ORIGINAL ARTICLE

TOBACCO EXPOSURE; A NEGLECTED MODIFIABLE CARDIOVASCULAR RISK FACTOR IN FEMALE PATIENTS ADMITTED WITH ACUTE CORONARY SYNDROME.

Amber Ashraf, Saadia Ashraf**, Rukhsana Anwar***

ABSTRACT:

Background: The modifiable cardiovascular risk factors associated with ACS may have different impact on men and women, which may also differ in different population groups. There are limited studies on the subject of modifiable cardiovascular risk factors in general and different type of tobacco exposure in special among female patients with acute coronary syndrome (ACS) in Pakistan. This study has been undertaken to determine the frequency of different type of Tobacco Exposure as one of a modifiable risk factor associated with ACS in female patients admitted to cardiology department, Khyber Teaching Hospital (KTH) Peshawar.

Objective: To determine the frequency of different type of Tobacco Exposure as a modifiable risk factor associated with ACS in female patients admitted to cardiology department, Khyber Teaching Hospital, Peshawar.

Study Design and Methodology: This cross-sectional study was conducted at Cardiology department, KTH Peshawar. All females who fulfill the diagnostic criteria of ACS, were included in the study by consecutive sampling technique, from Jan'09 to Dec'09. Under these categories the modifiable CV risk factors i.e. different types of tobacco use, along with diabetes mellitus, hypertension, dyslipidemia and lack of physical activity were identified and analyzed with particular reference to age, geographical distribution, education level and socio-economic status.

Results: A total of 337 female patients were diagnosed as ACS, these female patients with ACS were reviewed for modifiable CVD risk factors especially for tobacco use. Out of those 337 female patients with ACS, 115(34.1%) were diagnosed as STEMI, 78(23%) as NSTEMI and 144 (42.7%) as UA.

ACS appeared to be more common in female age group >55 years of age (54.2%), with mean age of 53yr±8 yrs. Interestingly, 43(12.7%) female presented with ACS were smokers, (52.8%) 178 had positive history of passive smoking and 91 (27%) were addicted to chewable tobacco (including niswar and pan).Lack of physical activity, hypertension, diabetes mellitus and dyslipidemia (84.5%, 76.5%, 63.7%, 42% respectively) appeared to predispose to ACS as well. 70% of patients with ACS had 1-2 modifiable risk factors whereas 23.6% had 3/more than 3 risk factors. 59% of patients with 3/more risk factors were of >55 yrs age group.

Conclusion: Frequency of passive smoking is alarmingly high in our study subjects, about one third of study population were addicted to chewable tobacco (including niswar and pan). Lack of physical activity, diabetes and hypertension were identified as other modifiable risk factors for ACS in female patients. Addressing these facts infrot of patients can decrease the disease as wel as financial burden of ACS.

Keywords: Modifiable Cardiovascular risk factors, Tobacco use, Acute Coronary Syndrome, Female patients.

***Cardiology Department, Khyber Teaching Hospital, Peshawar.**
[**]Pulmonology Department, Khyber Teaching Hospital, Peshawar.*

INTRODUCTION:

Tobacco Exposure accounts for 5.4 million people death per year from heart disease, lung cancer and other illnesses. The number will increase to more than eight million a year by 2030[1].Tobacco use in any form is a leading and one of the most preventable risk factor for coronary artery disease (CAD). Smoking doubles the risk for CAD and sudden cardiac death[2].

Different form of Tobacco exposure lowers HDL (good cholesterol) that protects heart, raises fibrinogen level and damages the endothelium of arteries which predisposes to arterial plaque formation and making them more susceptible to coronary artery disease (CAD)[4,5].

ACS covers the clinical spectrum of myocardial ischemia including ST-Elevation myocardial infarction (STEMI), Non- ST-Elevation myocardial infarction (NSTEMI) and Unstable Angina (UA)[3-6]. ACS is a burden on health care system, and is among one of the major cause of death[3-7]. The modifiable risk factors for CAD in general[8,9,10] and different type of tobacco exposure may have different impact on men and women, which may also differ in various studies, among different population groups[4,11,12,13].

There is change in global tobacco industry marketing strategies, which targets young people, adults and especially women (because most women currently do not use tobacco) in developing countries[9,14,15]. Hence this epidemic shifting towards the developing world is alarming, where 80% of tobacco-related deaths will occur within a few decades[1].

The identification and management of cardiovascular modifiable risk factor is the key to success in reduction of frequency of Acute Coronary Syndrome (ACS) in female[8]. Several modifiable risk factors for ACS are being identified even in female patients, i.e. different type of tobacco exposure, hypertension, diabetes mellitus, dyslipidemia, lack of physical activity. Many female patients suffer from hypertension and Diabetes Mellitus, and these conditions are emerging rapidly as a major public health concern in developing countries[9,14], where they now account for about 25% of all deaths, compared to about half of all deaths in developed countries[16]. ACS patients are increasing day by day and especially in young females[9,17], There are limited studies on the subject of modifiable CAD risk factors in general and different type of tobacco exposure in special among female patients with acute coronary syndrome (ACS) in Pakistan.

This study has been undertaken to determine the frequency of different type of Tobacco Exposure as one of a modifiable risk factor associated with ACS in female patients admitted to cardiology department, Khyber Teaching Hospital, Peshawar.

Methodology:

This was a cross sectional study, conducted at Cardiology Department KTH, Peshawar from Jan’09 to Dec’09. Consecutive sampling technique was applied and all the admitted female patients with age range 35->55 years who fulfilled the diagnostic criteria for ACS[3,6] were included in the study after obtaining informed consent. Patients with cardiomyopathy, Valvular heart disease and renal failure were excluded from the study.

ACS were further subdivided into 3 categories[3,6], on the basis of chest pain, ECG findings and cardiac markers; 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 MI (NSTEMI), and with normal troponins is defined as unstable angina [3,6].
The data regarding demographics and modifiable risk factors especially tobacco use along with diabetes, Hypertension, Dyslipidemias, and lack of Physical activity were gathered on a structural questionnaire.
Current smoking was defined as females who smoked at least 5 cigarettes /week in the last 6 months or huqqa smoking at least once /week. Passive smoking was defined[14] as females who spent at least 2 hours/day under the same roof for 6 or > than 6 months with the person who smoked and chewable tobacco was defined as either using in the form of niswar or pan.
Patients were defined as diabetic[18], if they were on anti-diabetic treatment / or they fulfilled the WHO criteria[16] i.e, fasting blood sugar ≥ 126md/dl or 2 random blood sugars > 180 mg/dl or HbA1C >6.0 from standardized reference lab. Hypertension was defined[19] as patients were taking any anti-hypertensive and or having two blood pressure readings 30 min apart, taken via standard sphygmomanometer was ≥ 140/90 mm of Hg. Patients were labeled as having dyslipidemia[16], if the total serum cholesterol ≥ 200 mg/dl, LDL ≥ 100 mg/dl and HDL ≤ 40mg/dl, obtained from 12 hours fasting blood sample taken with in 24hrs of chest pain and analyzed from a standardized reference laboratory. 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.
Data was entered in SPSS version 17 and analyzed. Age was categorized into 3 subcategories i.e. 35-45, 45-55, >55 years and risk stratification was done on the basis of age categories and ACS subsets.

RESULTS:

We reviewed 337 female patients with ACS for modifiable CAD risk factors in general and different type of tobacco exposure in particular. Out of those 337 female patients with ACS, 115(34.1%) were diagnosed as STEMI, 78(23%) as NSTEMI and 144 (42.7%) as UA, it was the most common diagnosis among females presented with ACS. (Table I)
Among these female patients 258(76.5%) were Pakistani national and rest of 79(23.4%) were Afghan refugees. Out of 337 female patient with ACS, 125(37%) patients were educated and 152(45%) belongs to lower socio-economic group (Table I). ACS appears to be more common in female age group >55 years of age (54.2%), with mean age of 53yr±8 yrs.
Interestingly, 43(12.7%) females presented with ACS were smokers, (52.8%) 178 had positive history of passive smoking and 91 (27%) were addicted to chewable tobacco (including niswar and pan) Lack of physical activity, hypertension, diabetes mellitus and dyslipidemia (84.5%, 76.5%, 63.7%, 42% respectively) appeared to predispose to ACS(Table II). Our study showed a worrisome finding of higher percentage of positive history of passive smoking, along with high frequency of lack of physical activity, Diabetes and hypertension as a modifiable risk factor for ACS in female patients.
Seventy percent of patients with ACS had 1-2 conventional risk factors whereas 24.6% had 3 or more than 3 risk factors (Table III). Fifty nine percent of patients with 3 or more risk factors were of >55 years age group (Table IV).

Table I: Baseline Characteristics among female patients with STEMI, NSTEMI and UA

Baseline	STEMI N=115(34.1%)	NSTEMI N=78 (23.1%)	UA N=144 (42.7%)	TOTAL N=337
Geographical Distribution				
Pakistani	93	52	113	258 (76.5%)
Afghanistani	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	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%)

Table II: Conventional Risk Factors verses ACS

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

Table III: ACS verses Risk factor

Risk Factor	STEMI N=115	NSTEMI N=78	UAP N=144	Total Female Patients, N=337
3 or More	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%)

Table IV: Age Verses Risk Factor

No of risk factors	35-45 N=27	45-55 N=126	>55 N=184	Total N=337
3 or More	-	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%)

All variables are expressed as Numbers (%).

DISCUSSION:

A number of modifiable cardiovascular risk factors are known to cause Coronary Artery Disease[6]. Coronary artery disease and its acute presentation in the form of Acute Coronary Syndrome (ACS) is a well-known cause of death world-wide[3]. Tobacco use in any form is a leading and one of the most preventable risk factor for coronary artery disease (CAD)[1,2], whereas, Smoking doubles the risk for CAD and sudden cardiac death[20].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 et al[10] has done first study in pursuit of risk factors associated with Coronary Artery Disease and since then numerous work have been done. In many developing countries, mortality from coronary heart disease has increased rapidly and the disease has become the leading cause of death[2,5].

There are limited studies[9,21] on the subject of modifiable CAD risk factors in general and different type of tobacco exposure in special among female patients with acute coronary syndrome (ACS) in Pakistan. Active cigarette smoking is one of the most important modifiable risk factors for coronary heart disease[1,2]. In the United States, active cigarette smoking results in approximately 100,000 deaths due to coronary heart disease each year [16].

The findings of this study appear to highlight the frequency of modifiable CAD risk factors in general and different type of tobacco exposure in particular associated with ACS in female population. Almost similar ratio has been found in other studies[9,21,22]. Out of 337 female patients with ACS, 115(34.1%) were diagnosed as STEMI, 78(23%) as NSTEMI and 144 (42.7%) as UA, it was the most common diagnosis among females presented with ACS.

Age is very important risk factors for ACS and its incidence increase with increasing age. In our study we have found that ACS among female were more common in fifth decade as mean age of study population was 53yrs ± 8 yrs. In other studies [9,23,24] it was found that ACS was more common in old age (52% patients were between 55-84 yrs).

National Health Survey of Pakistan (1990-1994) made an excellent contribution in understanding the health status of Pakistani people. According to the results from this survey, 28.6% of men aged ≥ 15 years in the general population were smokers compared to 3.4% of women[15].

In our study 12.75% female were smoker, interestingly 52.8% were passive smokers and 27% were addicted to chewable tobacco (including niswar and pan), Although the frequency of smoking among female ACS patient were only 12.75% as compared to other studies, where its

much higher, as 47.3% female patients smoke in parajuli et al[4], and same in other studies[9,10], but interestingly in our study the frequency of passive smoking is 52.8% and this is worrisome findings.

Statistics of WHO reveals that the prevalence of smoking rate is highest in Nepal than any other part of the world accounting for 73% in the hilly region[2]. The active as well as high passive smoking among females represents one of the risks for atherosclerosis and coronary heart disease. A smoker has a 2 to four fold greater risk of acute coronary syndrome and sudden cardiac death than a non smoker but as soon as one stops smoking the risk of ACS reduces sharply[16].

In this study, among modifiable 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 [21,25,26], a likely explanation could be the difference in the definition of physical activity used in other studies. Data reported by centers for disease control and prevention in 2002, 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.

Hypertension is very important risk factor. In this study 76.5% female patients were hypertensive. This figure is close by Jafery et al. [24] in which 55.2% patients of ACS had hypertension. In other studies [4,9,13] prevalence of hypertension was not differ in male or female patients. Jafery et al also found that diabetes, hypertension and hyperlipidemia were significantly more prevalent in women than in men, while smoking was more prevalent in men.

In developing as well as developed countries, diabetes mellitus is the fastest growing problem. In our study 63.7% females with ACS had diabetes, this percentage is higher as compare to other studies[4,13,24] but regarding local study by Butt et al, [9] there were statistically significant higher percentage of female diabetic patients i.e 60.6% as compare to 31.3% male patients. Howard et al showed that overall prevalence of myocardial infarction was higher in men than in women but diabetic women had significantly higher prevalence of MI than diabetic men[27] Moreover, diabetic women with ACS had worse outcome compared with diabetic men[28].

Dyslipidemia are recognized as modifiable risk factors for ACS[21,29]. In this study 42% of female patients were recorded as having dyslipidemia. Although these results were lower than those found in other studies[26,29]. These lower results of dyslipidemia could be due to 152 patients, who were from lower socio-economic group, as well as culturally female of this area eats later on and less as compare to male members of family [9,22].

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[30,31]. Framingham Heart study found that participants with 2 or more cardiac risk factors had a much higher risk of death compared with patients with zero or 1 factors[30].

In this study we observed, the relationship between modifiable cardiac risk factors and acute coronary syndromes 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 53yrs± 8yrs, similar results were highlighted in other studies[8,9,10,24] .

CONCLUSION:

Frequency of passive smoking is alarmingly high in our study subjects, about one third of study population was addicted to chewable tobacco (including niswar and pan) whereas 12.7% of

female presented with ACS were smokers. Lack of physical activity, diabetes and hypertension were identified as other modifiable risk factors for ACS in female patients.

Limitations:

There are few limitations to our study, as this is cross sectional study with consecutive sampling technique and we are sharing the experience of a single centre, so we must have a multicentre data with proper robust study design in order to confirm the findings of modifiable risk factors in general and different type of tobacco use in special among female patients with ACS.

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