Assessment of 10 Year Risk of Fatal or Non-Fatal Cardiovascular Disease Using WHO/ISH Charts in District Amritsar of Punjab (India)

Kanwal Preet Gill[1], Priyanka Devgun[2]

Author's Affiliation:
[1]Asso Prof; [2]Prof & Head, Department of Community Medicine, Sri Guru Ram Das Institute of Medical Sciences & Research, Amritsar.

Correspondence
Dr Kanwal Preet Kaur Gill
kpreet224@gmail.com

ABSTRACT

Introduction: World Health Organization recommends use of WHO/ISH risk prediction charts for identifying those who are at high risk of cardiovascular disease. Hence, the current study was conducted to assess 10 year risk of cardiovascular disease among adult population of Amritsar.

Materials & Method: The study was conducted in Urban Health Training Centre of Sri Guru Ram Das Institute of Medical Sciences and Research Amritsar. The Attendants of patients coming to the centre for treatment in the age group of 40-65 years were included in the study. The sample size of 400 was calculated. WHO/ISH charts for South East Asian Region in the setting were used to estimate fatal or non-fatal cardiovascular risk prediction for 10 years.

Results: Nearly half of study subjects (55.8%) were having low risk, 15.5% had moderate risk and 28.8% had high risk of cardiovascular disease. The risk was found to be higher among men, in urban areas, among those who had lower level of education and among those who were belonging to medium or high income group.

Conclusion: There is a high risk of cardiovascular disease. Further research on larger population is required for appropriate intervention.

Key Words: Cardiovascular, charts, risk, assessment.

INTRODUCTION

Cardiovascular diseases are one of the major public health problems globally. They cause devastating health consequences for individuals, communities and nations and have the capacity to cripple even the most robust of health care systems. It has been estimated that 31% of total deaths and 37% of premature deaths before 70 years of age occurred because of cardiovascular diseases in 2014.[1]Unfortunately 80% of these deaths occurred in low and middle income countries. In South East Asian region, cardiovascular diseases accounted for 25% of total deaths due to non-communicable diseases.[1] There are a number of evidence based interventions which can be applied to high risk group to prevent the occurrence of heart attack and stroke. World Health Organization recommends use of WHO/ISH risk prediction charts for identifying those who are at high risk of cardiovascular disease.[2] These charts are available for 14 WHO epidemiological sub-regions and take into consideration multiple risk factors like age, sex, blood pressure, smoking status, total blood cholesterol and presence or absence of diabetes. With the help of these charts we can estimate cardiovascular risk in people who do not have established coronary heart disease, stroke or other atherosclerotic disease. High income countries have developed

cardiovascular risk prediction charts by using cohort data from their own population. But middle income and low income countries do not have such country specific charts.[3] Therefore WHO/ISH charts are recommended for these countries. As shortage of resources is the major problem in middle and low income countries, limited resources can be effectively managed by focusing on high risk group. By identifying high risk population with these charts, appropriate intervention like change in life style, introducing physical exercise, taking antihypertensive drugs or lipid lowering drugs can be advised wherever appropriate. It may also be used as a motivational tool.[4-5]Hence, the current study was conducted to estimate 10 year risk prediction of cardiovascular diseases among adult population of Amritsar district.

MATERIALS AND METHOD

The study was conducted in Urban Health Training Centre of Sri Guru Ram Das Institute of Medical Sciences and Research Amritsar from 1st September 2017 to 31st December 2017. Though the centre is situated in urban area, patients also come from nearby villages. The Attendants of patients coming to the centre for treatment in the age group of 40-65 years who were willing to participate were included in the study. The purpose of the study was explained to them and their written consent was taken. The sample size was calculated presuming prevalence of cardiovascular disease to be 50% and allowable error (L) of 10% of prevalence. The sample size came out to be 400. Predesigned, pretested performa was used which included socio-demographic characteristics of the study subjects. Weight was measured using digital weighing machine with 0.01kg accuracy. It was standardized periodically with standard weights. Height was measured by using a stadiometer. Blood pressure was measured and random blood sugar was checked. Blood pressure was recorded on right arm in sitting position. Three readings were taken at an interval of five minutes and mean of the two lower readings was noted as final BP. Anyone having blood pressure ≥140/90 mm of hg or on medication)[6]was considered hypertensive. Similarly Random blood sugar ≥180mg/dl or the study subject on medication was considered as diabetic. WHO/ISH charts for South East Asian Region in the setting where serum cholesterol cannot be checked were used to estimate fatal or non-fatal cardiovascular risk prediction for 10 years.[7]The cases with history of myocardial infarction, coronary artery disease or angina were excluded from the study. For the purpose of analysis, the study subjects were divided into three categories i.e. low risk (<10%), moderate risk (10-<20%)

and high risk (20% or higher). The Data was collected, compiled and analyzed by using SPSS windows evaluation version 19.0. Chi Square was applied to analyze the relation between two attributes and p value of less than 0.05 was considered significant. Pilot testing was done before starting the study and required changes were made.

RESULTS

In the current study it was observed that 52% study subjects were in the age group of 40 -50 years while 48% were more than 50 years of age. Among all, 41.8% were males whereas 59.2% were females. Three quarter of them were residing in urban areas (67.3%). So far as their monthly income is concerned, large majority (84%) of them were belonging to medium or low income group and only 16% qualified to be put in high income group (Table 1)

By using WHO/ISH charts, 10 year risk of fatal or non-fatal cardiovascular risk was estimated (Table 2) and it was observed that nearly half of study subjects were having low risk (less than 10%), 15.5% had moderate risk (10 to less than 20%) and 28.8% had high risk (20% or higher).

Risk of cardiovascular disease was assessed in relation to various socio-demographic characteristics (Table 3).

Table 1: Socio-demographic characteristics of study subjects

Characteristics	Cases (n=400) (%)
Age	
40- 50	208 (52)
51-65	192 (48)
Sex	
Male	167 (41.8)
Female	233 (58.2)
Residence	
Urban	269 (67.3)
Rural	131 (32.7)
Education	
<10	273 (68.3)
10 or higher	127 (31.7)
Monthly income	
Low (< 20000)	174 (43.5)
Medium (20000-<40000)	162 (40.5)
High (≥40000)	64 (16)

Table 2: Estimated 10 year risk of cardiovascular disease among study subjects

Predicted risk	Cases (n=400) (%)
<10% (Low)	223 (55.8)
10 - <20% (Moderate)	62 (15.4)
20% or higher (High)	115 (28.8)

Table 3: Risk profile of study subjects according to their socio-demographic characteristics

Characteristics	Estimated Risk			Total	p value
	Low (<10%)	Moderate (10-<20%)	High (20% or higher)		
Age					
40- 50	170 (81.7)	38 (18.3)	0 (0)	208	0.000
51-65	50 (26.0)	26 (13.5)	116 (61.5)	192	
Sex					
Male	89 (53.3)	10 (6.0)	68 (40.7)	167	0.000
Female	131 (56.2)	54 (23.2)	48 (20.6)	233	
Residence					
Urban	97 (36.1)	62 (23.0)	110 (40.8)	269	0.000
Rural	123 (93.9)	2 (1.5)	6 (4.6)	131	
Education					
<10	161 (59.0)	14 (5.1)	98 (35.9)	273	0.000
10 or higher	59 (46.5)	50 (39.4)	18 (14.1)	127	
Monthly income					
Low (< 20000)	106 (60.9)	26 (14.9)	42 (24.1)	174	0.000
Medium (20000-<40000)	82 (50.6)	6 (3.7)	74 (45.7)	162	
High (≥40000)	32 (50.0)	32 (50.0)	0 (0)	64	

Figure in parenthesis indicate percentage.

Table 4: Risk profile of study subjects in relation to BMI

BMI (Kg/m²)	Estimated risk			Total	p value
	Low (<10%)	Moderate (10-<20%)	High (20% or higher)		
18.5 - 24.9 (Normal)	68 (89.5)	08 (10.5)	0 (0)	76 (100)	0.000
25-29.9 (Overweight)	124 (45.5)	52 (19.0)	97 (35.5)	273 (100)	
≥30 (Obese)	31 (60.8)	2 (3.9)	18 (35.3)	51 (100)	

It was observed that in the age group of 40-50 years, the risk of cardiovascular disease was very low and it increased with advancing age and the difference was statistically significant. Similarly, the risk was found to be higher among men, in urban areas, among those who have lower level of education and among those who are belonging to medium or high income group. Risk of cardiovascular disease was found to be higher among those who are overweight or obese in comparison to normal study subjects. (Table 4)

DISCUSSION

Cardiovascular diseases are among the leading causes of mortality in India. The risk assessment of cardiovascular disease helps in objectively understanding the severity of the illness. It also helps in better communication with the patients and their family members and forms the basis of various therapeutic decisions.[8]Also, It can help in better targeting the resources to those who are at risk of cardiovascular disease and With this objective 10 year risk of fatal or non-fatal cardiovascular risk was estimated among study subjects by using WHO/ISH charts. It was observed that nearly half of study subjects were having low risk (less than 10%), 15.5% had medium risk (10 to less than 20%) and 28.8% had high risk (20% or higher). These findings are in consistent with the findings of other studies.[9-10]Another study was conducted among supporting staff of a tertiary care hospital in Mysuru which showed that 1.7% of them had >10% risk of cardiovascular disease.[11]

Risk of cardiovascular disease was assessed in relation to various socio-demographic characteristics and it was observed that the risk of cardiovascular disease increased with advancing age and the difference was found to be statistically significant. These findings are in consonance with a study conducted in rural area of Punjab.[9] Another population based study conducted in Nepal also showed the similar results[12] indicating that greater care needs to be taken with advancing age.

In the current study, it was observed that the risk of fatal or non-fatal cardiovascular disease was higher among men. A study conducted in Ahmedabad by using Framingham risk equation also showed the similar results.[13]Another study conducted in rural area of Punjab showed that the risk is higher among women.[9] The difference may be because of geographical variation as in the current study both rural as well as urban population was included. Also in the current study lack of education, urban residence, and income emerged as strong predictors of fatal or non-fatal cardiovascular disease. Education upto matriculation or higher significantly decreased the risk of cardiovascular disease (p= 0.000). The findings are in concordance with a study conducted on Canadian adults which also showed higher risk was associated with lower

educational background.[14]A study conducted in rural area of South India also showed that lower level of education is associated with higher risk of cardiovascular disease.[15]

Also, the risk of cardiovascular disease was found to be higher in urban areas and in higher income group. Similar findings were observed in a study conducted in middle and low income countries of Asia.[16]Various other studies have also shown higher risk of cardiovascular disease in urban areas.[17-18]

Obesity was also found to be associated with increased risk of cardiovascular disease in the current study. These findings are consistent with the findings of another study conducted in Punjab which also showed higher risk among obese.[9]It emphasizes the role of primordial prevention.

CONCLUSION

The predicted risk of cardiovascular disease was found to be very high especially among men, in urban areas and among those who were overweight or obese. Cardiovascular disease is largely preventable and further large scale studies need to be planned so that appropriate intervention can be introduced to lessen the burden.

REFERENCES

1. World Health Organization. Global status report on non-communicable diseases 2014. Geneva: WHO; 2014. Available at: http://www.who.int/nmh/publications/ncd-status- report-2014/en/. Accessed 13 Jan, 2018.

2. World Health Organization. WHO/ISH cardiovascular risk prediction charts. An overview. Available at: http://www.who.int/cardiovascular_diseases/guidelines/ Chart predictions/en/. Accessed 15 Dec, 2017.

3. World Health Organization. Prevention of cardiovascular disease: Pocket guidelines with cardiovascular risk prediction charts for assessment and management of cardiovascular risk. Available at http://www.who.int/cardio vascular_diseases/guidelines/Questions%20and%20Answers%20on%20web%20PDF%20file%2012.9.2007.pdf?ua=1. Accessed 20 Jan, 2018.

4. Hussain SM, Oldenburg B, Wang Y, Zoungas S, Tonkin AM. Assessment of cardiovascular disease risk in South Asian populations. International Journal of Vascular Medicine. 2013. http://dx.doi.org/10.1155/2013/786801. Available at: https://www.hindawi.com/journals/ijvm/2013/786801/Accessed: Feb 20, 2018

5. National Vascular Disease Prevention Alliance. Guidelines for the management of absolute cardiovascular disease risk. 2012. Available at: https://www.heartfoundation.org.au/images/uploads/publications/Absolute-CVD-Risk-Full-Guidelines.pdf.Accessed 8 May, 2018.

6. World Health Organization. Prevention of Cardiovascular Disease. Guidelines for assessment and management of cardiovascular risk. Geneva: Switzerland; 2007. Available at: http://www.who.int/cardiovascular_diseases/ publications/Prevention of_Cardiovascular_Disease/en/. Accessed 12 Dec 2017.

7. World Health Organization. Prevention of cardiovascular disease. Pocket guidelines for assessment and management of cardiovascular risk. Geneva; 2007. Available at: http:// apps. who.int/iris/ Accessed Oct 24, 2017.

8. Bansal M, Kasliwa RR . Optimum cardiovascular risk prediction algorithm for South-Asians – Are WHO risk prediction charts really the right answer? Indian Heart Journal. 2016; 68: 581–3.

9. Bansal P, Chaudhary A, Wander P, Satija M, Sharma S, Girdhar S et al. Cardiovascular risk assessment using WHO/ISH risk prediction charts In a rural area of North India. Journal of Research in Medical& Dental Sciences. 2016; 4 (2): 127-31.

10. Khanal MK, Ahmed MSA, Moniruzzaman M, Banik C, Dhungana RR, Bhandari P et al. Total cardiovascular risk for next 10 years among rural population of Nepal using WHO/ISH risk prediction chart. BMC Res Notes. 2017; 10:120.

11. Savitharani BB, Madhu B, Renuka M, Sridevi, Ashok NC. Utilization of WHO-ISH 10-Year CVD risk prediction chart as a screening tool among supporting staff of a tertiary care hospital, Mysuru, India. Heart India. 2016; 4 (1): 13-6.

12. Dhungana RR, Khanal MK, Pandey AR, Thapa P,Devkota S,Mumu SJ et al . Assessment of short term cardiovascular risk among 40 years and above population in a selected community of Kathmandu, Nepal. Journal of Nepal Health Research Council. 2015 Jan - Apr;13 (29): 66-72.

13. Parikh S, Patel M, Tiwari H, Bala DV, Joshi B. Assessment of cardiovascular disease risk by using framingham risk equation amongst the residents of Ahmedabad city. Nat J Community Med. 2013; 4 (3): 392-7.

14. Setayeshgar S, Whiting SJ, Vatanparast H. Prevalence of 10-year risk of cardiovascular diseases and associated risks in Canadian Adults: The contribution of cardiometabolic risk assessment introduction. International Journal of Hypertension. 2013:1-8.

15. Ghorpade AG , Shrivastava SRL, Kar SS , Sarka 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 Manag 2015; 4 (8): 531–6.

16. Nordet P, Mendis S, Dueñas A, Noval RD, Armas M, Noval ID et al. Total cardiovascular risk assessment and management using two prediction tools, with and without blood cholesterol. MEDICC Review. 2013;15 (4):36-40.

17. Rohit A, Balu PS. Cardiovascular risk prediction Using WHO/ISH chart in urban and rural subjects attending diabetes screening clinic: A pilot study. Available at: https://d2cax41o7ahm5l.cloudfront.net/cs/speaker-pdfs/rohit-a-jjm-medical-college-india.pdf. Accessed 8 May, 2018.

18. Das M, Pal S, Ghosh A. Rural urban differences of cardiovascular disease risk factors in adult Asian Indians. American J of Human Biology. 2008; 20 (4): 440-5.