Original Research

Cardiovascular risk assessment among rural population: findings from a cohort study in a peripheral region of Bangladesh☆

K. Fatema [a,b,*,f], N.A. Zwar [b], A.H. Milton [c], B. Rahman [b], A.S.M.N. Awal [d], L. Ali [e]

[a] Department of Epidemiology, Bangladesh University of Health Sciences (BUHS), 125/1 Darus Salam, Mirpur, Dhaka 1216, Bangladesh
[b] The School of Public Health and Community Medicine, Faculty of Medicine, The University of New South Wales, Sydney, NSW 2052, Australia
[c] Centre for Clinical Epidemiology and Biostatistics (CCEB), The School of Medicine and Public Health, Faculty of Health and Medicine, The University of Newcastle, Newcastle, NSW 2008, Australia
[d] ORBIS International, Apartment No, B4 & C4, Plot #1, Road #137, Gulshan, Dhaka 1212, Bangladesh
[e] Department of Biochemistry and Cell Biology, BUHS, 125/1 Darus Salam, Mirpur, Dhaka 1216, Bangladesh

ARTICLE INFO

ABSTRACT

Objectives: The incidences of non-communicable diseases including cardiovascular diseases (CVDs) is increasing in Bangladesh. The reasons for this increasing trend need to be explored. The aim of this study is to assess the risk of CVDs among a peripheral rural Bangladeshi population and to explore the sociodemographic, anthropometric and clinical variables associated with increased risk.
Study design: Cohort study.
Methods: From a cohort of 190,471 individuals of all ages, originally included in a diabetic eye disease program initiated in 2008–2009, a purposive sub-cohort of 66,710 individuals, aged 31–74 years was recruited. During 2011–2012 these participants were assessed for CVDs using the WHO's risk assessment tool designed for primary care settings in low resource societies. Participant characteristics associated with higher risk were explored using univariable and multivariable regression analysis.
Results: Out of all (95.5% participation rate) participants 1170 (1.84%) were found to be at high risk for CVD. The prevalence of hypertension (HTN), pre-HTN, obesity, underweight and self-reported DM were 8.9%, 15.2%, 9.6%, 7.8% and 0.5% respectively, among the study population. In multivariable regression analysis female sex, older age, temporary housing structure (i.e., tin shed), extremes of BMI (both underweight and obese) and central obesity were associated with higher risk for CVDs.

Conclusions: The prevalence of CVD risk factors and high CVD risk individuals in this cohort was found to be lower than previous studies. It may be the effects of urbanization are yet to reach this relatively traditional rural population. This study adds to the literature on use of the WHO risk assessment tool.

Introduction

Non-communicable diseases (NCDs) are now major public health problems in both developed as well as low- and middle-income countries (LMICs).[1] While death rates from cardiovascular diseases (CVDs) have been declining in developed countries the prevalence of CVDs has been rising greatly in LMICs.[2] At the beginning of the present millennium 80% of the burden of CVDs was estimated to occur in these countries.[3] South Asians exhibit greater susceptibility to these diseases[4] and compared to the western population CVD-related death among South Asian populations has been found to occur 5—10 years earlier.[5] This increased susceptibility to CVD among South Asian populations is not fully explained by traditional risk factors.[2]

Although some useful information has been generated on the present and future burden of CVDs in Bangladesh, organized epidemiological studies exploring the prevalence of CVDs as well as their risk factors among various groups and subgroups of the population are relatively scarce. Evidence suggests that CVD risk prediction based on the combined effect of multiple risk factors is more accurate than that based on individual risk factors.[6] There are few studies on Bangladeshi population using multiple risk assessment approach for coronary heart disease (CHD) or CVDs as a whole. Moreover, the majority of studies to date were conducted either on Bangladeshi migrants (along with some other Asian ones) or on subjects recruited from tertiary hospital settings.[7—10] Only two studies, so far, have explored multiple CVD risk factors among the rural Bangladeshi population,[11,12] but the subjects were recruited from areas within 50 km of the capital (Dhaka) and thus, may not reflect the prevalence in peripherally located rural population.

Given the scarcity of population data the present study was undertaken to assess CVD risk factors among members of a large population-based cohort in a more traditional rural setting in a peripheral region of the country (at Pirganj Upazilla of Thakurgaon district, about 467 km north-west of Dhaka) using the WHO Risk Management Package tool for CVDs.[13] In this paper, we present the assessment of CVDs risk (using baseline data) in this population.

The association between CVD risk and sociodemographic, anthropometric and clinical characteristics has also been explored.

Methods

Study population and data collection procedures

This study was conducted as the baseline survey of a prospective cohort among the rural Bangladeshi population, started in 2008 under the 'BADAS-ORBIS Eye Care Project'. The original cohort was initiated to generate epidemiological data on the burden of diabetic retinopathy and associated risk factors from a rural population and study area was selected as per that project design. The study was conducted in an upazilla (sub-district) named 'Pirgonj' of Thakurgaon district - one of the north-western districts in Bangladesh. 'Pirgonj' has a total of 10 unions, 13 wards and 165 villages. It is situated at a distance of ~467 km from Dhaka, the capital of Bangladesh.

In 2011 we assessed a subset of this cohort for the presence of pre-existing CVDs symptoms (using the multiple risk assessment questionnaire of the WHO Risk Management Package) under the North Bengal Non-Communicable Disease Programme (NB-NCDP) of Bangladesh University of Health Sciences (BUHS). Eligible participants were those meeting the aged criteria (as recorded in the baseline data collection during 2008—09), usual residence of the study area, willing to participate and being able to communicate in a face to face interview and also do not have any physical disability that hinders the anthropometric measurements (Fig. 1).

To collect this data, we recruited 20 interviewers and a field supervisor from the local community. The interviewers had completed at least 12 years of education and had experience in conducting interviews, surveys and using the census method. All project staff received two weeks intensive training on data collection techniques by the investigators of this study. The principal investigator (KF) supervised the fieldwork. A randomly selected sample of two percent of the completed questionnaires was cross checked by the investigators.

Description of the questionnaire to assess CVD risk

The WHO questionnaire that was used to determine probable angina, heart attack, stroke and transient ischemic attack (TIA) consists of eight questions. These questionnaires were developed as a part of the 'WHO CVD-RISK Management Package for low- and medium — resource settings'[13] to identify pre-existing disease or likely disease participants on the basis of symptoms of a history of pre-existing CVD and it has been used in several studies.[14,15] In this study we used this tool for a group of cohort participants based on age alone and did not select subgroups with known risk factors. Those who had probable angina, heart attack, stroke or TIA symptoms were considered at high risk participants for CVD.[16]

Anthropometric and blood pressure measurements

Anthropometric measurements, such as height (ht) [using a portable, locally manufactured, stadiometer, standing upright on a flat surface machine], weight (wt) [modern electronic