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Research Paper

A Community based Cross sectional study for prediction of cardiovascular event using non laboratory based risk score.

Medical Science

KEYWORDS : non-laboratory based risk score, prediction, cardiovascular event.

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ABSTRACT

In developing countries like India the focus for long time has been on the control of communicable diseases. As there is health transition i.e., shift in trend from Communicable diseases to Non communicable diseases the present study is conducted with the

Objective:To predict 10 year risk of cardiovascular events of adults aged 40 years and above in an urban area in Tamilnadu using a non-laboratory based risk score.

Methodology :

This cross sectional study carried out in an urban area , among adults of age 40 years and above. The total study participants of 578 were chosen by multistage random sampling technique. The data was entered using epidata and analysis was done with SPSS.

Results :

Among the 578 study subjects, 516(89.3%) individuals have <10% risk, 50(8.65%) individuals have 10-20% risk , 7(1.2%) of individuals have 20%-30% risk and 5(0.85%) of individuals have >40% risk of developing cardiovascular event.

Introduction

Non communicable diseases are also referred to as chronic diseases are the leading cause of death worldwide. In 2008, eighty percent of non-communicable diseases deaths were in developing countries up from 40% in 1990(1). Non-communicable diseases will steadily increase the number of healthy years lost (Disability Adjusted Life Years-DALY) in middle income countries but the loss will increase very quickly in low income countries. In developing countries like India the focus for long time has been on the control of acute and chronic infections and communicable diseases. There is epidemiological evidence that health transition i.e., shift in trend from Communicable diseases to Non communicable diseases is occurring rapidly in low and middle income countries(2). Unfortunately less attention has been paid at developing risk scores that would be easier to use in clinical practice without loss of predictive discrimination. In developed countries, a prediction rule that requires a laboratory test is not an inconvenience but in low income countries with limited testing facilities, such analysis can be too expensive to use at all(3).Since developing countries have limited resources for prevention strategies that require laboratory testing facilities, it makes sense to do this study using non laboratory based parameters. There is scarcity of evidence of any research to suggest the non-lab based risk score in developing countries.

Objective

To predict 10 year risk of a fatal or non-fatal cardiovascular events of adults aged 40 years and above in an urban area of Kancheepuram District in Tamilnadu using a non-laboratory based risk score

Materials and methods:

The present study is a community based cross sectional study. The present study has been conducted in Maraimalai nagar which is an urban area situated in Kancheepuram district of Tamilnadu. Multi stage random sampling technique was used . Out of the three Blocks, NH1 was selected by random sampling by lottery method. Three wards were selected out of five wards in each blocks. Among the three selected wards there were 77 streets. As the required sample size was 566, assuming that atleast twenty people will be covered from each street 30 streets were planned for survey. Those 30 streets were selected by random sampling by lottery method from 77 streets. Sample size of 578 was achieved by covering all the 30 streets.

Sample size

As the prevalence of diabetes in Tamilnadu is 15% sample size was calculated using the formula n= z2pq /l2 (4) turned out to be 566. However a total of 578 were surveyed in the study area.

Study population

Adults of aged 40 years and above who are permanent residents of Maraimalai nagar (They should be residents of Maraimalai nagar atleast for past one year.). Inclusion for the study are respondent adults (both males and females) aged 40 years and above and less than 80 years of age and people who gave written informed consent. Those who could not be contacted even after 2 visits were excluded from the study. The study was conducted for a period of 1 year from August 2012 to July 2013.

Data Collection

Pilot study was conducted during September 2012 and feasibility was checked. Questionnaire was modified further after pilot study. As per the sampling technique 30 streets were needed to be covered. Door to door survey was conducted for all the streets. The streets had a total of three hundred and twenty seven households. Excluding the houses which were locked at the survey timing and those who did not give consent, 300 households were surveyed which included 578 study participants. Maximum of two persons one male and one female were included in each household. Timings on the survey days were chosen in such a way to have the representation of working people. Survey was conducted both during morning and evening to cover most of the working population.

People were asked if they have disease of sugar or diabetes. Those who said yes to the question status was confirmed by reports of diagnosis or treatment.

Study tool:

World Health Organisation/International society for Hypertension Risk prediction chart-SEAR-D has been used in this study[5] . There are two sets of charts. One set can be used in settings where blood cholesterol can be measured. The other set is for settings in which blood cholesterol cannot be measured.Both sets are available according to the 14 WHO epidemiological sub-regions. Each chart can only be used in countries of the specific WHO epidemiological sub-region. The charts for South East Asia sub-region D (SEAR D) can be used in India. This chart predicts 10 year risk of fatal or nonfatal cardiovascular event by gender,age,systolic B.P,smoking status and presence or absence of diabetes mellitus.

Results:

In the present study conducted among 578 study participants

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majority of study participants belonged to age group 50 to 59 years. Mean (SD) age in years was 54.2 ±10.2. Males (47.8%) and females (52.3%) were almost equal in distribution. The study population constituted 89.5% Hindus, 9.5% Christians and 1 % Muslims. About 65.46% of study population were literates. About 93.91% of study participants were from nuclear family and 6.09% of study participants were from joint family. Based on Joint National Committee VII on hypertension(6) Prevalence of hypertension was 3.2%.Most of the Prehypertensive cases (31.68%) were in the age group of 55 to64 years. nearly 80% of study population were in the Normotensive stage. only 0.3% were in the stage 2 hypertension.16.41% of the study population were in the Prehypertension category . Prevalence of diabetes was21%. Prevalence of smoking was 10.69 %. Among the 578 study subjects, 516(89.3%) individuals have <10% risk, 50(8.65%) individuals have 10-20% risk , 7(1.2%) of individuals have 20%-30% risk and 5(0.85%) of individuals have >40% risk of developing cardiovascular event. There is association between diabetic status and risk of cardiovascular event, but the relationship is not statistically significant.

Discussion :

In contrast ,the study done by Dugee otgunya[7] etal showed that the prevalence of WHO/ISH "high CVD risk" (≥20% chance of developing a cardiovascular event over 10 years) of 6%, 2.3% and 1.3% in Mongolia, Malaysia and Cambodia, respectively, is in line with recent research when charts alone are used. However, these proportions rise to 33.3%, 20.8% and 10.4%, respectively when individuals with blood pressure > = 160/100 mm/Hg and/or hypertension medication are attributed to "high risk". Of those at "moderate risk" (10-< 20% chance of developing a cardio vascular event over 10 years), 100%, 94.3% and 30.1%, respectively are affected by at least one risk-increasing factor. Of all individuals, 44.6%, 29.0% and 15.0% are affected by hypertension as a single risk factor (systolic ≥ 140 mmHg or diastolic ≥ 90 mmHg or medication).

The study done by S.Monira hussain [8] et al showed that as with almost all of the combinations of risk factors at their extreme values, the ATP III risk score predicts 10-year CVD risks below 10% for nonsmoking men <45 years of age and all women <65 years of age. In another Indian cohort, three risk scores were applied and predicted different levels of CVD risk for the individuals in the same population. The Framingham model predicted only 5.3% of the study subjects (males aged 37.2 ± 14 years and females aged 43.2 ± 13.7 years) at high risk; an apparent underestimation has given that an adjusted Framingham score calculates 30-year risks to be 7.9% for women and 18.0% for men in the population from which it originated. That Framingham algorithm has been observed to perform poorly across socioeconomic groups, and underestimated risk in socioeconomically deprived groups may be an explanation for this underestimation. The Joint British Cardiac Society (BCS)/British Hypertension Society (BHS)/British Hyperlipidemia Association (BHA) risk score also appeared to underestimate the CVD risk. However, the risk underestimation by the Framingham algorithm and the British Cardiac Society algorithm was disproportionate (5.3% by Framingham, 3.7% and 4.4% by the joint British Societies scores, resp.)

The study done by R.M. Conroy etal [9]has reealed that ten-year risk of fatal cardiovascular disease was calculated using a Weibull model in which age was used as a measure of exposure time to risk rather than as a risk factor. Separate estimation equations were calculated for coronary heart disease and for non-coronary cardiovascular disease. These were calculated for high-risk and low-risk regions of Europe. Two parallel estimation models were developed, one based on total cholesterol and the other on total cholesterol/HDL cholesterol ratio. The risk estimations are displayed graphically in simple risk charts. Predictive value of the risk charts was examined by applying them to persons aged 45–64; areas under ROC curves ranged from 0.71 to 0.84.

Conclusion :

Risk prediction chart of predicting cardiovascular event could be done at the primary care level, since it could be an appropriate technology for the resource limited country like India. The present study results using non lab based risk score should be compared with lab based risk scores. Since from the present study it has been found that diabetes is the single most predictor of cardiovascular event, Diabetes clinic, can be implemented. Health education campaign could be started for adolescence and adults as a means of primordial prevention.

Table 1: Age wise distribution of the Study Population in Years

Age in years	Frequency	Percent
40-49years	122	21.11
50-59years	277	47.92
60-69years	101	17.48
≥70years	78	13.49
Total	**578**	**100.0**

Figure 1: Smoking Status Among Study Population

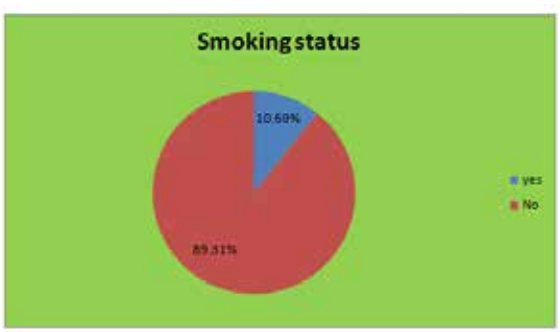
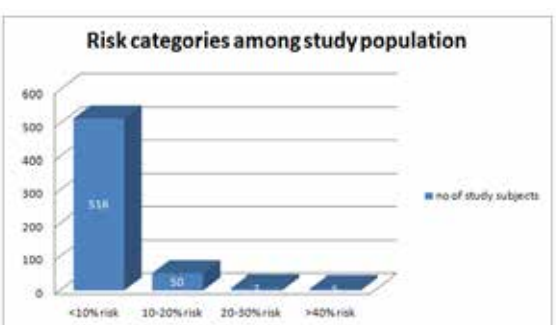


Figure2: Predicted Risk Categories among Study Population



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