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Original Research Article

A study on non-communicable diseases, it's prevalence on anthropometric and behavioural risk factors on tribal population of Raigad district: a cross sectional study

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ABSTRACT

Background: Non-communicable diseases (NCDs) are increasing at an alarming rate due to lifestyle modifications and increased level of stress but the prevalence of it in tribal population is still lacking. Thus, the study aimed at identifying the risk factors for non-communicable diseases among healthy adults aged 16-80 years in the tribal population of Raigad district.
Methods: A cross-sectional survey was done with 920 individuals aged 16-80 years of tribal population. Each subject was interviewed using the WHO stepwise questionnaire; where information on diet, physical activity, tobacco and alcohol, and treatment history for hypertension and diabetes were collected along with blood pressure (BP) measurement. Height, weight and waist circumference were also measured.
Results: Statistical analysis was done using SPSS version 24. Moderate prevalence of smoking and smokeless tobacco was observed in the tribal areas targeted with the number of smokers being more than the users of smokeless tobacco. Consumption of alcohol was seen in half of the population in the age group of 16-50 years. Low consumption of fruits and vegetables was seen across all the age groups. Most of the target population falls under the normal BMI category while a fewer population falls under the overweight category.
Conclusions: High prevalence of behavioural risk factors were found with awareness about NCD's was found to be alarmingly low among the tribal population. Prevention of NCD's through detection of risk factor can control the spread of non-communicable diseases, and will help in identifying earlier with its detection and treatment same as communicable diseases.

Keywords: Cardiovascular diseases, Diabetes mellitus, Non-communicable diseases, World Health Organization

INTRODUCTION

With the presentation of the National Health Mission in 2005, India has been quickly advancing towards the fulfilment of good well-being pointers.[1] But still, mortality and morbidity due to non-communicable diseases (NCDs) is expanding and it has turned into an important contributor of sickness due to statistic and epidemiological progress; with non-communicable diseases representing 60% of all worldwide mortality and 47% of all worldwide morbidity.[2] As of now 80% of interminable ailments are presently happening in developing nations.[2]

Indeed, even the World Health Organization (WHO) had pointed on the risk of a "double burden of ailment", which can be the developing epidemic of endless non-communicable diseases, along with the "unfinished plan of desirable illnesses that are the communicable disease".[3]

India is amidst an epidemiological change, with expanding criticalness being given to non-communicable

diseases.[4] In India approximately thousand million population i.e. 66% lives in rural areas.[4] Tribal population in Maharashtra represents 14.6% of the rural population and 9.4% of the aggregate urban and rural population.[5]

The tribal population shapes a significant piece of the total population of Maharashtra and subsequently contributes largely to disease prevalence.

The lifestyle prevailing in the tribal regions of India put them on a high risk of developing NCDs. A few reviews have inspected the prevalence of risk factors for non-communicable diseases in urban and rural India, yet the information from tribal India are scanty.

Tribal population have limited access to healthcare and would be unable to withstand the pay to medicinal expenses related of unending conditions due to which there are significant reasons for of morbidity and mortality in the tribal area.[4]

These non-communicable diseases (NCDs) share a common behavioural risk factors, for example, undesirable eating routine, absence of physical activity, utilization of tobacco and alcohol.[6] The tribal population is presented to these hazard factors at an early age and these practices thus lead to key metabolic changes, for example, weight, raised pulse; which in turn leads to the development of NCDs having impact on the productive performance of the individual resulting into socio-economic burden of the country.[6]

These risk factors luckily, are to a great extent modifiable or preventable.[6] Focusing on the risk factors for non-communicable diseases is perceived as a fundamental preventive methodology.[6] Emphasizing on discovering the risk factors for non-communicable diseases (NCDs) over some stretch of time has been observed to be helpful to make an indirect assessment of the actual disease burden on growing population but still there is a lack of information about NCDs in tribal population. Accordingly, the NCDs are additionally preventable to a huge degree.

In this manner, information on risk factors are important for the forecast of future NCDs and furthermore for preventing them at the beginning. Hence the aim of the study is to find out prevalence of risk factors for NCDs in tribal population.

METHODS

After obtaining the ethical clearance from MGM institute of health sciences and research centre, Navi Mumbai the study was conducted. This study was a cross sectional descriptive type of study which was conducted using a STROBE guideline, where convenient sampling technique method was used. Based on the tribal population, the villages of Morbe, Nere, Waja, Devichapada, Apte, Waveghar, Shirdone and Sai of the Raigad district were selected. A total of 920 participants between the age group of 16-80 years both male and female living in tribal areas of Raigad district were recruited for the study after screening them on the basis of the inclusion criteria.

Exclusion criteria

Participants with known case of infections/communicable disease, participants who were physically or mentally ill, and who were below age group of 16 years were excluded from the study.

The study was conducted for the duration of 5-month i.e. from January, 2017 to May, 2017.

All the participants were informed about the study by the members of the research team and written informed consent were obtained from all the participants following which they were individually interviewed by the researchers and were evaluated as per steps 1 and 2 of the standardized approach developed by the World Health Organization (WHO) known as step-wise approach in a door to door survey. In WHO steps questionnaire step 3 which involves biochemical investigations have been removed from the present study.

WHO step wise questionnaire

WHO step wise questionnaire is a universally accepted outcome measure designed by WHO to investigate NCD risk factors. Step 1 and Step 2 of the WHO steps questionnaire were used for this study.

Step 1 consisted of information about the demographic data which included basic information on gender, age, residential area and contact number along with income, education and occupation. In addition to information on alcohol (amount, frequency and patterns of drinking) and tobacco consumption (for smoking as well as smokeless tobacco) were collected. Knowledge, attitude and practices regarding fruit, vegetable intake and dietary habits were assessed. Information regarding physical activity was collected in the form of 3 main domains i.e. work, transport and leisure which then further classified into low (less than 600 MET minutes per week), moderate (600-1500 MET minutes per week), and high (more than 1500 MET minutes per week). The health history constituent questions regarding the information on diabetes mellitus, hypertension and use of medications also the habit of smoking cigarette.

Step 2 consisted of physical measurements. Height, weight, waist circumference was measured using standardized instruments recommended by WHO steps while conducting the community-based survey. Height was measured with the participant standing upright using a measuring tape. Measurements were taken bare foot with light clothing. Weight was measured on a weighing meter scale with participant being barefoot with light

clothing. Body mass index was calculated as weight in kilogram by height in meter square.

RESULTS

Predesigned and pretested standardized tool was used for collection of data. Collected data were stored in Microsoft excel 2010. Basic statistical analysis like graph and custom tables were prepared in MS excel and statistical analysis was done using SPSS version 24. Data analysis was performed to obtain prevalence of NCDs using descriptive statistical analysis test such as mean, standard deviation, percentage, upper limit and lower limit range. The confidence interval 95% were used to calculate normal range of prevalence.

Table 1: Age group distribution.

Age group (yrs)	Male (%)	Female (%)
≤20	10 (1.9%)	16 (4.0%)
21-25	29 (5.4%)	44 (11.1%)
26-30	65 (12.4%)	74 (18.6%)
31-35	71 (13.6%)	48 (12.1%)
36-40	89 (17.0%)	49 (12.3%)
41-45	68 (13.0%)	60 (15.1%)
46-50	72 (13.8%)	33 (8.3%)
51-55	62 (11.9%)	23 (5.8%)
56-60	33 (6.3%)	22 (5.5%)
61-65	12 (2.3%)	15 (3.8%)
66-70	7 (1.3%)	8 (2.0%)
>71	5 (1.0%)	5 (1.3%)

In this cross-sectional survey of 920 participants aged between 16-80 years from tribal areas of Raigad district, according to age group distribution we have found out maximum population of 17% in the age group of 36-40 years for male whereas for females' maximum population was found between the age group of 20-30 years with 18.6% (Table 1).

Table 2: Educational qualification of people living in tribal areas of Raigad district.

Education	Male (%)	Female (%)
No formal schooling	88 (16.8%)	124 (31.4%)
Less than primary school	140 (26.8%)	117 (29.5%)
Primary school completed	145 (27.7%)	82 (20.7%)
Secondary school completed	92 (17.6%)	58 (14.6%)
High school completed	49 (9.4%)	7 (1.8%)
College/university completed	9 (1.7%)	7 (1.8%)
Post graduate degree	0 (0%)	0 (0%)
Refused	0 (0%)	2 (0.5%)

According to the survey, we have found out that the educational qualification of people living in tribal areas of Raigad district with maximum number of people having primary school completion qualification for males and for females it was less than primary school. Barely people from tribal region have completed higher levels of education (Table 2).

Table 3: prevalence of behavioural risk factors for NCD's (tobacco, smokeless tobacco and alcohol).

Age group (yrs)	Tobacco N (%)	Smokeless tobacco N (%)	Alcohol N (%)
≤20	7 (0.7-3.0)	11 (1.3-4.1)	5 (0.6- 3.4)
21-25	23 (3.3-7.4)	22 (3.1-7.0)	16 (3.0- 7.8)
26-30	56 (9.5-15.6)	71 (12.4-19.0)	48 (11.4- 19.2)
31-35	61 (10.5-16.8)	75 (13.2-19.9)	41 (9.5-16.8)
36-40	86 (15.5-22.7)	75 (13.2-19.9)	63 (15.6-24.2)
41-45	71 (12.5-19.2)	64 (11.0-17.3)	54 (13.0-21.2)
46-50	57 (9.7-15.8)	54 (9.1-15.0)	37 (8.4-15.4)
51-55	46 (7.6-13.1)	41 (6.6-11.8)	27 (5.7-11.8)
56-60	25 (3.7-7.9)	26 (3.8-8.1)	20 (4.0-9.3)
61-65	14 (1.8-5.0)	5 (0.4-2.4)	3 (0-2)
66-70	4 (0.3-2.1)	9 (1.0-3.5)	4 (0-3)
>71	5 (0.4-2.4)	6 (0.5-2.7)	3 (0-2)

Prevalence of tobacco use was high in the age group of 36 to 40 years with 15.5% to 22.7% (according to 95% CI) and smokeless tobacco was found to be more in 31-40 years of age with 13.2% to 19.9% (according to 95% CI). A high prevalence of alcohol use among the population was found in the age group of 36-40 years with 15.6% to 24.2% (according to 95% CI) (Table 3).

Table 4: Distribution of anthropometric risk factors.

BMI	n=920	Mean intake (95% CI)	Standard error (SE)
Underweight	31	3.4% (2.3-4.7%)	0.6%
Normal	372	40.4% (37.3-43.6%)	1.6%
Overweight	208	22.6% (20.0-25.4%)	1.4%
Obese	309	33.6% (30.6-36.6%)	1.6%
Waist circumference			
<101	913	99.1% (98.4-99.6%)	0.3%
>101	7	0.8% (0.3-1.5%)	0.3%
Diagnosed blood pressure			
Yes	76	8.3% (6.6-10.2%)	0.9%
No	562	61.0% (57.8-64.1%)	1.6%
Don't know	282	30.6% (27.7-33.7%)	1.5%
Diagnosed diabetes			
Yes	36	3.9% (2.8-5.3%)	0.6%
No	381	41.1% (38.2-44.6%)	1.6%
Don't know	503	54.6% (51.4-57.8%)	1.6%

Distribution of anthropometric risk factors showed that people living in the tribal population area has BMI ranging from obese (mean intake of 33.6%) to normal (mean intake of 40.4%) with maximum people having

waist circumference of more than 101 (mean intake 99.1%). It also showed that most of the people living in tribal area of Raigad district were not aware of their blood glucose as well as blood pressure status (Table 4).

Table 5: Prevalence of physical activity among people living in tribal region.

Physical activity	n=920 Yes	Mean intake (95% CI)	Standard error (SE)	n=920 No	Mean intake (95% CI)	Standard error (SE)
Work related vigorous activity	284	30.8% (27.9-33.9%)	1.5%	636	69.1% (66.0-72.0%)	1.5%
Work related moderate activity	619	67.2% (64.1-70.2%)	1.5%	301	32.7% (29.7-35.8%)	1.5%
Use of bicycle/ walk to travel	827	89.8% (87.7-91.6%)	1.0%	93	10.1% (8.3-12.2%)	1.0%
Recreational vigorous activity	23	2.5% (1.6-3.7%)	0.5%	897	97.4% (96.2-98.3%)	0.5%
Recreational moderate activity	192	20.8% (18.3-23.6%)	1.3%	728	79.0% (76.3-81.6%)	1.3%

Table 6: Distribution of dietary habits of study participants.

Average number of days fruits consumed per week	n=920	Mean intake (95% CI)	Standard error (SE)
0 day	86	9.3% (7.5-11.3%)	1.0%
1 day	91	9.8% (8.0- 11.8%)	1.0%
2 days	206	22.2% (19.7-25%)	1.4%
3 days	184	19.9% (17.4-22.5%)	1.3%
4 days	142	15.3% (13.1-17.8%)	1.2%
5 days	128	13.8% (11.7-16.2%)	1.1%
6 days	34	3.7% (2.6-5.0%)	0.6%
7 days	45	4.9% (3.6-6.4%)	0.7%
Don't know	4	0.4% (0.1-1.0%)	0.2%
Average number of days vegetables consumed per week			
0 day	20	2.2% (1.4-3.3%)	0.5%
1 day	12	1.3% (0.7-2.2%)	0.4%
2 days	51	5.5% (4.2-7.1%)	0.7%
3 days	119	12.9% (10.8-15.1%)	1.1%
4 days	252	27.2% (24.4-30.1%)	1.5%
5 days	199	21.5% (18.9-24.2%)	1.3%
6 days	88	9.5% (7.7-11.5%)	1.0%
7 days	179	19.3% (16.9-22.0%)	1.3%
Don't know	-	-	-

From the survey, we have discovered that most of the people's work were related to moderate physical activity. 619 people out of 920, almost 67.2% (mean intake) who were agreed that they involved moderate amount of physical activity for their work and also nearly 827 out of 920 (mean intake 89.8%), either uses bicycle or walk to travel to and from places (Table 5).

Table 6 showed dietary habits of the participants which suggested that maximum number of people consume fruits at least twice a week with a mean intake of 22.2% (19.7-25%) and consumes vegetables 4 days per week with mean intake of 27.2% (24.4-30.1%) (Table 6).

DISCUSSION

A total of 523 males and 397 females amongst the tribal population of Raigad district participated in the study. The study reveals high prevalence of tobacco use, alcohol consumption, unhealthy diet, physical activity and overweight.

Tobacco use

Prevalence of tobacco use was found to be more with the number of smokers being higher compared to the users of smokeless tobacco. A similar study performed in Assam showed higher prevalence of tobacco usage.[7] Apart from this, the prevalence of tobacco use was substantially higher than the state percentage of the urban and rural populations.[8] This prevalence is found in the presence of high degree of awareness with 81% agreeing that tobacco use is harmful for health. This can credit to the communal influence amongst their peers. A higher prevalence of tobacco use was seen in two age groups; 16-35 and 36-50 which forms the major working class of the population who are burdened by physical and mental stress.

Alcohol consumption

About half the population was found to be consuming alcohol with a greater percent among the working class of 16-35 and 36-50 years. This study points out that the tribal regions of Raigad district have a lower prevalence

of alcohol consumption than the Mishing tribes of Assam.[7] However, the same is greater than the tribal population of Kinnaur where the alcohol consumption was found in 24.9% of the population.[9] Also, this percentage is far higher than the urban (12.3%) and rural (15.6%) prevalence of alcohol consumption in the state of Maharashtra.[8] This may be due to traditional concept of alcohol consumption caused by familial and social influence. Greater percentage in the young age group of 16-35 can be due to peer pressure apart from the above-mentioned factors. Alcohol, apart from being an active contributor to chronic disorders, also predisposes to obesity in later life.[10] Alcohol dependence largely contributes to unnatural deaths or, for a better term, premature death which is also individually caused by NCDs.

Diet

Low consumption of fruits and vegetables was found across all age groups. Similar results were obtained in the studies done on the other tribal regions of India.[7-9] However, with the state having more than double percentage of people consuming healthy servings of fruits and vegetables, the tribal population falls back comparatively in this domain too.[8] This can be attributed to low levels of fruit farming as they prefer vegetables over fruits. Lack of transportation facilities hinder the supply of fruits and vegetables.

Physical activity

More than half of the population has moderate level of physical activity along with some who have high level of physical activity. According to the IDSP NCD survey (Phase-I), Maharashtra has only 3.8% people doing high levels of physical activity in the urban population with a slightly higher percentage following a physically active lifestyle in the rural population (5.3%).[8] Higher levels of physical activity found in the tribal regions can be attributed to multiple factors. Traditional occupations like farming that are being followed involves vigorous or moderate level of physical activity. Lack of transportation and occupational needs results in people performing walking and bicycling for longer durations. Higher prevalence of low level of physical activity is seen in age group of 51-69 years as this population comprises more of non-working class.

Attitude and awareness

Significantly low level of awareness about NCD's was found among the population. A study in the tribal people of Kinnaur which evaluated the awareness of hypertension and diabetes found a higher percentage of people having awareness.[9] Poor health seeking behaviour was reported among the tribal population of India which could lead to poor knowledge of NCD's. Also, lack of medical facilities in the tribal areas negatively affects their awareness.[11]

Most people consider it not important to quit tobacco or alcohol maybe because their mindset regarding the advantages are greater than the disadvantages. This attitude can act as an obstacle in the government's attempts to barricade the effects of the risk factors and in the implementation of the various programmes aimed at prevention of NCDs, like the national program of prevention and control of cancer, diabetes, CVD and stroke (NPCDCS).

Obesity

While the studied population presents with high levels of physical activity, more than half of the population was found to be overweight. Similar results on overweight population were found among the tribal population of Assam though the levels of physical activity there were comparatively lower than what was found in our study.[7] This contradicting finding may be due to the unhealthy dietary habits or the high prevalence of alcohol consumption which predisposes to obesity.[10]

There is a high prevalence of the behavioural risk factors of NCDs among the tribal population of Raigad district which need to be addressed immediately. A pattern is observed across the age groups for the prevalence of the behavioural risk factors with majority of the working-class population more prone to tobacco and alcohol use. Awareness about NCDs is alarmingly low among the tribal population corresponding to an increased prevalence of risk factors. Though the physical activity levels of the population are convincingly good, higher levels of overweightness and obesity is still quite prevalent among the population due to unhealthy dietary habits and alcohol consumption.

Thereby, the study concludes that there is a high prevalence of the behavioural risk factors of NCDs among the tribal population of Raigad district which need to be addressed immediately. A pattern is observed across the age groups for the prevalence of the behavioural risk factors with majority of the working-class population more prone to tobacco and alcohol use. Awareness about NCDs is alarmingly low among the tribal population corresponding to an increased prevalence of risk factors. Though the physical activity levels of the population are convincingly good, higher levels of overweightness and obesity is still quite prevalent among the population due to unhealthy dietary habits and alcohol consumption.

As the questionnaire has been translated and explained the vocative skills of the researcher as well as the perception of the targeted demographics can be a limitation.

Implementation of national programmes aimed at prevention of NCDs like the NPCDCS (National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke) is warranted at the earliest. The NPCDCS since its launch in

2010 has not reached the Raigad district.[12,13] Local educational sessions in coordination with the ASHA and Anganwadi workers to improve the knowledge and create a positive attitude in the tribal population.

CONCLUSION

High prevalence of behavioural risk factors were found with awareness about NCD's was found to be alarmingly low among the tribal population. Prevention of NCD's through detection of risk factor can control the spread of non-communicable diseases, and will help in identifying earlier with its detection and treatment same as communicable diseases.

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