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Prevalence of Risk Factors of Non-Communicable Diseases in a Rural Population of Eastern Uttar Pradesh

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Abstract

Introduction: Over past few decade morbidities and mortalities associated with NCDs (Non-Communicable Diseases) leads to a significant loss of productive life years both in developed and developing countries. Therefore, the present study was done to determine the prevalence of common risk factors for major NCDs in a rural population of Barabanki district in eastern Uttar Pradesh. **Materials and Methods:** The present cross-sectional study was conducted in Satrikh block of Barabanki district. Multistage sampling was used for enrolment of the study subjects. A totalof 1824 participants aged ≥25 years were enrolled in the study. WHO STEPs- wise tool was used to collect information on behavioural risk factors like tobacco use, diet, alcohol useand associated anthropometric indices were measured. **Results:** Prevalence of tobacco smoking, smokeless tobacco products use, alcohol consumption, less than five servings of fruits/vegetables, more than five grams of salt intake and overweight/obesity was found to be 26.2%, 27.08%, 24.1%, 91.61%, 10.9% and 34.86% respectively. Individuals with age more than 35 years, male subjects, illiterates and those who belonged to scheduled castes/ tribes were significantly ($p<0.05$) more predisposed to both smoked tobacco as well as smokeless tobacco use and alcohol consumption.Consumption of alcohol was significantly ($p<0.05$) higher among employed groups who belonged to upper and upper middle class while tobacco consumption was more prevalent in lower socioeconomic group. Consumption of salt more than 5 grams per day was significantly higher among individuals in elder age group (35-65 days), among females, those who were literate, those who belonged to other backward castes and among government employees. **Conclusion:** The study revealed high prevalence of non-communicable disease risk factors among adults. This indicates towards need of prompt community based preventive measures and control strategies to lower the forthcoming consequences of NCDs.

Keywords: Alcohol, Hypertension, Physical inactivity, Risk Factors

1. Introduction

Globally 70% of the total deaths (about 40 million) are caused by non-communicable diseases. Cardiovascular diseases account for majority (17.7 million) of deaths, followed by cancers (8.8 million), chronic respiratory diseases (3.9 million) and diabetes (1.6 million).[1] Non Communicable Diseases (NCDs) affects both males and females worldwide and currently are major challenge for all health care models.[2] Socio-demographic transition has lead to substantial modification in the health behaviors and health profile of people both in developed and developing world economies.[3] The overall effect of this economic transition with changes in behavioral lifestyle

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pattern can be visualized in real world as epidemiological transition from communicable to non communicable diseases.[4] By 2020 it is projected that, non communicable diseases will contribute more than 80% of the total morbidities and 70% of total mortalities.[5] Even in young country like India, the study reviews reflect that about 50% of total deaths and 62% of the total disease burden are attributed to NCDs.[6]

Aiming the risk factors as a part of primordial and preventive strategies is the most effectual way to tackle the problem of non-communicable diseases. The key behavioural risk factors recognized in the World Health Report 2002, are tobacco use, harmful alcohol intake, low fruits and vegetables consumption as unhealthy diet and lack of physical activity while major biological risk factors identified are increased Body Mass Index (BMI), raised arterial blood pressure, raised blood glucose and total cholesterol levels.[7] Risk factors nowadays ultimately become the diseases. Public health approach with management of these risk factors are the most affordable way to deal with the problem on long term. That why from last two decades majority of programs and policies are aimed targeting these risk factors so as to make a extensive control. World Health Organization (WHO) has also developed the STEPs approach to conduct surveillance of NCD risk factors and conduct appropriate interventions to reduce them.[8] Similar approach has been adopted in present study with the view that if risk factors are managed properly, more than half of untimely deaths could be prevented. Although various studies have assessed the prevalence of risk factors for non-communicable diseases in urban India, but studies from rural India is relatively meagre. Thus, the current effort was done to study the prevalence of common NCDs risk factors in a rural population of Barabanki district, Eastern Uttar Pradesh.

2. Materials and Methods

2.1 Study Design

Community based Cross Sectional study

2.2 Study Population

The study population comprised of individuals aged ≥25 years of either sex residing in the villages in the catchment area of Rural Health Training Centre (RHTC), Satrikh, Barabanki district, U.P.

2.3 Study Period

From 1st June 2016 to 31th May 2017.

2.4 Sample Size

Sample size was calculated based on the formula for estimation of proportion;[9] $z^2_{1-\alpha/2}$ p (1-p)/d^2; where z was value of standard normal variable at 5% level of significance, pwas anticipated prevalence of risk factors (prevalence of Obesity from *Sandhu et. al., 2015* was taken as 6.2%);[10] and d was allowable error. Since the multistage sampling method was used the sample size was adjusted for a design effect of 2, and sample size was calculated to be 1518. Accounting for a non-response rate of 20%, the final sample size was calculated as 1824.

2.5 Sampling Technique

Multistage sampling was used and during first stage eight villages from RHTC area was selected by simple random method and number of study subjects per village was based on their proportionate size. In each village, houses were selected by systematic random sampling procedure. Every third house was studied till the required sample size for that village was achieved. All members in the household aged ≥25 years were included in the study. Individuals not available during visit were excluded from study.

2.6 Study Approach

WHO STEPs wise approach was used.[8]

2.7 Data Collection

The individuals selected were approached, interviewed and examined for physical measurement. For each study subject a separate questionnaire was filled. WHO STEPS based questionnaire was used to gather information regarding age, sex, marital status, religion, caste, educational status, occupation, family history etc. and risk factors for non-communicable diseases i.e., tobacco smoking, consumption of smokeless tobacco and alcohol, dietary habits, physical inactivity, body mass index, life style, physical measurements, etc. Socioeconomic status was assessed using Modified B G Prasad Socioeconomic scale 2016.[11] Data was collected by structured interview method by using a pre-design and pretested questionnaire based on WHO STEPs approaches for surveillance of NCD in context to STEP 1 and STEP 2 only.[8]

2.8 Data Analysis

Data collected was primarily entered in Microsoft Excel and finally transferred to Epi-Info for analysis. Quantitative data was expressed in percentages and odds ratios were calculated with 95% confidence interval for assessment of risk factors. Value of $p<0.05$ was considered significant.

2.9 Ethical Considerations

Ethical approval was sought from institutional ethics committee before commencement of study. The purpose of the study was explained to each person in the local language and a written and informed consent was taken.

3. Results

In our study population, the age group of participants ranged from 25-75 years. Among them 560(30.7%) individuals were in 25 to 34 years' age group, while only 118(6.47%) individuals were above 65 years of age. Mean age of the participants was 42.63±11.72 years. Out of total 1824 participants, 780(42.8%) were males and 1044(57.2%) were females. The percentage of married population was 87.1% among the total studied population. Among the study population, 730(40%) were literate and 1094(60%) were illiterate. (Table 1)

The overall prevalence of risk factors smoked tobacco, smokeless tobacco, alcohol consumption, less than five

Table 1. Distribution of study population on the basis of bio-social characteristics

(N=1824)

Characteristics		Number	Percentage (%)
Age Category(years)	25-34	560	30.70
	35-44	538	29.5
	45-54	424	23.2
	55-64	184	10.1
	65 and above	118	6.47
Sex	Male	780	42.8
	Female	1044	57.2
Religion	Hindu	1412	77.4
	Others	412	22.6
Marital Status	Unmarried	30	1.6
	Married	1590	87.2
	Divorced/Separated	8	0.4
	Widowed/ Widower	196	10.7
Category	General	161	8.8
	Other Backward class	965	52.9
	Scheduled caste	682	37.4
	Scheduled tribe	16	0.9
Educational Status	Illiterate	1094	60
	Literate	730	40
Occupation	Government-employed	87	4.8
	Non-government employed	179	9.8
	Self-employed (Labour/Shopkeeper/Agricultural)	800	43.9
	Student	25	1.4
	Home-maker	718	39.4
	Retired	15	0.8
*Socio-economic Status	Upper Class	426	23.4
	Upper Middle Class	351	19.2
	Middle Class	320	17.5
	Lower Middle Class	571	31.3
	Lower Class	156	8.6

*Modified B G Prasad Socioeconomic scale 2016

Table 2. Association between tobacco and alcohol consumption with bio-social characteristics

(N=1824)

Demo-graphic Variable	Current tobacco use				Current alcohol consumption	
	Smoked Tobacco users		Smokeless tobacco users			
	n=478 (%)	OR (95%CI)	n=494 (%)	OR (95%CI)	n=440 (%)	OR (95%CI)
Age group (Years)						
25-34 (n=560)	89 (18.6)	Reference	94 (19.0)	Reference	81 (18.4)	Reference
35-44 (n=538)	140 (29.3)	**1.80 (1.34-2.43)**	139 (28.1)	**1.78 (1.33-2.40)**	115 (26.1)	**1.65 (1.20-2.25)**
45-54 (n=424)	152 (31.8)	**2.92 (2.16-3.95)**	170 (34.4)	**3.47 (2.58-4.67)**	176(40.0)	**4.28 (3.15-5.81)**
55-64 (n=184)	62 (13.0)	**2.99 (2.03-4.41)**	62 (12.6)	**2.77 (1.89-4.06)**	42 (9.5)	**1.82 (1.20-2.77)**
65 and above (n=118)	35 (7.3)	**2.53 (1.59-4.04)**	29 (5.9)	**1.83 (1.13-2.96)**	26 (5.9)	**1.74 (1.06-2.87)**
Sex						
Female (n=1044)	116 (24.3)	Reference	108 (21.9)	Reference	8 (1.81)	Reference
Male (n=780)	362 (75.7)	**6.92 (5.45-8.79)**	386 (78.1)	**8.49 (6.65-10.83)**	432 (98.18)	**160.75 (79.05-326.91)**
Educational Status						
Literate (n=730)	100 (20.9)	Reference	98 (19.8)	Reference	18 (4.09)	Reference
Illiterate (n=1094)	378 (79.1)	**3.32 (2.60-4.24)**	396 (80.2)	**3.65 (2.86-4.67)**	422 (95.90)	**24.84 (15.31-40.27)**
Marital Status						
Un-married (n=30)	4 (0.8)	Reference	2 (0.4)	Reference	4 (9.09)	Reference
Married (n=1590)	400 (83.7)	1.64 (0.55-4.86)	427 (86.4)	**5.11 (1.21-21.62)**	382 (86.81)	2.09 (0.72-6.03)
Others* (n=204)	74 (15.5)	**3.16 (1.03-9.68)**	65 (13.1)	**7.19 (1.65-31.20)**	54 (12.3)	2.42 (0.80-7.25)
Category						
General (n=161)	23 (4.8)	Reference	31 (6.3)	Reference	24 (5.45)	Reference
OBC (n=965)	182 (38.1)	1.34 (0.83-2.15)	193 (39.1)	1.02 (0.67-1.56)	125 (28.40)	0.83 (0.52-1.34)
SC/ST (n=682)	273 (57.2)	**3.86 (2.41-6.18)**	270 (54.6)	**2.71 (1.77-4.14)**	291 (66.1)	**3.96 (2.50-6.27)**
Occupation						
Unemployed (n=758)	78 (16.3)	Reference	67 (13.6)	Reference	6 (1.6)	Reference
Government-employed (n=87)	45 (9.4)	**9.73 (5.97-15.87)**	46 (9.3)	**12.91 (7.80-21.35)**	54 (12.27)	**202.36 (81.23-504.08)**

Non-government employed (n=179)	11 (2.3)	0.61 (0.32-1.19)	32 (6.5)	**2.44 (1.54-3.88)**	16 (3.63)	**12.60 (4.85-32.71)**
Self-employed (Labour/Shopkeeper/ Agricultural) (n=800)	344 (72.0)	**6.64 (5.04-8.73)**	349 (70.6)	**8.20 (6.14-10.93)**	364 (82.72)	**105.66 (46.75-238.83)**
Socio-economic class#						
Lower class (n=156)	41 (8.6)	Reference	44 (8.9)	Reference	37 (8.40)	Reference
Upper class (n=426)	131 (27.4)	1.22 (0.81-1.85)	147 (29.8)	1.30 (0.87-1.96)	138 (31.36)	**1.56 (1.02-2.37)**
Upper Middle class (n=351)	111 (23.2)	1.27 (0.83-1.94)	122 (24.7)	1.31 (0.86-1.99)	120 (27.27)	**1.67 (1.09-2.58)**
Middle class (n=320)	91 (19.0)	1.12 (0.72-1.73)	83 (16.8)	OR=0.87 (0.56-1.35)	75 (17.04)	0.98 (0.62-1.55)
Lower Middle class (n=571)	104 (21.8)	**0.60 (0.39-0.92)**	98 (19.8)	**0.51 (0.33-0.77)**	70 (15.90)	0.45 (0.29-0.71)

***Divorced/Separated/Widow**
#Modified B G Prasad Socioeconomic scale 2016

servings of fruits/vegetables, more than five grams of salt intake and overweight/obesity was found to be 26.2%, 27.08%, 24.1%, 91.61%, 10.9% and 34.86% respectively. Daily smokeless tobacco use was 49.5% and 10.3% for males and females respectively. However, the prevalence of daily smoked tobacco was 46.4% for males and 11.1% among females. The proportion of study subjects currently consuming alcohols was 56.5% and 2.4% among males and females respectively. Individuals with aged ≥35 years, male subjects, illiterates, those who were separated/ divorced/widowed, those who belonged to scheduled castes/tribes, labourer/agricultural workers, shop-owners, government employees, those who belonged to lower middle class were significantly more predisposed to both smoked tobacco as well as smokeless tobacco use. Apart from that significantly higher (five times) consumption of smokeless tobacco was found among married subjects as compared to unmarried and more among non government employers (about three times) as compared to those who were unemployed.

Consumption of alcohol was also found comparatively higher among elder age-groups (>35 years), among males, those who were illiterate, belonging to scheduled castes/ tribes, among employed earning groups and among those individuals who belonged to upper and upper middle class (as compared to lower class).

Mean servings of fruits and vegetables less than five was reported three times higher among individuals belonging to age group (45-54 years) as compared to those in reference age group of 25-34 years.Also risk of less consumption of fruits and vegetables was found to be higher among females, illiterates, those who were either married or divorced/widowed/separated as compared to unmarried, those belonging to other backward castes or SC/ST group and among self employed group.

Also in reference to elderly age group (≥65years) consumption of salt more than 5 grams per day was significantly higher among individuals in age group (35-65 days), among females those who were literate, married as well as unmarried subject (in comparison to others), those who belonged to other backward castes and among government employees. However, consumption of salt was significantly less among self employed group. The proportion of obese/overweight individuals were significantly higher in married age group.

Mean serving of fruit & vegetables less than 5 per day was quite high (5.4% among males and 10.6% among females). With respect to physical activity, majority of the study subject were having mild physical behaviour (43.7% and 50.2% of males and females respectively). Overweight individuals were quite equal among males (34.6%) and females (35.1%). Odd ratios between intake

of fruits and vegetables and age group in the study population showed age group 45-54, 55-64 and ≥65 years was 3.15(1.75-5.64), 1.81(0.93-3.54) and 1.02(0.52-1.96) respectively with reference to age group 25-34 years; odd ratio of age group of 35-44 years was 0.97(0.66-1.43). Odd ratio between Intake of fruits & vegetables and gender in the study population, males was 0.62(0.44-0.87) with reference to females. Odd ratio between Intake of fruits & vegetables and marital status in the study population, married and divorced/separated/widower/widowed was 4.89(2.19-10.91) and 5.03(1.98-12.80) with reference to unmarried populations. In the table 3 the odd ratio between Intake of fruits and vegetables and educational status in the study population showed literates were 6.88(4.00-11.82) with reference to illiterates. (Table 3)

Table 3. Association between salt intake, body mass index, serving of fruits and vegetables with bio-social characteristics

						(N=1824)
Demo-graphic Variable	**<5 Servings of fruits and vegetables**		**>5 grams of Salt intake**		**Body Mass Index(BMI) Overweight/ Obesity**	
	n=1671 (%)	**OR (95%CI)**	**n=199 (%)**	**OR (95%CI)**	**n=636 (%)**	**OR (95%CI)**
Age group (Years)						
25-34 (n=560)	502 (30.04)	Reference	38 (19.09)	2.79 (0.84-9.19)	183 (28.7)	Reference
35-44 (n=538)	481 (28.78)	0.97 (0.66-1.43)	81 (40.70)	**6.79 (2.10-21.89)**	207 (32.5)	1.28 (1.00-1.65)
45-54 (n=424)	409 (24.47)	**3.15 (1.75-5.64)**	53 (26.63)	**5.47 (1.67-17.85)**	163 (25.6)	1.28 (0.98-1.67)
55-64 (n=184)	173 (10.35)	1.81 (0.93-3.54)	24 (12.1)	**5.75 (1.69-19.55)**	55 (8.6)	0.87 (0.61-1.26)
65 and above (n=118)	106 (6.34)	1.02 (0.52-1.96)	3 (1.50)	Reference	28 (4.4)	0.64 (0.40-1.01)
Sex						
Male (n=780)	738 (44.16)	Reference	64 (32.16)	Reference	270 (42.5)	Reference
Female (n=1044)	933 (55.83)	**1.61 (1.14-2.27)**	135 (67.38)	**1.66 (1.21-2.27)**	366 (57.5)	1.01 (0.83-1.23)
Educational Status						
Literate (n=730)	715 (42.78)	Reference	99 (49.74)	**1.66 (1.21-2.27)**	258 (40.6)	1.03 (0.85-1.26)
Illiterate (n=1094)	956 (57.21)	**6.88 (4.00-11.82)**	100 (50.25)	Reference	378 (59.4)	Reference
Marital Status						
Un-married (n=30)	21 (1.25)	Reference	6 (3.01)	**3.67 (1.27-10.56)**	5 (0.8)	Reference
Married (n=1590)	1462 (87.49)	**4.89 (2.19-10.91)**	180 (90.45)	**1.87 (1.04-3.35)**	577 (90.7)	**2.84 (1.08-7.48)**
Others (n=204)	188 (11.3)	**5.03 (1.98-12.80)**	13 (6.5)	Reference	54 (8.5)	1.80 (0.65-4.93)
Category						
General (n=161)	83 (4.96)	Reference	8 (4.02)	Reference	57 (8.9)	Reference

OBC (n=965)	942 (56.37)	**38.48 (22.96-64.50)**	144 (72.36)	**3.35 (1.61-6.97)**	319 (50.2)	0.90 (0.63-1.27)
SC/ST (n=682)	646 (38.6)	**26.39 (15.72-44.31)**	47 (23.6)	1.46 (0.67-3.15)	260 (40.8)	1.08 (0.75-1.54)
Occupation						
Government-employed (n=87)	80 (4.78)	1.12 (0.50-2.53)	46 (23.11)	**8.43 (5.24-13.56)**	29 (4.5)	Reference
Non-government employed (n=179)	135 (8.07)	**0.30 (0.19-0.46)**	26 (13.06)	1.27 (0.79-2.04)	49 (7.7)	0.75 (0.43-1.31)
Self-employed (Labour/Shopkeeper/ Agricultural) (n=800)	766 (45.84)	**2.22 (1.45-3.39)**	38 (19.09)	**0.37 (0.25-0.55)**	295 (46.4)	1.16 (0.73-1.86)
Unemployed (n=758)	690 (41.3)	Reference	89 (44.7)	Reference	263 (41.4)	1.06 (0.66-1.70)
Socio-economic class#						
Upper class (n=426)	394 (23.57)	Reference	42 (21.10)	Reference	143 (22.5)	Reference
Upper Middle class (n=351)	314 (18.79)	0.68 (0.41-1.13)	40 (20.10)	1.17 (0.74-1.85)	134 (21.1)	1.22 (0.91-1.64)
Middle class (n=320)	289 (17.29)	0.75 (0.45-1.26)	37 (18.59)	1.19 (0.74-1.90)	109 (17.1)	1.02 (0.75-1.38)
Lower Middle class (n=571)	530 (31.71)	1.04 (0.64-1.69)	67 (33.71)	1.21 (0.80-1.82)	193 (30.3)	1.01 (0.77-1.31)
Lower Middle class (n=571)	144 (8.61)	0.97 (0.48-1.94)	13 (6.53)	0.83 (0.43-1.59)	57 (8.9)	1.13 (0.77-1.67)

***Divorced/Separated/Widow**
#Modified B G Prasad Socioeconomic scale 2016

4. Discussion

Various risk factors of major non communicable diseases were explored in community settings in a rural population of Barabanki district during the study. The prevalence of smokeless tobacco consumption was found to be 27.08%. The results were quite lower as compared to the findings of preliminary study conducted in same settings where 48.5% of the subjects were consuming tobacco in smokeless form.[12] Also the proportion of smokeless tobacco consumers were less in comparison to the findings reported by Bhagyalaxami *et. al.*, Pandya *et. al.*, and Kumar *et. al.*,[13–15] However it was higher when compared to a study by Chaya *et. al.*, and Krishnan *et. al.*, who reported prevalence of same about 12.15% and 5.8% respectively.[16,17] The consumption of tobacco in smoked form was 26.2%. This was also quite less when compared to the findings of pilot study where prevalence of smoking was found to be 40.9%[12] and that reported by Pandya *et. al.*, and Misra *et. al.*, in their study.[15,18] On the other hand it was much higher as compared to the studies conducted in other parts of India.[13,14,16–18,20] However, the study findings in context to smoking were comparable to other studies.[21–23] These variations in prevalence of tobacco consumption could be explained by disparities in socio demographic characteristics which used to vary from state to state. The higher prevalence of tobacco consumption (both smoke and smokeless form) among older age group (>35 years) might be attributed to the fact that these age groups were more predisposed to different working environment which might have enhancing inculcating factor. The same sort of inferences might be implicated directly/ indirectly in gender as well as occupational context in regards to tobacco consumption. Similar to the findings

of an earlier study, the consumption of tobacco products was higher among males.[14–16,23,26] Also the comparatively higher rates of proportion of tobacco use among illiterate reflects their under awareness regarding the hazards of the same and their casual attitude regarding the same.

About 29.1% were current alcohol consumers. This was much higher when compared with other Indian studies.[16,20–22] However, the findings are quite comparable to studies done by Krishnan et. al., Garg et. al., and Kumar et. al., who reported the prevalence of the same about 24.9%, 26.0% and 22.7% respectively.[14,17,19] On the other hand, few other studies reported higher prevalence.[15,18] The increasing proportion of alcohol consumption with increasing age and among males might be reflected from the fact that these groups have comparatively more independence and less interference in context to these sorts of lifestyle habits. Also those who were capable financially to bear these sorts of expenses (employed ones and the ones belonging to upper strata) were found to be more habitual towards alcohol consumption.

The proportion of individuals taking unhealthy diet (less than 5 means serving fruits and vegetables) was found to be 91.6%, similar findings was also reported by Mishra *et. al.*,[18] who found major proportion of the surveyed individuals taking unhealthy diet. It is also reported by WHO that the majority (91.6%) of the population consume less than five servings of fruits and vegetables daily.[25] Our findings are similar to reports from other STEPS Surveys.[14,26] A study done under IDSP-NCD, project reported, 87.5% prevalence of low fruits and vegetable consumption which is similar and comparable to the finding of our study.[27] Less than five servings of fruits and vegetables might be due to the lack of awareness, especially in rural population. Approximately three million deaths per year due to non-communicable diseases are attributed to inadequate consumption of fruits and vegetables.[28] The present study 11% of individuals found to have a higher salt consumption, as against a norm of less than 5 grams/capita/day, which exposes the community to the risk of hypertension and its consequences. This was similar to study done by Kumar *et al.* reported 14.6gm/capita/day high salt intake.[14]

In present study about 34.86% of the surveyed population was found to be obese/overweight. The proportion was quite higher than that found during the pilot study;[12] and prevalence reported by other Indian studies.[14,15,17,24] However, it was quite comparable to findings reported by Bhagyalaxmi *et. al.,* and Chaya *e.t al.*[13,16] In contrast to that Garg *et. al.*, conducted a study in Delhi and reported the prevalence of the same about 77.5%.[19] This variation might be due to use of different methods/parameters used for categorized of individual into different BMI categories.

The findings of the study should be interpreted in lights of limitations. Since the study was conducted in one of the selected block of Barabanki district, the findings couldn't be generalized to whole population. Also since the study was cross-sectional, causal relationship could not be established.

5. Conclusions

The study findings conclude thatcommon risk factors for major NCDs are quite prevalent in rural communities. Therefore, there is need to intensify the current health care surveillance system so as to periodically monitor and evaluate existing health programmes in context to NCDs so as to lower the community burden. Implementation of prevention and control measures should be focussed to decrease the associated risk factors.

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