ORIGINAL ARTICLE

Risk factors of cardiovascular disease in district Swat

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Abstract

Objectives: To identify different risk factors of cardiovascular disease, to examine the association of these risk factors with the disease, and to assess the incidence of the disease in the study region.

Methods: The cross-sectional study was carried out at the Cardiology Department of Saidu Teaching Hospital, Swat, Pakistan, from September2013 to February2014, and comprised patients presenting with cardiac problems. Data was collected through cardiovascular risk assessment questionnaire by arranging a scheduled interview. Cardiovascular risk assessment questionnaire included modifiable, non-modifiable and contextual risk factors.

Results: Among 582 individuals interviewed, 356(61.16%) were positive for cardiovascular disease, and 226(38.83%) were negative. Of the 356 positive individuals, 206(57.86%) were males and 150(42.13%) were females. There was a significant association of education, household population, marital status, blood pressure, blood sugar, age, family history, stress and sleep with cardiovascular diseases ($p<0.05$ each). However, gender, smoking, diet, residence and socio-economic status had no association ($p>0.05$ each).

Conclusion: Stress and contextual risk factors played an important role in contributing to cardiovascular disease.

Keywords: Cardiovascular disease, Risk factors, Chi-square, Logistic regression. (JPMA 65: 1001; 2015)

Introduction

Cardiovascular disease (CVD) is the leading cause of death in the world. An estimated 17 million people die of CVD. Presently CVD is the number one cause of death throughout the world. According to the projection for the year 2020, the largest increase in number of deaths from CVD will occur in southeast Asia.[1] CVD is the major cause of death in New Zealand and Australia where approximately 50,000 persons die of CVD each year. CVD is the number one cause of death for both men and women in the United States, and approximately a million people die of it annually.[2] South Asia, which represents one-fourth of the developing world, is affected strongly by the increase of CVD.[3]

Pakistan has a very high disease burden, estimated to be 5.09 million.[4] In Pakistan it is estimated that one in four adults suffer from CVD. Risk factors include smoking, high blood pressure (HBP), raised cholesterol, and being overweight.[5]

Public-sector hospitals of Peshawar cater to health needs of patients not only from Khyber-Pakhtunkhwa but also neighbouring Afghanistan and northern Punjab. Patients admitted usually belong to poor or middle-income segments of society. A few studies on risk factors of stroke have been done in this part of the country and inadequate reliable data is available.[6] Peshawar Heart Study identified risk factors for CVD in various occupational groups which are more or less similar to the data of occupational groups from developed countries.[7]

CVD is a group of diseases affecting blood and heart vessels. The growth of fats by continuous additions in the arteries is the CVD. These fats cause blood clots. When a clot blocks a blood vessel feeding the heart, part of the heart dies; this is called a heart attack, whereas blockage of a blood vessel connected to brain causes a stroke.[8]

Risk factors for CVD are divided into two main categories — non-modifiable and modifiable factors. Nowadays, contextual factors are also added as risk factors of CVD.[8] Age, race, family history and gender are the non-modifiable risk factors of CVD. Age is one of the important risk factors of CVD as, after age 55, the risk of stroke doubles. Family history is an important risk factor if a close relative has or had CVD. Race is another non-modifiable risk factor as there are more CVD deaths for black Americans and south Asians. Gender is also a non-modifiable risk factor as the rates of CVD deaths among men is higher than women. However, Thai women have high prevalence rate of CVD than Thai men.[9] Diabetes mellitus, unhealthy diets, obesity, exercise, smoking, abnormal blood lipids and blood pressure are the main modifiable risk factors for CVD. There is a strong evidence that exercise improves cardiovascular-related mortality.[10] Instead of these modifiable risk factors, depression, stress, use of medications, use of alcohol and lipoprotein are also modifiable risk factors for CVD.[11] Stress is a part of life.

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Stress contributes to HBP which in turn is a CVD risk factor.[12] Evidence showed that contextual risk factors can also contribute to CVD. Contextual risk factors include health beliefs, health information, level of education, socio-economic status, culture, household population, healthcare and residence.[13] Socio-economic status is the strongest predictor of an individual morbidity experience.[14]

The current study was planned to identify different risk factors of CVD, to see the association of these risk factors with the presence of CVD in people of Swat and, finally, to model them so that to bring awareness in the people about the benefits of adopting a heart-healthy lifestyle.

Subjects and Methods

The cross-sectional study was carried out at the Cardiology Department of Saidu Teaching Hospital, Swat, Pakistan, from September 2013 to February 2014.

Prior approval was obtained from the in-charge of the department regarding data collection. Subjects were included after they signed the consent form. Estimated average number of patients/visitors to the site from 8am to 1pm per month was 200 from which close relatives were excluded. Trained investigators were used for data collection. Data was collected using cardiovascular risk assessment questionnaire. Risk factor assessment questionnaire consisted of modifiable, non-modifiable and contextual risk factors. Internal consistency for data was confirmed through Conbach's alpha test which was 0.71.

Logistic regression was used to select the model in a situation where the dependent variable was binary. The final model was selected by applying stepwise procedure through SPSS version 16. Stepwise regression are sequential in the sense that they assume a current model and look to add to, or delete terms one at a time from the model.[15,16] We obtained the final model in 10 steps. This model contained main effects only.

The association among dependent and independent variables of CVD and risk factors were examined by using chi square test.

Results

Of the total 1200 subjects approached, 582(48.5%) agreed to participate. Of them, 356(61.16%) were CVD-positive and 226(38.83%) were CVD-negative. Of the 356 positive individuals, 206(57.86%) were males and 150(42.13%) were females. Among contextual risk factors, the association of CVD with education, marital status, and household population was significant ($p<0.05$ each). Among the modifiable physiological risk factors, the association of blood pressure and blood glucose was significant ($p<0.05$ each). Likewise, among non-modifiable risk factors, advancing age and family history had a significant association with CVD ($p<0.05$ each). Finally, among modifiable psychological risk factors, stress and lack of sleep had significant association ($p<0.05$ each) (Table-1).

Logistic regression through backward elimination

Table-1: Chi-square analysis.

Risk factors			Frequency	Percent	Chi-square	Degrees of freedom	p-value
Contextual risk factors	Education	No education	336	57.7	35.97	3	0.000
		Literate	140	24.1			
		Undergraduate	63	10.8			
		Graduate	43	7.4			
	Socioeconomic status	Poor	233	40.0	0.91	1	0.338
		Satisfactory	349	60.0			
	Household population	Normal	340	58.4	62.93	1	0.000
		Overcrowded	242	41.6			
	Residence	Rural	425	73.0	0.32	1	0.570
		Urban	157	27.0			
	Marital Status	Single	79	13.6	79.936	1	0.000
		Married	503	86.4			
Modifiable physiological risk factors	Blood pressure	No	293	50.3	16.97	1	0.000
		Yes	289	49.7			
	Blood glucose	No	431	74.1	22.85	1	0.000
		Yes	151	25.9			
Modifiable behavioral risk factors	Exercise	No	297	51.0	32.15	1	0.000
		Yes	285	49.0			
	Smoking	Ex-smoker	436	74.9	3.64	3	0.303
		Never smoked	49	8.4			

		Current smoker	90	15.5			
		Snuffing	7	1.2			
	Diet	Unhealthy	324	55.7	2.27	1	0.131
		Healthy	258	44.3			
Non modifiable risk factors	Age	0-14	2	0.3	169.17	3	0.000
		15-34	195	33.5			
		35-54	173	29.7			
		55-above	212	36.4			
	Family history	No	296	50.9	24.44	1	0.000
		Yes	286	49.1			
	Gender	female	259	44.5	1.61	1	0.204
		Male	323	55.5			
Modifiable psychological risk factors	Stress	No	196	33.7	16.96	1	0.000
		Yes	386	66.3			
	Sleep	Below average	272	46.7	32.90	2	0.000
		Average	166	28.5			
		Above average	144	24.7			

Table-2: Parameter estimates.

Variables	Coefficient	Standard error	Wald statistic	Degrees of freedom	Significance	Odds ratio	95% C-I for odds ratio Lower	Upper
Age	1.44	0.15	82.65	1	0	4.22	3.09	5.75
Marital status	1.47	0.38	13.29	1	0	4.08	1.91	8.7
Family history	1.25	0.23	27.51	1	0	3.5	2.19	5.6
Exercise	-0.84	0.22	13.4	1	0	0.43	0.27	0.67
Stress	0.92	0.24	14.79	1	0	2.52	1.57	4.04
Blood sugar	0.95	0.27	12.18	1	0	2.6	1.52	4.44
Constant	-4.51	0.5	80.61	1	0	0	--	--

procedure showed that all coefficients were highly significant (Table-2). Our final model is:

Logit (***p***) =-4.51+1.44age+1.47marital status+1.25family history-0.84exercise+ 0.92stress +0.95 blood sugar.

Discussion

In our study 582 individuals were interviewed. For each individual, the phenomenon of CVD was studied in relation to different risk factors. Overall, 356(61.16%) were CVD-positive patients. There was a strong significant association of CVD with education, household population, marital status, blood pressure, blood sugar, age, family history, stress, and sleep.

Binomial logistic regression indicated that the most significant risk factors of CVD were age, marital status, family history, exercise, stress and blood sugar. Important findings from this study are that males are more exposed to the risk of CVD than females, CVD is more common in an uneducated married person, an individual having a large family, in a person age 55 and above, and a person having less than 4 hours' sleep. Also the ratio of smoking is very low in this area, but the ratio of illiteracy in aged people is very high. The trend of early marriages was common in the study population. Studies with larger samples are needed to validate the results.

Conclusion

Stress and contextual risk factors played an important role in contributing to CVD, but below average sleep can also be a contributing factor.

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