International Journal of Community Medicine and Public Health
Velavan A et al. Int J Community Med Public Health. 2018 Feb;5(2):698-701
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20180253

Original Research Article

Assessment of cardiovascular risk among adults in a rural area of Kancheepuram district, Tamil Nadu

Velavan A.[1]*, Jyothi Vasudevan[1], Arun S.[2], Anil J. Purty[1], Vincent A.[1]

[1]Department of Community Medicine, Pondicherry Institute of Medical Sciences (PIMS), Puducherry, India
[2]Mahatma Gandhi Medical College and Research Institute, Puducherry, India

Received: 06 December 2017
Revised: 05 January 2018
Accepted: 06 January 2018

***Correspondence:**
Dr. Velavan A.,
E-mail: velu.anand13@gmail.com

ABSTRACT

Background: Increasing longevity of the world's population has resulted in a shift in the disease patterns prevalent hitherto. The worst affected are the middle and low- income countries including India. The genetic make-up of Indians render them highly susceptible to cardiovascular diseases and diabetes at a much earlier age with resultant higher mortality rates. Thus, low- cost early detection, and innovative, customized preventive strategies are the need of the hour.
Methods: In this cross- sectional study, we have used the WHO/ISH risk prediction charts tailor – made for the SEAR D region, to assess the cardiovascular risk of a rural population aged above 40 years. Data regarding multiple cardiovascular risk factors were collected using a pre- defined and pre-tested questionnaire, from 400 participants, including other variables like BP and anthropometric measurements. The data were entered in Microsoft excel and analysed using SPSS- ver16.
Results: We found that 14.5% of the population had more than 10% risk of cardiovascular diseases and 41.5% were in stage I or II hypertension. People who belonged to the class II SES, use of oral tobacco, saturated cooking oils and sedentary lifestyle was found to be associated with high CV risk. However the association of CV risk with other risk factors like smoking and BMI was inconsistent.
Conclusions: There is an increasing trend of cardiovascular risk in rural areas of Tamil Nadu and risk factors like higher socio economic class, use of oral tobacco, saturated cooking oils and sedentary occupation were found to be associated with high CV risk.

Keywords: Cardiovascular risk, Adults, Rural areas

INTRODUCTION

The increasing lifespan of the world's population over the years has resulted in a dramatic change in the health care needs of the people, with non-communicable diseases (NCDs), rapidly replacing infectious diseases and malnutrition as the leading causes of disability and premature death. According to the Global Health Observatory Data of the WHO, ischemic heart disease, stroke and chronic obstructive lung disease have remained the top killers during the past decade.[1] India presents a bleak picture with ischemic heart disease being the leading cause of death currently with an alarming increase of 41.5% from 2005 to 2016.[2] Compared to other developed countries, the hallmarks of cardiovascular disease (CVD) epidemiology in India are high mortality rates, premature CHD, and increasing burden all across the country.[3] CVD has emerged as the leading cause of

death in all parts of India, including poorer states and rural areas. The improvements in socioeconomic status leading to changes in dietary patterns, high prevalence of diabetes, tobacco use, lack of timely medical care, etc are reasons stated for increased morbidity and mortality of CVD in rural areas of the country.[4] Early detection and innovative, customized preventive strategies are the need of the hour to counter rising trends of CVDs especially in rural areas. Assessment of the prevalence of cardiovascular risk factors is the first step towards developing any interventional or preventive strategy but risk scores based upon studies conducted in high income countries may not be suitable for use in low-resource settings. The World Health Organization and the International Society of Hypertension (WHO/ISH) developed sets of regional risk prediction charts based on fewer risk factors that can be assessed by physicians and non-physician health workers in primary care setting. In this study, we have used the WHO/ISH risk prediction charts tailor – made for the SEAR D region, under which India falls, to assess the cardiovascular risk of a rural population residing in Kancheepuram district of Tamil Nadu.

METHODS

In this cross- sectional study, we have attempted to assess the CVD risk score and prevalence of CVD risk factors among the target population, by utilizing the risk charts and studying other established risk factors for the same.

This study was carried out during August to October 2015 in three villages of Chunampet in Kancheepuram district with a population of 3145 individuals from among 10 villages falling under the Rural Health Training Centre of the Pondicherry Institute of Medical Sciences by simple random sampling.

All available individuals aged more than 40 years were invited to take part in the study. Subjects unavailable during home visits on two separate days were excluded from the study. In addition, those individuals with confirmed atherosclerotic CVD and those who were critically ill were excluded from the study. In total, 400 subjects participated in the assessment.

After obtaining verbal consent, interview was done using pre designed and pre-tested questionnaire. Anthropometric measurements like standing height (in cms) and weight (in kgs) without shoes or chappals were recorded close to one decimal point after standardization using stadiometer and weighing machine, respectively; waist circumference was measured using inch tape. Two Blood pressure readings were measured in sitting position at an interval of 5 minutes using sphygmomanometer. Blood cholesterol levels of subjects if available were also documented. Cardiovascular risk was predicted using WHO – ISH Risk prediction charts for South East Asian region.

Operational definitions

For the categorization of the work status (viz. employed and unemployed) guidelines of Census 2001, recommended by the Government of India were utilized.[5] BG Prasad modified classification was employed for classifying the study population as per their socio-economic status.[6] Smoking was defined as the use of any smoke form of tobacco product in the last six months. Alcohol use was defined as consumption of any type of alcohol in the last one year. Hypertension grading was done based on the JNC classification.[7]

Statistical analysis

The collected data was entered in Microsoft Excel. Data were analyzed by the SPSS version 16.0 for Windows (SPSS Inc., Chicago, IL, USA). Frequency distributions and percentages were computed for all the variables. The association between various study categorical variables and gender was calculated by using Chi-Square test. *P*-values were considered significant when values were less than 0.05.

RESULTS

Majority of the study participants belonged to the age group 41-50 years. Female participants (54.3%) were higher than male participants (45.7%). About 54% of the study participants had no formal schooling. Majority of the participants were daily wage laborers (39.5%) and belonged to the Class IV socio economic status (34.3%) and most of them were married (90.5%).

Among the study participants 338 (84.5%) of them had their blood pressure checked at least once by a health worker or doctor and 166 (41.5%) were in stage I or stage II hypertension and 252 (63%) of the study participants had their blood sugar checked at least once out of which 73 of them (28.9%) had high blood sugar. Out of the participants who had high blood sugar, 46 (63.01%) was taking treatment for the same, either tablets or insulin.

Among the study participants 14.8% were smoking tobacco products. Twenty nine percent of the study population was using oral tobacco products. Among the study participants 29.8% of them consume alcohol (former & present alcoholics).

Table 1: Cardio vascular risks of study subjects (N=400).

CV risk category	Frequency	Percent (%)
<10%	342	85.5
(10-20)%	48	12.0
(20-30)%	8	2.0
>40%	2	0.5
Total	400	100.0

The Table 1 shows that 85.5% of the study participants had <10% of cardiovascular risk.

About 9.3% of the study population was not taking any fruits in their daily diet while 56.5% were taking fruits for two days in a week. Close to half (45.5%) of the study population were taking vegetables all the days of the week and 41.5% of the study population were using unsaturated cooking oil for cooking

Regarding physical activity, 48.8% of the study participants' occupation involved moderate physical activity and 80% of the study population either walked or used a bicycle for at least 15 minutes a day to travel.

Table 2: Association between risk factors and cardio vascular risk of the study population (N=400).

Risk factors	Categories	CV Risk		Total (%)	P value
		Low≤10(%)	High >10(%)		
Socio Economic Status	I	26 (100)	0 (0)	26 (100)	0.000
	II	32 (68.1)	15 (31.9)	47 (100)	
	III	101 (83.5)	20 (16.5)	121 (100)	
	IV	116 (84.7)	21 (15.3)	137 (100)	
	V	66 (95.7)	3 (4.3)	69 (100)	
Oral Tobacco chewing	Yes	83 (71.6)	33 (28.4)	116 (100)	0.000
	No	258 (90.8)	26 (9.2)	284 (100)	
Smoking	Yes	50 (84.7)	9 (15.3)	59 (100)	0.906
	No	291 (85.3)	50 (14.7)	341 (100)	
Alcohol consumption	Yes	105 (88.2)	14 (11.8)	119 (100)	0.273
	No	236 (84)	45 (16)	281 (100)	
Physical Activity	Vigorous	111 (94.1)	7 (5.9)	118 (100)	0.004
	Moderate	157 (80.5)	38 (19.5)	195 (100)	
	Sedentary	73 (83.9)	14 (16.1)	87 (100)	
BMI	Normal	181 (85)	32 (15)	213 (100)	0.404
	Overweight	125 (85.6)	21 (14.4)	146 (100)	
	Obese	12 (100)	0	12 (100)	
	Underweight	23 (79.3)	6 (20.7)	29 (100)	
Cooking Oil	Saturated oil	116 (78.9)	31 (21.1)	147 (100)	0.006
	Unsaturated oil	152 (91.6)	14 (8.4)	166 (100)	
	Mixed oil	73 (83.9)	14 (16.1)	87 (100)	

DISCUSSION

This study was done in a rural area to assess the cardiovascular risk among the individuals aged 40 and above. The study results showed a cardiovascular risk score of more than 10% among 14.5% individuals while a low cardiovascular risk score of less than 10% among 85.5% of study participants. In a similar study by Ghorpade et al in a rural population in South India, using WHO risk charts to predict the CV risk, 86% of the population had low risk less than 10% and a risk score of more than 20% was seen among 10.2% of the population.[8] These findings are similar to our study. Various studies have revealed a variable level of prevalence of CVD risk using the similar WHO/ISH risk prediction charts in some of the Asian countries (viz. China 1.1%, Iran 1.7%, Sri Lanka 2.2%, Nepal 9.8%, and Pakistan 10.0%).[9,10] These differences can be attributed to the differences in population genetically and according to their lifestyle followed. Among the participants in our study, 41.5% were in stage I or II hypertension. The findings were slightly higher than other Indian studies where the prevalence of hypertension ranged from 26%-33%. This shows that there is an increasing trend of CVD risk factors especially in the rural areas. In our study, people who belonged to the class II SES had higher risk for CVD when compared to class V SES and is statistically significant (p=0.000). It is similar to a study done by Ghaffar et al in India which showed that individuals with high levels of income are at a higher risk, thus suggesting that CVD burden is high among the upper socio-economic class even in rural areas.[11] Use of oral tobacco, saturated cooking oils and sedentary occupation was found to be associated with high CV risk, in our study, similar to other studies.[12,13] However the association of CV risk with other risk factors like smoking and BMI is inconsistent and not statistically significant.

Limitation

The present study was conducted in only three of the villages of rural Tamil Nadu (viz. sample size being small) and thus findings of the study cannot be generalized to the other populations.

Recommendation

The risk prediction chart used in this study can be used in primary care setting and hence developing a comprehensive risk prediction chart for the Asian population including specific risk factors relevant to the population shall be more fruitful.

ACKNOWLEDGEMENTS

The Authors would like to acknowledge the support of Interns, Medical Officers and Field staff of Rural Health Training Centre of PIMS in carrying out this study.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. WHO. World Health Organization. World Health Organization; [cited 2017Nov17]. Available from: http://www.who.int/gho/mortality_burden_disease/en/
2. India. Institute for Health Metrics and Evaluation. Available from: http://www.healthdata.org/india. Accessed on 17 November 2017.
3. Gupta R, Guptha S, Sharma KK, Gupta A, Deedwania PC. Regional variations in cardiovascular risk factors in India: India Heart Watch World J Cardiol. 2012;4:112-20.
4. Prabhakaran D, Jeemon P, Roy A. Cardiovascular Diseases in India. Circulation. 2016;133(16):1605–20.
5. Orgi. Census of India Website: Office of the Registrar General & Census Commissioner, India. Census of India Website: Office of the Registrar General & Census Commissioner, India. Available from: http://censusindia.gov.in/. Accessed on 17 November 2017
6. Vasudevan J, Mishra A, Singh Z. An update on B. G. Prasads socioeconomic scale: May 2016. Int J Res Med Sci. 2016;12:4183–6.
7. Weber MA, Schiffrin EL, White WB, Mann S, Lindholm LH, Kenerson J, et al. Clinical Practice Guidelines for the Management of Hypertension in the Community. J Clin Hypertension. 2013;16(1):14–26.
8. Ghorpade AG, Shrivastava SR, Kar SS, Sarkar S, Majgi SM, Roy G. Estimation of the cardiovascular risk using World Health Organization/International Society of Hypertension (WHO/ISH) risk prediction charts in a rural population of South India. Int J Health Policy Management. 2015;4(8):531-6.
9. Mendis S, Lindholm LH, Anderson SG, Alwan A, Koju R, Onwubere BJ, et al. Total cardiovascular risk approach to improve efficiency of cardiovascular prevention in resource constrain settings. J Clin Epidemiol. 2011;64:1451–62.
10. Koju R, Gurung R, Pant P, Humagain S, Yogol CM, Koju A. et al. Prediction of cardiovascular disease in suburban population of 3 municipalities in Nepal. Nepalese Heart J. 2011;8:3–7.
11. Ghaffar A, Reddy KS, Singhi M. Burden of non-communicable diseases in South Asia. Br Med J. 2004; 328:807-10.
12. Basu S, Babiarz KS, Ebrahim S, Vellakkal S, Stuckler D. Palm oil taxes and cvd mortality in India: economic-epidemiologic model. BMJ. 2013;347:f6048.
13. IDSP Non-Communicable Disease Risk Factors Survey, Tamil Nadu, 2007-08: Indian Council of Medical Research (ICMR); 2009.

Cite this article as: Velavan A, Vasudevan J, Arun S, Purty AJ, Vincent A. Assessment of cardiovascular risk among adults in a rural area of Kancheepuram district, Tamil Nadu. Int J Community Med Public Health 2018;5:698-701.