)	
	> 50	62	33.0	62	33.0	124(33.0)	
	Never	103	54.8	100	53.2	203(54)	3.915 2 0.147
Tobacco	Used to consume in past / sometimes	55	29.3	44	23.4	99(26.3)	
	Daily	30	16.0	44	23.4	74(19.7)	
Alcohol (Daily)	No	172	91.5	176	93.6	348(92.6)	0.617 1
	Yes	16	8.5	12	6.4	28(7.4)	0.556
Waist circumference	Female <80						
	Male <90	73	38.83	74	39.36	147(39.09)	5.753 2 0.058
	80-90	95	50.53	106	56.38	201(53.46)	
>90	20	10.53	8	4.26	28(7.45)		
Physical activity	<150 min a week	155	10.64	144	76.6	299(79.5)	1.976 1
	At least 150 min a week	33	17.6	44	23.4	77(20.5)	0.201
Family h/o DM,HTN,CVDs	No	120	63.8	107	56.9	227(60.4)	1.879 1
	Yes	68	36.2	81	43.1	149(39.6)	0.206

Overall mean age was 46.25 + 12.44 years , range : 50(30 - 80) years. Urban: M: 46.73 ± 12.62 years and range : 50 (30 – 80) years, F : 45.27 ± 12.04 years and range : 48 (30 – 78) years and Rural: M : 47.49 ± 12.13 years and range : 50 (30 – 80) years, F : 45.58 ± 13.01 years and range : 48 (30 – 78) years

Overall mean waist circumference 87.15 + 6.94 cms, range:32(72-104)cms . overall males : mean + SD = 91.13 + 5.03 cms., range : 26 (78 – 104) cms , Overall females : mean + SD = 83.34 + 6.36 cms, range : 30(72 – 102) cms U: M: 92.13 + 4.75 cms, range : 22 (82 – 104) cms, F : 83.81 + 6.66 cms, range : 26 (72 – 98) cms and R: M : 90.16 + 5.13 cms, range : 24 (78 – 102) cms, F : 82.86 + 6.04 cms, range : 30 (72 – 102) cms

Table 4: Distribution of study participants based on community based assessment risk score as per residence.

Risk score	Study participants						x ² df p value
	Urban (n=188)		Rural (n=188)		Total n=(376)		
	No	%	No	%	No	%	
<4	74	39.4	73	38.8	147	39.1	0.011 1 1
≥ 4	114	60.6	115	61.2	229	60.9	

Table 5: Association of NCD risk score with socio-demographic variables

Demographics characteristics	Study participants						x ² df p value
	<4 (n=147)		≥4 (n=229)		Total n = 376		
	No	%	No	%	No	%	
Gender							19.592 1 0.000
Male	51	27.7	133	72.3	184	48.9	
Female	96	50	96	50	192	51.1	
Education							12.94 6 0.042
Professional degree	8	57.1	6	42.9	14	3.7	
Graduate /PG	28	33.7	55	66.3	83	22.1	
Intermediate/ Diploma	58	47.2	65	52.8	123	32.7	
High School Certificate	29	37.2	49	62.8	78	20.7	
Middle School Certificate	15	42.9	20	57.1	35	9.3	
Primary School Certificate	7	24.1	22	75.9	29	7.7	
Illiterate	2	14.3	12	85.7	14	3.7	
			Socio-economic Status				
Class I	33	32.0	70	68.0	103	27.4	3.904 4 0.422
Class II	66	44.0	84	56.0	150	39.9	
Class III	24	39.3	37	60.7	61	16.2	
Class IV	15	36.6	26	63.4	41	10.9	
Class V	9	42.9	12	57.1	21	5.6	

Table 6: Association of NCD risk score with CBAC variables

CBAC Variables	NCD risk score in study participants						x ² df p value
	<4 (n=147)		≥4 (n=229)		Total n=376 No.(%)		
	No.	%	No.	%			
Age in years	30-39	98	71.0	40	29.0	138 (36.7)	99.704 2 0.000
	40-49	33	28.9	81	71.1	114(30.3)	
	> 50	16	12.9	108	87.1	124(33.0)	
Tobacco	Never	112	55.2	91	44.8	203(54.0)	47.948 2 0.000
	Used to consume in past / sometimes	21	21.2	78	78.8	99(26.3)	
Alcohol (Daily)	Daily	12	18.9	60	81.1	74(19.7)	19.420 1 0.000
	No	147	42.2	201	57.8	348(92.6)	
Waist circum-ference	Yes	0	0.0	28	100	28(7.4)	62.835 2 0.000
	Female <80	93	63.3	54	36.7	147(39.1)	
	Male <90	52	25.9	149	74.1	201(53.5)	
Physical activity	80-90	2	7.1	26	92.9	28(7.4)	2.385 1 0.149
	90-100	111	7.1	188	62.9	299(79.5)	
	>90 >100	36	46.8	41	53.2	77(20.5)	
Family h/o DM,HTN,CVDs	<150 min a week	121	53.3	106	46.7	227(60.4)	48.566 1 0.000
	At least 150 min a week	26	17.4	123	82.6	149(39.6)	

Table 7: Association of NCD risk score with CBAC variables by residence

CBAC Variables	Risk of NCDs in study participants						x ² df p value
	Urban ≥ 4 (n= 114)		Rural ≥ 4 (n= 115)		Total ≥ 4 n=229 No. (%)		
	No.	%	No.	%			
Age in years	30-39	21	52.5	19	47.5	40(17.47)	0.441 2 0.837
	40-49	38	46.91	43	53.09	81(35.37)	
	> 50	55	50.93	53	49.07	108(47.16)	
Tobacco	Never	45	49.45	46	50.55	91(39.74)	4.253 2 0.129
	Used to consume in past / sometimes	45	57.69	33	40.31	78(34.06)	
Alcohol (Daily)	Daily	24	40.00	36	60.00	60(26.20)	0.691 1 0.427
	No	98	48.76	103	51.24	201(87.77)	
Waist circum-ference	Yes	16	57.14	12	42.85	28(12.23)	6.53 2 0.03
	Female <80	24	44.44	30	55.56	54(23.58)	
Physical activity	Male <90	71	47.65	78	52.35	149(65.07)	0.020 1 1
	80-90	19	73.08	7	26.92	26(11.35)	
Family h/o DM,HTN,CVDs	>90	94	50.00	94	50.00	188(82.10)	2.728 1 0.11
	At least 150 min a week	20	48.78	21	51.22	41(17.90)	
	No	59	55.66	47	44.34	106(46.29)	
	Yes	55	44.72	68	55.28	123(53.71)	

risk score and SES of the study participants.(p= 0.422).

Table 6 Shows most participants with score ≥ 4 belonged to age group 30-39 and the risk of NCD with score ≥ 4 was found to be significantly associated with CBAC variables viz. Age (p=0.000), Tobacco consumption(p=0.000), Alcohol intake(p=0.000), Waist circumference (p= 0.000) and Family history of hypertension, Diabetes mellitus and cardiovascular illnesses (p=0.000).

Table 7 Shows that among the participants with score ≥ 4 having risk of NCDs, there was no significant association found between place of residence and CBAC variable viz. age (p=0.837), Tobacco consumption (p=0.129), Alcohol intake(p=0.427), physical activity (p = 1) and Family history of hypertension, Diabetes mellitus and cardiovascular illnesses (p = 0.11) while the association was significant for Waist circumference (p= 0.03).

4. Discussion

Early detection of non-communicable diseases leads to better health outcomes. A cost-effective early risk detection strategy will act as the key in preventing the burden of NCDs. Community-Based Assessment Checklist (CBAC) is the population-based high-risk screening strategy for NCDs introduced in India at the primary health care level. The first validity study of a community-based assessment checklist as a comprehensive approach for assessing NCD risk in rural areas was conducted by Choudhary N et.al.⁹ Our study found the overall risk of common NCDs was 60.9% with cbac score ≥ 4 while 39.1% had score <4. The risk of common NCDs was 61.2% in rural area which was higher

than in study by Kaur MP et.al.⁸ 57.7% study participants had with cbac score ≥ 4 and nearly 42.3% of respondents had score less than 4. Kalidoss VK et.al.¹⁰ observed that overall 70% had scored more than 4. Choudhary N et.al.⁹ found that 28% individuals had CBAC score above 4, 48% at 4 and 24 % had a score below 4. In our study, 36.7% of study participants belonged to age group 30-39years and this finding was opposite to study conducted by Kaur MP et.al.⁸ where 41% of the respondents were more than equal to 50 years similar to findings of Kalidoss VK et.al.¹⁰ and Choudhary N et.al.⁹ where majority participants from age group above 50 years,71% and 64.66 % respectively. This may be because as most individuals > 50yrs from surveyed population of our study were already diagnosed case of NCDs hence were excluded from the study.

There were more females 192(51.1%) than males 184(48%) in our study in line with the study conducted by Kaur MP et.al.⁸ where 70.8% were females and in contrast to Kalidoss VK et.al.¹⁰ where 69% were male and Choudhary N et.al.⁹ found 145(64%) out of 266 males.

In the present study higher percent 203 (54%) of study participants never used tobacco were found, this may be due to majority participants were females 52% out of these 50 % females were lifetime abstainers and only 12(10.81%) females had past history of tobacco use whereas 8(8.08%) of female respondents had daily tobacco use this finding was similar with Choudhary N et.al.⁹ where tobacco consumption was 10.5% and less than that found in the study conducted by Kalidoss VK et.al.¹⁰ where 12% of participants used tobacco daily while tobacco use was found

higher in study by Maimela E et.al.¹¹ 81.3% and the second global tobacco adult survey which showed 20% current tobacco.¹²

Nearly 28(7.4%) of the male respondents were daily drinker higher than found in Kalidoss VK et.al.¹⁰ study where 6% using alcohol daily and lower than found in Choudhary N et.al.⁹ study i.e. 11.27% and Krishnan A et.al.¹³ as 24.6% among men while women were abstainer this is consistent with our study where all the female were lifetime abstainers.

Waist circumference of more than 100cm in men and >90cm in female which is considered high risk was 7.45% in our study which was lower as observed in Choudhary N et.al.⁹ 36%. Overall 229(79.5%) of study participants performed physical activity less than 150 minutes/week was more than that as observed by Kaur MP et.al.⁸ where it was 71.4% and Kalidoss VK et.al.¹⁰ where 60% did not have adequate physical activity. Choudhary N et.al.⁹ study reported 52% had physical inactivity similar findings were observed by Nelson F et.al.¹⁴ and Sandhu S et.al.¹⁵ with physical inactivity in 54.3% and 51% study participants respectively.

Our study found 149 (39.6%) of participants had family history of High Blood pressure, Diabetes and cardiovascular diseases much less than reported by Kaur MP et.al.⁸ Kalidoss VK et.al.¹⁰ and Choudhary N et.al.⁹ where family history was found in 42.9%, 48.2 % and 49.24% in respectively.

In present study significant relationship was seen between age and risk of NCD ($p = 0.000$) and this finding was supported by the study conducted in Kathmandu, Nepal by Dhungana RR et al (2014).¹⁶ and were also alike with the results of a study conducted by Bansal P et al (2016).¹ The risk of NCD was found to be significantly associated with CBAC variables viz. tobacco use ($p = 0.000$), alcohol consumption ($p = 0.000$), waist circumference ($p = 0.000$), and family history of hypertension, Diabetes mellitus and cardiovascular illnesses ($p = 0.000$) were found have significant association with the risk of developing NCD these findings are in line with similar study conducted by Kaur MP et.al.⁸ except for tobacco use. A cross-sectional study conducted by Premanandh K et.al.¹⁷ also showed that abdominal obesity and alcohol consumption were significantly associated with higher CVD risk.

In our study, there was no significant association seen between NCD risk and CBAC variable by place of residence. There is lack of data from studies which included both rural and urban population simultaneously. In our study Only 5 study participants were diagnosed to have ulcer in mouth out of which three of them used tobacco daily and two used sometimes, no women had any suggestive symptoms of breast cancer while three had foul smelling vaginal discharge. These suspected symptoms were not considered in the previous studies conducted for assessing risk factors of NCDs using CBAC.

5. Conclusion and Recommendations

Overall risk of NCD was found to be 60.9% in adults of urban and rural field practice area of IGGMC, Nagpur. Majority of the CBAC variables were found to have significant association with increase NCDs risk. CBAC is a very simple easy to employ tool that can be used to screen communities for identifying people at risk of NCDs. This may further help to plan and implement strategies and assist early intervention among the recognized high risk population which in turn will further restrict the burden of NCDs.

6. Limitation

The study is an observational study and did not involve any investigation for further screening of participants with high risk score for NCDs. Risk factors like family history may not be known to all the participants and alcohol consumption, tobacco consumption, physical activity may not be reported correctly by participants.

7. Source of Funding

None.

8. Conflict of Interest


None.

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