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Behavioural Risk Factors and Health Promotional Activities in Adults at Risk of Cardiovascular Disease in a South Indian Tertiary Care Teaching Hospital

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Abstract

Background: India along with other South Asian countries significantly contributes to the global burden of cardiovascular diseases. Studies have shown Indians to exhibit higher prevalence of Coronary Artery Disease and coronary risk factors as compared with Caucasians. These risk factors are compounded by behavioural risk factors such as regular tobacco use, low physical activity as well as a high saturated fat intake and this places a need for effective behavioural modification.

Objective: To identify behavioural risk factors among patients at increased risk of cardiovascular disease in the general medical practice and to identify if these high-risk patients were subjected to any health promotional activities to modify their risk behaviour.

Methods: A cross sectional study was carried out at the general medical clinics of a tertiary care teaching hospital in coastal Karnataka, India. A total of 68 patients who were at an increased risk for cardiovascular disease attending these outpatient services during a two month period were recruited into the study. A pretested questionnaire was used to collect the relevant data.

Results: Seventy three percent of the participants were older than 50 years of age. Majority (79%) were diagnosed with Type 2 Diabetes. Most of the participants (66%) were engaged in light physical activity, and almost 48% were observed to have a high Body Mass Index (BMI). None of the 8 smokers identified in the study had been subjected to any stage based behaviour change therapy. Although diet modification was advised in up to 95% of the cases, only 19% received a supervised diet plan. A marginal improvement in the BMI was noted among these individuals.

Conclusion: These findings indicate the paucity of behavioural change intervention in the day to day care of chronic patients. A targeted behavioural counselling imparted by trained professionals is the need of the hour to bring about the desired change among patients at risk of cardiovascular disease.

Keywords: Behavioural Risk Factors; Cardiovascular risk factors; Counselling; Physical Activity.

Introduction

Cardiovascular diseases have reached epidemic proportions the world over[1]. India along with other South Asian countries significantly contributes to this global burden[2]. Studies in the United States have shown that South Asians, which include Indians, exhibit the highest prevalence of Coronary Artery Disease and coronary risk factors as compared with Caucasians [3]. The prevalence of metabolic syndrome constituting of central obesity, glucose intolerance, hypertension, high triglyceride (TG) levels, and low levels of high-density lipoprotein cholesterol (HDL-c) is again noted to be highest among Indians [4]. These risk factors are compounded by behavioural risk factors such as regular tobacco use, low physical activity as well as a high saturated fat intake.

The control and prevention of cardiovascular diseases through adequate lifestyle changes such as smoking cessation, dietary fat reduction and regular physical activity form the 'centrepiece' of the suggested management for cardiovascular disease prevention[5]. A meta-analysis of multiple risk factor intervention trials for preventing coronary heart disease had concluded that interventions using personal or family counselling and education with or without medication is particularly effective in reducing risk factors in hypertensive population[6]. It is a challenge of modern public health to incorporate this positive behaviour counselling in day-to-day physician practice. This study was carried out with a view to identify behavioural risk factors among patients at increased risk of cardiovascular disease in the general medical practice and to study if these high-risk patients were subjected to any health promotional activities to modify their risk behaviour.

Methodology

This was a cross sectional study carried out as a short term student project funded by the Indian Council of Medical Research (ICMR). Due clearance was obtained from the Institutional Ethics Committee at the Kasturba Medical College - Manipal, India.

Study Population

The study setting was the Kasturba Hospital - a tertiary healthcare facility in Manipal which is situated in the state of Karnataka in southern India. The study population consisted of all those patients at an increased risk for cardiovascular disease attending the outpatient facility of the general medical clinics from April to May 2007. Increased risk referred to underlying disorders that contribute to the development of coronary artery disease, peripheral vascular disease or stroke.

Patients with one or more of the following risk factors were recruited: hypertension,

type 2 diabetes mellitus, hyperlipidemia, and high body mass index (>25 Kg/m^2)(The international WHO criteria was followed). They should have registered at the hospital at least two years prior to the current follow up. This was to ensure that a minimum of two years retrospective data pertaining to risk factors, counselling in terms of whether it was provided and who provided it was available in order to study the change in these factors. Patients were excluded if they were diagnosed with gestational or type 1 diabetes, eclampsia and secondary hypertension, had a history of cardiovascular disease (coronary heart disease, peripheral artery disease or cerebrovascular disease) or any other serious chronic illness.

Study Technique

In keeping with the inclusion and exclusion criteria and the time frame a total of 80 patients were identified of which 68 volunteered to participate. The participants were sequentially recruited into the study as they were followed up at the out-patient clinics. These patients were personally interviewed by the investigator with the help of a content validated and pre designed questionnaire. The questionnaire comprised of items on current smoking habits, food habits, frequency of follow-up and current physical activity. Data that required to be retrieved retrospectively was also included. The questionnaire was pilot tested on first five patients and necessary modifications were made prior to administering it to the study participants.

The behavioural risk factors were quantified in the following manner. Questions related to smoking habits were asked using a modified questionnaire designed by the Division of Disease Prevention & Control, Pan American Health Organization a division of WHO[7].

Physical activity was quantified into light, moderate and vigorous intensity activities using a classification devised by Ainsworth et al[8, 9]. Light intensity activities were defined as those with a MET (Metabolic Equivalent of Task) less than 3, moderate intensity activities with a MET value ranging from 3.0 to 5.9 and vigorous intensity activities as 6 METs or more. Frequency of follow-up was collected as Monthly, Quarterly, Half-yearly or Irregular. Irregular follow-up was defined as follow up after more than a year or if patient missed more than 3 scheduled appointments. Food habits were recorded as plant or meat based and type of cooking oil was noted. The responses were independently confirmed with the patient's attendant with a view to reduce the possibility of recall bias.

The details of the participant's weight and height were recorded twice. Details at the time of their first visit to hospital were obtained from the records and the current measurements were taken during their visit at the time of the study. Counselling measures implemented for smoking cessation, consuming a balanced diet and improving physical activity was documented from the records which were verified during the personal interview. The person providing counselling such as Doctor versus Dietician or Physiotherapist or Clinical Psychologist, and counselling measures

at subsequent visits was also incorporated into the questionnaire.

Data collected was entered and analyzed using SPSS (Statistical Package for Social Sciences) version XI. Data was summarized using proportions for categorical variables and median for skewed continuous variables. Appropriate test of significance was applied to quantify association.

Results

Seventy three percent of the population were older than 50 years and seven percent were observed to be less than 40 years of age. There were more males than females and almost all the women were housewives. Of the males 17.6% had retired from their jobs and 16% were agriculturists. Virtually 60% were chronic patients with a disease course greater than 6 years.

Behavioural risk factors in study population

Diet

There was an equal preponderance in the consumption of plant and meat based diet. The non vegetarians mainly consumed fish and occasionally other meat but the consumption of vegetables and fruits was restricted to two three days in a week. The most common type of fat consumed for cooking was coconut (42.6%) and palm oil (23.5%) both of which are high in saturated fat[10,11,12] . The use of coconut oil is a culturally accepted norm in coastal areas of southern India.

Although diet modification was advised in up to 95% of the cases, only 19% received a supervised diet plan. Almost all of these beneficiaries barring one had modified their diet pattern and a marginal improvement was observed in their BMI (Fig 1). Of the seven individuals with a high BMI, on a supervised diet plan four became normal or moved to the lower category of BMI while out of the 25 obese or overweight individuals not on a diet plan five moved to normal or the lower category of BMI (Fischer's exact test, p=0.076).

BMI

Forty eight percent of the population were observed to be in the overweight and obese category. Among these, 25 individuals were diagnosed with either hypertension or type 2 diabetes and not on any diet plan. Expectedly, there was no notable change in their BMI status over a period of time although they regularly followed up at the hospital.

Physical Activity

Retrospective data predominantly reported light physical activity among the study population (66%) (Table 1).

Eighty four percent of the individuals were advocated a physical activity regime which was however not supervised or structured. Although there was no change in the physical activity levels, there seemed to be some change in the BMI with three of the obese individuals dropping to the overweight category.

Smoking

Interestingly, there were only 8 smokers of which 7 were still smoking. Almost all had started the practice at a young age and most smoked less than a pack a day. Although they were aware of risks and complications of smoking, practice was not in sync with their awareness.

Frequency of Follow-up

It was observed that patients with disease duration of greater than six years were likely to follow up regularly as scheduled. This could be due to increasing awareness regarding the disease and a consequent fear of complications as the disease progresses. Familiarity with the prescribed treatment was noted to be marginally higher (67%) in those with longer duration of the disease.

Discussion

Several studies have shown specific health behaviours such as cigarette smoking, physical inactivity and, to a lower extent, diet low in fruits and vegetables to be associated with an increased risk of cardiovascular disease and premature mortality[13,14,15].

Saturated fat intake, especially ghee, has been shown [5,16] to contribute to the development of vascular disease. This study population did not use ghee as a cooking medium, nevertheless one fourth of them were using palm oil which is of concern as there is evidence to show that it adversely alters the lipoprotein profile[10,11,12] .

It has been shown that regular exercise improves insulin sensitivity, decreases plasma triglyceride levels, and reduces cardiovascular morbidity and mortality [2]. Mosca et al[17] in their study found that recommendations for lifestyle interventions (physical activity and dietary counselling) were suboptimal among patients at risk for CVD.

Although majority (88%) of the patients in this study admitted to having received advice to increase their physical activity, it was alarming to note that low activity was the norm. Moreover, a good number of them were diagnosed with either Type 2 Diabetes alone or in combination with other risk factors and this lack of physical activity among them is a cause for concern. However, one could also attribute the low activity to progression of the disease and increasing age of the patients as much as to insufficient behavioural intervention.

Deedwania et al[3] has shown body mass index (BMI), waist size, and weight gained after one's early twenties to be directly linked to increased risk of various cardiovascular diseases. Our study showed an association between supervised diet plan and BMI although, very small. A matter of concern however, was the small proportion that received the diet plan. As the diet chart has been associated with better adherence to healthy diet and improvement in BMI[18], there is a greater need for involving the dietician in providing diet advice for all risk groups, in keeping with the patient's cultural and traditional lifestyle.

Steptoe and co-workers[5] used a stage of change model to illustrate the behaviour change with respect to smoking. Of the 8 smokers identified in this study only 1 had decided to quit. None of them had undergone any stage based counselling programme to modify their behaviour. This goes to show that behavioural counselling is yet to be routinely incorporated into our health care system.

The combined effect of poor health behaviours such as smoking, low physical activity, alcohol intake and poor diet have been studied only in 4 studies[19,20,21,22]. In all these study populations a combination of behavioural risk factors were associated with increased morbidity and mortality. In this study, a combination of the above mentioned risk factors was seen in 10% of the population.

Conclusion

Modest favourable changes in major cardiovascular risk factors have been shown to significantly decrease cardiovascular disease and mortality[23]. The focus of health care professionals should be to effect these behaviour changes in patients at risk for development of cardiovascular disease. Simple advice giving is thought to bring about the necessary behaviour change. The logic of this approach seems to be that if people receive information that they lack from a respectable source they are likely to abide by it[24]. However, studies have shown that patients are not uniformly committed to receiving advice and the need therefore of targeted interventions. In a tertiary care setting where there is a limitation on physician time, counselling by physiotherapists, clinical psychologists and dieticians may have a larger role to play. These trained professionals could ensure need based and individualized advice in a streamlined manner to bring about the desired behavioural change. This is illustrated to a certain extent in this study, although the small sample size limits its scope. Also, the cross-sectional findings further restrict its usage in making a causal inference. Given that

this study was in a hospital setting it may not be pragmatic to extrapolate these findings to the population at large. An evaluation of the effectiveness of such an intervention with a stronger study design in a developing country like India could throw more light in this direction.

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Table 1: Prevalence of Risk Factors in the Study Population   n= 68

RISK FACTOR	Male n = 39	Female n = 29	Total n (%)
Diabetes only?	17	13	30 (44.11)
Hypertension only?	08	06	14 (20.58)
Diabetes & hypertension	14	10	24 (35.29)
BMI* Overweight Obese	 13 01	 15 04	 28 (41.17) 05 (7.35)
Light physical activity$^\#$	21	24	45 (66.17)
Cigarette smoking Current smoker Median No of cig / day	 07 7.5	 00 00	 07 (10.29) 7.5 (IQR 3.5 – 17.5)
Irregular follow up †	07	03	10 (14.70)

* Overweight ≥ 25; Obese ≥ 30

$^\#$ Activities with MET < 3

† Follow up > 1 year or having missed > 3 scheduled appointments

Fig 1. Change in BMI category on diet intervention