CONVENTIONAL CARDIOVASCULAR RISK FACTORS ASSOCIATED WITH ACUTE CORONARY SYNDROME IN FEMALE PATIENTS ADMITTED IN CARDIOLOGY DEPARTMENT KHYBER TEACHING HOSPITAL PESHAWAR

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ABSTRACT

Objective: *To determine the frequency of conventional cardiovascular risk factors associated with acute coronary syndrome (ACS) in female patients admitted in cardiology unit.*

Methodology: *This cross-sectional study was conducted on all females fulfilling the diagnostic criteria of ACS, admitted in cardiology department, KTH Peshawar from January to December 2009. Under the categories of ST-Elevation myocardial infarction (STEMI), Non- ST-Elevation myocardial infarction (NSTEMI) and Unstable Angina pectoris (USA), the conventional risk factors i.e. diabetes mellitus, hypertension, dyslipidemia, lack of physical activity and smoking were identified and analyzed with particular reference to age, geographical distribution, education level and socio-economic status.*

Results: *A total of 337 female patients with ACS were reviewed for conventional risk factors. Out of 337 patients with ACS, 115(34.1%), 78(23%) and 144 (42.7%) were diagnosed as STEMI, NSTEMI and USA respectively. ACS appears to be more common (54.2%) in female age group >55 years of age, with mean age of 53 years ± 8 years. Lack of physical activity (84.5%), hypertension (76.5%), diabetes mellitus (63.7%) and dyslipidemia (42%) appear to predispose to ACS. Interestingly, 43(12.7%) female presented with ACS were smokers. About 60% patients with ACS had >2 conventional risk factors and 59% of patients with >3 risk factors were of >55 years age group.*

Conclusion: *USA was the most common diagnosis among females presented with ACS. Lack of physical activity, diabetes and hypertension were identified as conventional risk factors for ACS in female patients. The frequency of number of conventional risk factors increases with increasing age.*

Key Words: *Risk factors, Acute Coronary Syndrome, ST-Elevation myocardial infarction (STEMI), Non- ST-Elevation myocardial infarction (NSTEMI), Unstable Angina (USA), Diabetes Mellitus, Hypertension, Dyslipidemia.*

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INTRODUCTION

Acute Coronary Syndrome (ACS) covers the clinical spectrum of myocardial ischemia including ST-Elevation myocardial infarction (STEMI), Non- ST-Elevation myocardial infarction (NSTEMI) and Unstable Angina pectoris (UAP)[1]. ACS is a burden on health care system, and is among one of the major cause of death[1,2]. The conventional risk factors for coronary artery disease (CAD) may have different impact on men and women[3].

The identification and management of cardiovascular conventional risk factors is the key to success in reduction of prevalence of ACS in female patients[4]. Several conventional risk factors for ACS are being identified even in female patients, i.e. hypertension, diabetes mellitus dyslipidemia, smoking and lack of physical activity. Many female patients suffer from hypertension and Diabetes Mellitus (DM) which are emerging rapidly as a major public health concern in developing countries[5]. In female, ACS patients are underestimated although CAD is the leading cause of death in females, more female than male die due to cardiovascular causes each year[6]. In the year 2004, 32% of female died of cardiovascular diseases world-wide as compared to 27% of male[1,3]. In Pakistan CAD is the 2nd leading cause of death at all ages contributing to 11% of all deaths[4]. However, CAD is the commonest cause of death worldwide in both gen-

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ders and CAD develops 10-20 years later in female as compared to male. Incidence of CAD in men is several times of that in age-adjusted pre-menopausal women[5]. CAD in female is not the same as it is in male. There are limited studies on the subject of conventional CAD risk factors in female patients with acute coronary syndrome (ACS) in Pakistan.

This study has been undertaken to find out frequency of various conventional cardiovascular (CV) risk factors in female patients presenting with ACS in our setup in order to prevent and reduce conventional risk factors, which in turn decrease the prevalence of ACS in developing countries. These results can be utilized in public awareness programs as a measure to reduce the disease burden which in turn may be beneficial especially for female patients as well as for health care system.

METHODOLOGY

This was a cross sectional study, conducted at Cardiology Department, Khyber Teaching Hospital, Peshawar, from January 2009 to December 2009. Convenient sampling technique was employed and all the admitted female patients with age range 35->55 years who fulfilled the diagnostic criteria for ACS[1] were included in the study after obtaining informed consent. Patients with cardiomyopathy, Valvular heart disease and renal failure were excluded from the study on the basis of chest pain, ECG findings and cardiac markers.

ACS were further subdivided into 3 categories i.e., Patients with acute and persistent chest pain of >20 min with ST-segment elevation is termed as *ST-Elevation Myocardial Infarction (STEMI);* patients with acute chest pain with persistent or transient ST-segment depression or T-wave inversion, flat T waves, pseudo-normalization of T waves, or no ECG changes at presentation, with raised troponins is labeled as *Non-ST Elevation Myocardial Infarction (NSTEMI)* and with normal troponins is defined as *unstable angina pectoris*[7].

The data regarding demographics and conventional risk factors such as diabetes, Hypertension, Dyslipidemias, Lack of Physical activity and smoking were gathered on a structured questionnaire.

Patients were defined as diabetic, if they were on anti-diabetic treatment & or they fulfilled the WHO criteria i.e., fasting blood sugar > 126md/dl or 2 hours random blood sugar > 200 mg/dl or HbA1C >6.5[8]. Hypertension was defined as patients who were taking any anti-hypertensive drugs and or having two blood pressure readings 30 min apart, taken via standard sphygmomanometer were > 140/90 mm of Hg[1]. Patients were labeled as having dyslipidemia, if the total serum cholesterol > 200 mg/dl, LDL > 100 mg/dl and HDL > 40mg/dl[1] obtained from 12 hrs fasting blood sample taken with in 24hrs of chest pain and analyzed from a standardized reference laboratory[5]. Current cigarette smoking was defined as females who smoked at least 5 cigarettes/week in the last 6 months. Passive smoking was defined as females who spent at least 2 hrs/day under the same roof with the person who smoked[4]. Lack of physical activity was defined as females who have no leisure time for physical activity less than 20 min, 3 or more times / week[7].

Data was entered in SPSS version 17 and analyzed. Age was categorized into 3 subcategories i.e, 35-45, 45-55, >55 yrs and risk stratification was done on the basis of age categories and ACS subsets.

RESULTS

A total of 769 patients were diagnosed as ACS. Out of 769 patient, 432(56.2%) were male 337(43.8%) were female. We reviewed 337 female patients with ACS for conventional cardiovascular risk factors. Out of those 337 female patients with ACS, 115(34.1%) were diagnosed as STEMI, 78(23%) as NSTEMI and 144 (42.7%) as USA.

Among these female patients 258 (76.5%) were Pakistanis nationality and rest of 79 (23.4%) were Afghan refugees. Out of 337 female patient with ACS, 125(37%) patients were educated above primary level and 152(45%) belonged to lower socio-economic group (Table I).

ACS was observed to be more common in female age group >55 years of age (54.2%), with mean age of 53 years ± 8 years. Lack of physical activity (84.5%), hypertension (76.5%), diabetes mellitus (63.7%), and dyslipi-demia (42%) appeared to predispose to ACS (Table II). Interestingly, 43(12.7%) female presented with ACS were smoker. Lack of physical activity, diabetes and hypertension were identified as conventional risk factors for ACS in more than 65% of female patients (Table II).

About 60% patients with ACS had >2 conventional risk factors whereas 16 (4.7%) had no obvious risk factor (Table III). Fifty nine percent of patients with > 3 risk factors were of >55 years age group (Table IV).

DISCUSSION

Coronary artery disease and its acute presentation in the form of Acute Coronary Syndrome (ACS) is a well-known cause of death world-wide[1]. A number of conventional cardiovascular risk factors are known to cause Coronary Artery Disease[3]. Conventional risk factors can be modified but other factors like age, gender, race and family history cannot be changed, these factors have different impact on male and female. In 1963, Keys A et al[9] have done first study in pursuit of risk factors associated with Coronary Artery Disease and since then much work has been done[10], but in Pakistani female population there are limited studies[11,12] available till date.

The findings of this study appear to highlight the frequency of conventional risk factors associated with

BASELINE CHARACTERISTICS AMONG FEMALE PATIENTS WITH STEMI, NSTEMI AND USA

	Baseline	STEMI n=115	NSTEMI n=78	USA n=144	Total n=337
GeographicalDistribution	Pakistani	93	52	113	258 (76.5%)
	Afghani	22	26	31	79 (23.4%)
Age in years	>35 -45	6	9	12	27 (8%)
	>45-55	46	28	52	126 (37.3%)
	>55-65	63	41	80	184 (54.5 %)
Education	No Education	12	10	18	40(11.8%)
	Quran only	24	15	30	69(20.4%)
	Primary	36	25	42	103(30.5%)
	>Primary	43	28	54	125(37%)
Income	<20,000	55	32	65	152(45%)
	>20,000	60	46	79	185(54.8%)

STEMI: ST-Elevation myocardial infarction
NSTEMI: Non- ST-Elevation myocardial infarction
USA: Unstable Angina

Table I

CONVENTIONAL CARDIOVASCULAR DISEASE RISK FACTORS FOR ACUTE CORONARY SYNDROME

CVD Risk Factors	Acute Coronary Syndromes			
	STEMI n=115	NSTEMI n=78	USA n=144	Total n=337
Lack of Physical Activity	95	69	121	285(84.5%)
Hypertension	103	40	115	258(76.5%)
Diabetes	89	51	75	215(63.7%)
Dyslipidemia	55	38	49	142(42.1%)
Passive Smoking	60	39	79	178(52.8%)
Niswar/Chewable tobacco	28	23	40	91(27%)
Current Smoking	13	9	21	43(12.7%)

CVD: cardiovascular disease; STEMI: ST-Elevation myocardial infarction; NSTEMI: Non- ST-Elevation myocardial infarction; USA: Unstable Angina

Taboe II

NUMBER OF RISK FACTOR IN ACUTE CORONARY SYNDROME

Risk Factor	Acute Coronary Syndromes			
	STEMI n=115	NSTEMIn=78	USAn=144	Total female patients (n=337)
>3	29	16	38	83 (24.6%)
2	33	23	63	119 (35.3%)
1	50	33	36	119 (35.3%)
None	3	6	7	16 (4.7%)

STEMI: ST-Elevation myocardial infarction; NSTEMI: Non- ST-Elevation myocardial infarction; USA: Unstable Angina

Table III

NUMBER OF RISK FACTOR IN VARIOUS AGE GROUPS

	Age Groups			
No. of risk factors	**35-45 years n=27**	**>45-55 years n=126**	**>55 years n=184**	**Total n=337**
>3	—	34	49	83(24.6%)
2	2	48	69	119(35.3%)
1	16	38	65	119(35.3%)
None	9	6	1	16(4.7%)

Table IV

ACS in female population. In the study period total of 769 patients were diagnosed as ACS, out of 769, 43.8% i.e. three hundred and thirty seven were female, almost similar ratio has been found in Butt Z and other studies,[11-13] where 33% were females and more females than males were presented with USA, however, statistically it was not significant. Age is very important risk factors for ACS and its incidence increases with increasing age. In our study we have found that ACS among female was more common in fifth decade as mean age of study population was 53yrs ± 8 yrs. In other studies it was found that ACS was more common in old age (52% patients were between 55-84 yrs)[11,14,15]. As our study is cross-sectional hospital based, there was possibility that we had received more younger patients as compared to elderly, as these females are under-privileged in our society. Either, majority belongs to lower socioeconomic group, or due to low literacy rate in our study population.

In this study, among conventional risk factors lack of physical activity (84.5%)was the leading risk factor in female patients with ACS, it is different from that reported in other studies,[12,14,16] a likely explanation could be the difference in the definition of physical activity used in other studies reported by centers for disease control and prevention in 2002,[17] was near to our study results, but we have limited local studies to comment and compare this important risk factor of ACS in female population. The factor modification of this risk factor via exercising is an extremely effective, safe and cost effective measure in preventing cardiac problem especially in our females.

Hypertension is very important risk factor. It emerged as next important risk factor. In this study 76.5% female patients were hypertensive. This percentage is close to that shown by Jafery et al[16] in which 55.2% patients of ACS had hypertension, in other studies[2,6,14] prevalence of hypertension was not different in male or female patients, but in a study by Butt et al,[11] they found that hypertension was more prevalent in women with ACS than in men.

In developing as well as developed countries, diabetes mellitus is a fast growing problem. In our study 63.7% females with ACS had diabetes, this percentage is higher as compare to other studies[2,6,16] but regarding local study by Butt et al,[11] there was statistically significant higher percentage of female diabetic patients i.e. 60.6% as compared to 31.3% male patients. In our study 23.4% study population were Afghan refugee, mostly uneducated with limited physical activity.

Dyslipidemia is recognized as conventional risk factor for ACS[15,18]. In this study 42% of female patients were recorded as having dyslipidemia. Although these results were lower than those found in other studies[19-21] i.e. > 63% of patients were labeled as dyslipidemic, Jafar et. Al,[15] found that hyperlipidemia was significantly more prevalent in women than in men, these lower results of dyslipidemia in our study could be, 152 patient belongs to lower socio-economic group, as well as on cultural grounds, female eats later on and less as compared to male family members.

In this study 12.75% female were smoker, interestingly 52.8% were passive smokers and 27% were addicted to chewable tobacco (including naswar), Although the prevalence of smoking among female ACS patients were only 12.75% as compared to other studies, such as 47.3% female patients smoke in parajuli et al[2] study in Nepal, and in other studies,[10,11,21] but interestingly in this study the frequency of passive smoking is 52.8% and this is a worrisome findings.

In this study we observed, the relationship between conventional cardiac risk factors and acute coronary syndrome was significantly modified by age. ACS appears to be more common in female age group >55 years of age (54.2%)with mean age of 53 years ± 8 years, similar results were highlighted in other studies[4,10,11,16]. In our study we found the frequency of ACS in female patients incrementally increased as the number of conventional cardiac risk factors, and similar results were highlighted in other studies[22,23]. In 2003, Khot et. al[22] found that at least one of four conventional factors was

present in 84.6% of women and 80.6% of men. Framingham Heart study found that participants with 2 or more cardiac risk factors had a much higher risk of death compared to patients with zero or 1 factor[24]. Pollock et al[25] observed that patients with 3 or more risk factors presented with AMI and received thrombolytic therapy had an odd ratio of 1.9 (95% CI 1.5 to 2.5) for 30 days death, acute myocardial infarction, or revascularization.

CONCLUSION

USA was the most common diagnosis among females presented with ACS. Lack of physical activity, diabetes and hypertension were identified as conventional risk factors for ACS in female patients. The frequency of number of conventional risk factors increases with increasing age.

LIMITATIONS

There are few limitations to our study, as this is cross sectional study with convenient sampling technique and we are sharing the experience of our own centre, so we must have a multicentre data with proper robust study design in order to confirm the findings of conventional risk factors in female patients with ACS and to formulate more practical preventive measure which is need of the day.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

AA: Conception and design, collection, analysis and interpretation of data, critical revision and final approval of the version to be published

SA: Drafting the manuscript

CONFLICT OF INTEREST

Authors declare no conflict of interest

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NONE DECLARED

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