HOW SUCCESSFUL IS SECONDARY PREVENTION FOR CORONARY ARTERY DISEASE (CAD) IN THE REAL WORLD?

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Contribution
All the authors contributed significantly to the research that resulted in the submitted manuscript.

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ABSTRACT

Objective: To document the effects of secondary prevention on different risk factors in the real world situation.

Methodology: It was a cross sectional comparative study carried out at a referral cardiac clinic in Peshawar from January 2010 to December 2010. Study subjects presenting with at least 6 months follow up were included from different parts of Khyber Pukhtunkhawa. All patients with positive history or objective evidence of CAD were enrolled. Study subjects were divided in two groups based on the fact that either taking or had stopped medication for the duration of the study period. Study variables were levels of lipids, glucose, blood pressure (BP), smoking and obesity.

Results: A total of 843 patients were included in the study. Males were 70.4 % (593). Mean age was 58.74 ± 10.6 years. Patients taking regular medicine were 69.03% while 30.97% had stopped their medicine for at least three months. Diabetics, hypertensive and positive family history for CAD were 33.4%, 50.25% and 24% respectively. When compared to patient who had stopped medicine, mean systolic BP (p= 0.014), diastolic BP (p= 0.05), mean Cholesterol (p=0.000), mean LDL (p=0.000), mean HDL (p=0.000) and HbA1c% (p=0.049), was well controlled in patients who were taking medicine regularly. Mean BMI (p=0.786), triglycerides and smoking (p=0.761) had no significant difference between the two groups.

Conclusion: Blood pressure, serum cholesterol, LDL, HDL, as well as HbA1c% were reduced with little effect on serum TGs, BMI and smoking in those who were taking medicine regularly compared to those who had stopped.

Key Words: CAD (coronary artery disease), Risk factors, Secondary prevention

INTRODUCTION

There are marked variations in the epidemic of CAD among regions of the world, nations, and even between regions within a country.[1] According to the Global Burden of Disease Study,[2] the developing countries contributed 3.5 million of the total number of 6.2 million deaths from CAD in 1990. The projections estimate that these countries will account for 7.8 million of the 11.1 million deaths due to CAD in 2020.

The highest age-standardized cardiovascular disease death rates (per 1000) in the world among the middle-aged population (30-69years) are recorded in south East Asia (>400). A dramatic increase in the prevalence of CAD is predicted in the next 20 years, due to rapid change in demography and lifestyle,[2] and in rural areas it has almost doubled in the last decade[3] the exact cause is not known.[4]

The prevalence of conventional risk factors such as smoking, hypertension and diabetes mellitus is not different in South Asians as compared with other ethnic groups.[5] Lipid patterns however, are known to vary with dietary habits, which could be different in diverse ethnic groups and geographical locations.[6] Disease like hypertension and diabetes mellitus are well-known risk factors. Other risk factors associated with CAD had been identified e.g. cigarette smoking, sedentary habits, dyslipidemia, male gender, age, positive family history, obesity, elevated blood homocysteine and hypoestrogenemia.[7] Control of these risk factors has resulted in a substantial reduction in morbidity and mortality of coronary heart disease.[7] In Pakistan mortality from CAD is 410/100000.[8] According to the National Health Survey of Pakistan (NHSP), the prevalence of hypertension is 17.9% and that of diabetes is 10%.[9] Prevalence rate of obesity in urban Pakistani population is 22% and 37% in males and females respectively, while high blood cholesterol is prevalent in 13% of Pakistani adults.[9] Tobacco use has been documented in 29% of adult Pakistani men.[9] The increasing prevalence of these risk factors points to the fact that Pakistan shares the encroachment that non-communicable disease risk factors had been making in most developing countries.

The goals for primary prevention are similar, but the cost effectiveness of medical intervention is not so favorable in all populations. The consequences of modest population-wide risk reduction [e.g., reduction in fat intake (currently 33% of total calories) and cholesterol levels] and life-saving technologies (e.g., surgery, angioplasty, and coronary care units) had reduced the death rate and possibly contributed to reduced morbidity, but the burden of CAD remains a major challenge.[10]

Treatment of coronary artery disease being a systemic disorder is not confined to 'plumbing' - opening up or bypassing of symptomatic stenotic coronary artery lesions.

Mainstay of treatment of a systemic disorder like coronary artery disease is recognition and aggressive treatment of risk factors. Obsession with intervention by either percutaneous coronary angioplasty or Bypass surgery cannot be the answer to this commonly prevalent systemic illness. Most patients after discharge from hospital after a cardiac event or intervention do not receive detailed instructions on risk factors management. During follow up the emphasis should be on risk factors amelioration to improve long-term prognosis.

The aim of the study was to document the extent to which risk factors of CAD could be altered with treatment in patients of coronary artery disease in routine cardiac setup.

METHODOLOGY

This was a cross-sectional comparative study conducted at a specialist cardiology clinic in Peshawar Khyber Pukhtun Khwa a major city of Pakistan from 1st January 2010 to December 2010. This clinic provides services by offering a cardiac checkup package, which includes complete history taking and physical examination with basic laboratory investigations and treatment. All adults (>24 years) presenting at the clinic with positive previous history of CAD for at least more than six months or with a positive exercise tolerance test (ETT) who were on treatment for more than 6 months and having at least two or more than two follow up. Study subjects were divided in two groups based on the fact that they were taking medication regularly for the duration of the above mentioned study period or they had stopped medicine for at least three months. (ETT) was chosen for CAD diagnosis because of its sensitivity and specificity.[11] Population of KPK province is 17.7 million and population in between age (24-86years) is about 8.3 million.[12]

Informed consent was obtained from all the subjects prior to the interview. Interview was conducted in Urdu and Pushtu before his/her visit with the physician. Questionnaire was also administered in Urdu. Laboratory and clinical data were obtained from the medical record of the subject. The study had the approval of the Ethical Committee of the institution.

Data were entered and analyzed in the Statistical Package of Social Sciences (SPSS) version 15. Demographic data and frequency of risk factors are reported by giving their percentages and in addition, assuming random sampling, 95 % confidence intervals were calculated for CAD risk factors.

RESULTS

Total number of the study population was 843. Those taking medication regularly for the duration of the above mentioned study period were 69.03% (n=582) while those who had stopped there medicine for at least three months were

30.97% (n=261). Base line characteristics were the same in both groups Table 1. Diabetics were 33.4% (n=277), hypertensive were 50.25% (n=429). There were only 13.6 %(33) diabetic patients and only hypertensive were 40.7 %(99). Patient having both hypertension and diabetes mellitus were 19.8 %(48). So total diabetics were 33.4% (81) and total hypertensives were 60.5% (147). Overall BMI was 22.29 ± 3.72, patients taking medications had BMI of 22.26 ± 3.8 and those not taking medications had a mean BMI of 22.44 ± 3.17 with the difference statistically insignificant. Mean systolic blood pressure was 136.33±21.95,patient taking medications had mean systolic blood pressure of 134.82±19.17 and those not taking medicine had mean systolic blood pressure of 144.23±32.08 (p=0.014). Mean diastolic blood pressure was 81.68±11.33, patients taking medications had mean diastolic blood pressure of 81.07±10.08 and those not taking medications had mean diastolic blood pressure of 84.87±16.20(p=0.055).In patients of diabetes mellitus overall mean HbA1c was 8.22 ± 1.83, patients taking medication had mean HbA1c of

7.87% ± 1.67 and not taking medications had HbA1c of `10.55% ± 1.06(p= 0.049).

Lipid profile of patients includes serum cholesterol, LDL, HDL and triglycerides. Total mean Cholesterol was 160.46 ± 35.51, patients taking medication had a mean cholesterol of 150.09 ± 26.6 and patients not taking medications had a mean cholesterol of 214.69 ± 25.64 (p>0.000).

Total mean LDL was 82.24±24.08, patients taking medications had a mean LDL of 75.26±16.88 and patient not taking medications had mean LDL of 118.74±23.32, (p>0.000).

Overall HDL of patients was 40.11±10.22, patients taking medications had mean HDL of 41.77±9.92 and those who were not taking medications had mean HDL of 29.92±4.59 (p>0.000). Total triglycerides were 260.08±145.03, patient taking regular medicine had mean TGs of 248.25±149.34 and those not taking medications had mean TGs of 328.44±96.94 (p= 0.127).

Table 1: Patients Baseline Characteristics

Variables	Taking medicine	Not taking medicine	P-valve
Age (years)	57.54±11.6	56.92 ± 10.2	0.87
Gender			
Male	410/583(70.35%)	184/261(70.5%)	0.95
Female	173/583(29.65%)	77/261(29.5%)	0.93
Family history	151/583(25.90%)	63/261 (24.13%)	0.95
History of STE MI	251/583 (43.05%)	104/261 (39.85%)	0.32
Interventions			
PCI	256/583 (43.91%)	110/261 (42.14%)	0.57
CABG	82/583 (14.06%)	26/261 (9.91%)	0.18
NO	245/583 (42.02%)	125/261 (47.89%)	0.13

Table 2: Smoking in Both Groups

Number of patients Smoking	At first visit	Last visit	Number of patients who stopped smoking
Total number of patients	228/843 (27.04%)	177/843 (20.99%)	51/228(22.36%)
Taking medicine	129/583 (22.12%)	101/583 (17.32%)	28/129 (21.7%)
Not taking medicine	99/261 (37.93%)	76/261 (29.11%)	23/99 (23.23%)

Table 3: Summary of the Risk Factors in Both Groups

Risk factors	Taking medicine	Not taking medicine	P-valve
Weight (BMI)	22.26	22.4	0.786
Serum cholesterol (mg/dl)	150.09	214.69	0.000
Serum LDL (mg/dl)	75.27	118.74	0.000
Serum HDL (mg/dl)	41.78	29.93	0.000
Serum TGs (mg/dl)	248.25	328.44	0.127
Blood sugar (HbA1c%)	7.87	10.55	0.049
Systolic BP (mmHg)	134.83	144.23	0.014
Diastolic BP (mmHg)	81.08	84.87	0.05
Smoking (%)	21.7	23.23	0.241

DISCUSSION

CABG and PCI are widely performed with excellent results, despite an increasingly worsening patient profile. However, it is vital to realize that long-term success can only be due to lifestyle alterations and risk factor modification. Afflicted with a cardiac ailment importance of secondary prevention cannot be over emphasized[13-14] as this plays a significant role in optimizing outcomes. Despite good understanding of the role of secondary prevention guidelines[15], patient compliance has not been optimum. The publication of a guideline does not automatically translate into practice.[16-18]

We believe that the patient's understanding of the various risk factors of CAD and measures of secondary prevention, specially the role of medication, is vital to improving the compliance rate and to achieve the targets set out in the guidelines. Hence, we designed this questionnaire to assess these issues. The results of our study should be a cause of concern to all health policy makers, physicians, and other health-care professionals responsible for the care of patients with coronary artery disease in hospitals and the community. Prophylactic prescribing and risk factor profile improved over our study period, although further implementation strategies are needed to modify risk factors further and to attain healthier lifestyles.

Our study includes patients who attended the clinic regularly for 6 months with two or more than two follow ups irrespective of drug compliance, which is representative of the wider population.

Our data are encouraging, with improved secondary prevention as compared to UK and European surveys.[17,18] Mean total cholesterol values were reduced in patient who were regularly taking medicine reaching up to the level set in guidelines compared to those with poor compliance (p>0.000). Similar reduction in serum LDL was documented and serum HDL although mean serum HDL

was not to the target set by guidelines[10]. Mean serum triglyceride had no significant difference between the two groups.

Education regarding smoking reduced the total number of smokers with time. But most of the patients continued smoking as was documented in EUROASPIRE II[18] and McLeod et al.[21] With regard to blood pressure control the decline in proportions reaching target appear to increase in the group with good compliance compared to the other group with significant P-valve. Both systolic as well as diastolic blood pressure were controlled similarly reported in EUROASPIRE II[18] and McLeod et al.[21] Furthermore blood pressure was recorded at a single point in time at the out-patient clinic, and therefore cannot exclude a 'white coat' effect, or be representative of ambulatory blood pressure recordings.

Weight control has remained poor over time, and there does not appear to be any effect on reduction with clinic visits, despite dietary advice. There were no significant effect on patient weight reduction or BMI in both groups as seen in EUROASPIRE II[18] and McLeod et al.[21] This would appear to highlight a general resistance among patients to adopting a healthier lifestyle. Though all patients were encouraged to take a brisk 30 min walk or equivalent every day, there were no objective measures of exercise and activity levels.

Diabetes is known to have independent effects on atherosclerosis, commonly associated with other risk factors. It is especially important risk factor in females.[22] Good glycaemic control has been shown to prevent micro vascular complications in both type 1 and type 2 diabetes; if implemented soon after the diagnosis of diabetes, it also reduces the risk of cardiovascular disease. In our study diabetes were well controlled in those taking regular medicine compared to the other group with highly significant P-valve.

Sustained professional support is needed to help patients stop smoking, adopt a healthy diet, increase physical activity, and take regular medicine; however, very small numbers of patients with coronary heart disease are able to access well established cardiac rehabilitation programs.[23] Although intervention in cardiology and the use of cardio protective drugs has increased, it is clear that drug treatments alone are not sufficient and must be combined with a professional lifestyle intervention.

A greater collaboration between primary and secondary care is required to further optimize secondary prevention. A more community-based approach to the management of secondary prevention has been suggested, with advanced practice nurses and community health workers providing more accessible care as part of the multidisciplinary team.[18] With the increasing evidence base for use of pharmacological secondary prevention influencing prescribing habits, there appears to be a greater need in the community for further health promotion towards lifestyle changes in a multicultural society.

The limitations of study were:

The results of our study apply only to patients who are under treatment of cardiologist and being followed in specialist outpatient follow-up clinic. This study population may not truly represent general population of Pakistan but it surely provides some baseline data regarding the evaluation of risk factors in symptomatic CAD patients on optimum medical therapy.

CONCLUSION

Blood pressure, serum cholesterol, serum LDL, serum HDL, as well as HbA1c% were reduced with little effect on serum TGs, BMI and smoking in those who were taking medicine regularly as compared to those who stopped their medicine.

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