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ISCHEMIC HEART DISEASE;

TREND OF CARDIOVASCULAR RISK FACTORS IN WOMEN

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ABSTRACT… Objectives: To find out distribution of cardiovascular risk factors for women in established coronary artery disease. **Study Design:** Retrospective cross sectional descriptive study. **Place and Duration of Study:** Private clinic of consultant cardiologist at Bahawalpur from June 2013 to December 2015. **Methodology:** Total 6345 patients were registered and only 820 female patients were diagnosed cases of ischemic heart disease selected for analysis of their cardiovascular risk factors. **Results:** The overall mean age of women was 57.75±11.28 years, weight was 66.3±15.14 kilogram, height was 153.77±7.87 cm, body mass index (BMI) was 27.89±6 kg/m^2 and body surface area (BSA) was 1.76±0.28 m^2. Significantly high frequency of obesity was found in premenopausal women as compared to other group i.e. 56.5% with p value <0.0001. BMI was also high in premenopausal women 32.13±7.91 then perimenopausal women, postmenopausal women and women with hysterectomy 28.06±6.93, 27.84±5.51 and 27.33±6.03 respectively. The overall weight is also more in premenopausal group as compared to postmenopausal, perimenopasaul and hysterectomy group i.e. 77.54±21.18, 66.46±13.66, 66.07±16.33 and 64.41±15.31 respectively and P Value was <0.0001. There was no difference found when DM, HTN and smoking compared within these four group. Smoking, CVA and PCI or CABG were 13(1.5%), 30(3.7%) and 13(1.5%) women respectively. **Conclusion:** Hypertension and DM are most common risk factor in women with IHD. Weight, BMI and different class of obesity are more common in younger age group as compare to older age. Smoking, PCI and CABG are very less frequent in women in this area.

Key words: Cardiovascular risk factors in women, Ischemic heart disease in women, women with CAD.

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INTRODUCTION

Ischemic heart disease (IHD) is one of the largest killer in the world in both gender. It causes more than one third of all death over 35 years of age. In developed countries, the mortality has declined due to IHD. The declined death rate is higher in men than women. Women have more cardiovascular events then men i.e. 51%vs 42%.[1-3] Usually IHD in women occurred 10 years later as compared to men. Before 50 years the IHD is more common in men than women and become equal in next decade. After that risk of IHD in women increased as compared to men.[4] Women are more concern with breast cancer then IHD. But leading cause of death in women is IHD even more common than breast cancer.[5] The low frequency of IHD in women less then 50years age are usually correlated usually with estrogen. The proposed mechanism of estrogen is to improve serum HDL level and vascular endothelial function.[6] The estrogen has many effects on reproductive system. After the menopause women not only develop increased frequency of IHD but also developed palpitation, hot flushes and other changes like stress. To control these symptom of menopause, gynecologist used to give hormone replacement therapy (HRT) in such women.[7] Theoretically the incidence of IHD should reduce in postmenopausal women who are on hormone replacement therapy. But there are controversial data about the benefit of hormone replacement therapy. Randomized control trial fail to show any benefit of HRT in postmenopausal women rather it increased the thromboembolic events and

diseases of gall bladders.[8]

The women have different symptoms, pathogenesis and outcomes in IHD as compared to men. In women the prognosis after acute myocardial infarction is worse as compared to men. Because atypical presentation is more common in women than men.[9] The cardiovascular risk factors are also different in women than men. In women HTN and smoking is less common than men but on the other side hypertriglyceridemia and low HDL more common in women than men. Morbidity and mortality is high in women with metabolic syndrome as compared to women without metabolic sysndrome.[10] Because menopause affect the cardiovascular risk factors. Menopause increases total cholesterol and triglyceride and decreases HDL levels. The prevalence of HTN, DM and metabolic syndrome also increases in postmenopausal women.[11]

On the basis of these finding we need to know the gender specific cardiovascular risk factors for coronary artery disease. So this study is organized to find out distribution of cardiovascular risk factors for women in established coronary artery disease.

METHODOLOGY

This is a retrospective cross sectional descriptive study done at the private clinic of a consultant cardiologist in Bahawalpur. Database Software was made for clinic in 2013 and all patients coming to private clinic entered in this software. All patient's basic profile like age, sex, profession, height and weight, cardio vascular risk factor, others ailment and clinical examination was routinely entered. After those ECG findings, any other abnormal investigation findings and then medicines were entered routinely for all patients. At the end of the 2015 total 6345 patients were registered. Amongst the 6345 patients only 820 female patients were diagnosed cases of ischemic heart disease. These patients were categorized in four groups i.e. premenopausal women, perimenopausal women, postmenopausal women and women with hysterectomy. These female patients were analysed for their risk factors under these four categories.

Analysis also performed after categorizing the age into two group i.e. 1- age less then 50 years and 2- more than 50 years. Clinical characteristics were summarized in terms of frequencies and percentages for categorical variables. For numerical variables, mean±1SD were used. Statistical analysis was done by using statistical software SPSS V.20.

RESULTS

The overall mean age of women was 57.75±11.28 years, weight was 66.3±15.14 kilogram, height was 153.77±7.87 cm, body mass index (BMI) was 27.89±6 kg/m^2 and body surface area (BSA) was 1.76±0.28 m^2. The overall demographic data described in Table-I. These parameters also described under four group i.e. premenopausal women, perimenopausal women, postmenopausal women and women with hysterectomy as in Table-I. Obesity level classification according who criteria were defined and compare with four groups in Table-II.[12] This table demonstrates significantly high frequency of obesity in premenopausal women i.e. 56.5%, 31.0%, 34.5 % and 30.7% in premenopausal women, perimenopausal women, postmenopausal women and women with hysterectomy respectively and P value was <0.0001. This is also confirmed in post hoc analysis of BMI in each group with other in Table-III. This table showed overall BMI is high in premenopausal women 32.13±7.91 than perimenopausal women, postmenopausal women and women with hysterectomy 28.06±6.93, 27.84±5.51 and 27.33±6.03 kg/m^2 respectively and P value was <0.0001 in Table-III. BMI is also higher in less than 50 years age group as compared to more than 50 years age i.e. 28.5±6.5 and 27.6±5.7 respectively with P Value <0.02. The overall weight is also more in premenopausal group as compared to postmenopausal, perimenopasaul and hysterectomy group i.e. 77.54±21.18, 66.46±13.66, 66.07±16.33 and 64.41±15.31 respectively and P Value was <0.0001. Weight was also high in lower age group with P Value <0.05 as in Table-IV.

Demographic data N(%)	Premenopausal 46(5.6)	Postmenopausal 436(53.2)	Perimenopausal 29(3.5)	Hysterectomy 309(37.7)	Total 820(100)
Age mean±1SD years 95% Confidence interval	40.48±6.6 38.66-43.00	59.61±10.18 58.65-60.57	52.97±11.41 48.63-57.31	58.09±11.06 56.85-59.33	57.75±11.28 56.98-58.52
Weight mean±1SD kg 95% Confidence interval	77.54±21.18 71.25-83.83	66.46±13.66 65.18-67.75	66.07±16.33 59.86-72.28	64.41±15.31 62.70-66.13	66.30±15.14 65.26-67.34
Height mean±1SD cm 95% Confidence interval	155.02±6.66 153.04-157.00	154.24±8.05 153.49-155.00	152.90±4.91 151.03-154.76	153.00±7.96 152.11-153.89	153.77±7.87 153.23-154.31
BMI mean±1SD kg/m^2 95% Confidence interval	32.13±7.91 29.79-34.48	27.84±5.51 27.32-28.36	28.06±6.93 25.42-30.70	27.33±6.03 26.65-28.00	27.89±6.00 27.48-28.31
BSA mean±1SD m^2 95% Confidence interval	1.76±0.28 1.68-1.84	1.8±0.28 1.77-1.82	1.65±.24 1.56-1.74	1.71±.28 1.68-1.74	1.76±0.28 1.74-1.77
HTN N(%)	40 (87)	371(85.1)	27(93.1)	271(87.7)	709(86.5)
DM N(%)	15(32.6)	191(43.8)	9(31)	112(36.2)	327(39.9)
Smoker N(%)	2(4.3)	3(0.7)	0	8(2.6)	13(1.5)
Stress N(%)	6(13)	52(11.9)	2(6.9)	22(7.1)	82(10)
CABG N(%)	0	6(1.4)	0	3(1.0)	9(1.1)
PCI N(%)	0	2(0.5)	0	1(0.3)	3(0.4)
CVA N(%)	0	21(4.8)	1(3.4)	8(2.6)	30(3.7)
Obesity BMI >29.9 kg/m^2 N(%)	26(56.5)	135(31.0)	10(34.5)	95(30.7)	266(32.5)

Table-I. Overall demographic Data

Obesity Classification	Premenopausal N(%)	Postmenopausal *N(%)*	Perimenopausal N(%)	Hysterectomy *N(%)*	Total N(%)
Normal weight	10(21.7)	152(34.9)	12(41.4)	133(43.0)	**307(37.4)**
Over weight	10(21.7)	149(34.2)	7(24.1)	81(26.2)	**247(30.1)**
Class I obesity	12(26.1)	78(17.9)	5(17.2)	52(16.8)	**147(17.9)**
Class II obesity	5(10.9)	45(10.3)	2(6.9)	33(10.7)	**85(10.4)**
Class III obesity	9(19.6)	12(2.7)	3(10.3)	10(3.2)	**34(4.2)**
	46(5.6)	**436(53.2)**	**29(3.5)**	**309(37.7)**	**820(100)**

Table-II. Classification of obesity

	Age	weight	Height	BMI	BSA
Premenopausal vs postmenopausal	<0.0001	<0.0001	0.5	<0.0001	0.40
Premenopausal vs perimenopausal	<0.0001	<0.001	0.25	<0.004	0.09
Premenopausal vs Hysterectomy	<0.0001	<0.0001	0.1	<0.0001	0.23
Perimenopausal vs postmenopausal	<0.001	0.89	0.4	0.84	0.005
Perimenopausal vs Hysterectomy	<0.01	0.57	0.9	0.0.52	0.26
postmenopausal vs Hysterectomy	<0.05	0.65	<0.04	0.24	<0.0001
Overall in Total	<0.0001	<0.0001	0.11	<0.0001	<0.0001

Table-III. Post hoc Analysis and significance level within the group

	Age <50years 261(31.8)	Age >50years 559(68.2)	Sig level
Age mean±1SD years	44.7±5.3	63.8±7.5	*P Value <0.0001*
Weight mean±1SD kg	68.6±16.2	65.3±14.5	*P Value <0.05*
Height mean±1SD cm	154.65±7.3	153.36±8.1	*P Value <0.04*
BMI mean±1SD kg/m^2	28.5±6.5	27.6±5.7	*P Value <0.02*
BSA mean±1SD m^2	1.77±0.26	1.75±0.29	*P Value <0.005*
HTN N(%)	222(85.1)	487(87.1)	*P Value >0.5*
DM N(%)	90(34.5)	237(42.4)	*P Value <0.03*
Smoker N(%)	6(2.3)	7(1.3)	*P Value >0.26*
Stress N(%)	31(11.9)	51(9.1)	*P Value >0.20*
CABG N(%)	0	9(1.6)	*P Value <0.04*
PCI N(%)	2(0.8)	1(0.1)	*P Value >0.2*
CVA N(%)	2(0.8)	28(5.0)	*P Value <0.003*
Obesity BMI >29.9 kg/m^2 N(%)	100(38.3)	166(29.7)	*P Value <0.01*

Table-IV. Demographic data with age of 50 years

When age of the women analyzed, then it was found significantly higher in postmenopausal group as compared to premenopausal women, perimenopausal women, and women with hysterectomy i.e. 59.61±10.18, 40.48±6.6, 52.97±11.41 and 58.09±11.06 respectively. Within the group post hoc analysis also shows postmenopausal group has significantly higher age from to other three groups. The individual analysis of the group shown in Table-III.

When comparison of height in cm and BSA in m^2 were made then overall height in premenopausal group was 155.02±6.66 cm slightly higher than other group but overall significant difference was not found. This pattern was also sustained in lower age group i.e. 154.65±7.3 with p value <0.04. On post hoc analysis only identify the significant difference between postmenopausal and hysterectomy group and p value was <0.04 as Table-III. On other side the analysis of BSA m^2 showed overall significantly high in postmenopausal group as compared to other groups and p Value was <0.0001.

Hypertension was present in these premenopausal women, perimenopausal women, postmenopausal women and women with hysterectomy i.e. 40 (87%), 27(93.1%), 371(85.1%) and 271(87.7%) respectively. Similarly, DM was found 15(32.6%), 9(31%), 191(43.8%) and 112(36.2%) respectively. But no statistical significant difference was found in the analysis of HTN and DM. Although cerebrovascular accident (CVA) accounts more in postmenopausal group but chi square test failed to show significant difference. When HTN and smoking compared between two age group then no significant difference is observed. DM is high in more than 50 years age group with p value <0.03 as in Table-IV.

DISCUSSION

Major cause of death in the world is ischemic heart disease. Millions of death occurred worldwide each years according to WHO report.[13]

Now new knowledge is emerging regarding gender difference in ischemic heart disease. The diagnosis of IHD is more challenging in women than men due to the difference in symptoms, pathophysiology and prevalence. Mortality due to IHD is more in women than men.[14]

In this study established IHD women were enrolled and this study shows high burden of cardiovascular risk factors especially obesity, DM and HTN but smoking is very low because of our cultural norm. Our study showed the overall obesity (BMI >29.9 kg/m^2) in women is 32.5%

and 4.2% those who have BMI >40 kg/m^2. Other study shows overall prevalence of obesity is in one third of women with IHD which comparable with this study and 7% have BMI >40 kg/m^2 with increased morbidity and mortality.[15]

In our study prevalence of obesity is more common premenopausal group as compared to other group and 19.6% women have BMI >40 kg/m^2.

Weight of the women is also high in younger age group. It is significantly high in premenopausal group i.e. 77.54±21.184 kg as compared to other group and p Value is <0.0001. When a woman developed diabetes mellitus then she lost the protection against IHD. The diabetic women have double the risk of myocardial infarction as compared to diabetic men. The diabetic women have four time high risk of developing heart failure as compared to non-diabetic women.[16]

DM has one of the potential risk for developing atherosclerotic cardiovascular disease which leads to higher risk of fatal IHD, early MI, heart failure, stroke and peripheral arterial disease.[17]

Diabetes mellitus was 39.9 % in our study and more in older age group than younger group i.e. 42.4% vs 34.5% respectively. It is approximately same as study done in USA where DM was approximately 35% but American women had same as 39.9%.[18]

Hypertension increased the two to threefold cardiovascular risk in women. It is also called as silent killer because most of the time it did not have any symptoms. The frequency of overall HTN in our study is 86.5% women and no significant difference is found among the different groups. The proportion of HTN is much higher than other study of USA i.e. only up to 65%.[18]

In another our study which was published in 2014 showed high frequency of HTN in IHD patient. The possible reason of high frequency of HTN is the presence of arsenic in drinking water of southern Punjab especially Bahawalpur area. There is a strong association between arsenic and HTN.[19]

Smoking is less frequent in Pakistan as compared to western population especially in women due our cultural norm. Combination of smoking with HTN and DM has synergistic effect for cardiovascular diseases. The frequency of women smoking in worldwide is 15% as compared to men is 19%. Smoking increases CV risk in women 25% as compared to men.[17]

Our study showed the frequency of smoking is only 1.5%. In this area women especially living in village are used to smoking. Because in our village Huqqa is more prevalent than cigarette. Mostly at home huqqa is prepared by women and then handed over to men. In this way they used to huqqa smoking. Very few women used cigarette to get relieve from flatulence after meal and gradually become habitual. Past history of PCI or CABG frequency is only 1.5% which is very low in this study as compared to other study and it is more in postmenopausal group. When compared with age group than ratio of CABG was high in age group > 50years p value <0.04. PCI slightly more in younger age group but non-significant. But other study shows PCI or CABG frequency is range from 14-16% but Spanish women also shows low frequency i.e. 3.8% but again higher than this study.[18]

The possible cause of low frequency of PCI or CABG frequency in women in this study is poverty, ignorance, and afraid of surgery. Recent data showed increase mortality of women as compared to men after acute myocardial infarction. Clinical evidence failed to explain it. Depression and stress may be the possible factor for it. Depression and stress is more common in women as compared to men especially in younger women up to twice than men. Studies showed depression and stress occurred up to 35-40% women after acute MI.[20,21]

In this study stress was found only in 10% women which was much less. No statistically difference was found among different groups but slightly higher in younger age group. Cerebrovascular

accident (CVA) is co-existent with IHD because of similar cardiovascular risk factors. Study shows 12% CVA in IHD patient.[22]

In this study overall frequency of CVA is much less about 3.7% and more in age >50years group i.e. 5% and p value is <0.003.

CONCLUSION

In conclusion weight, BMI and different class of obesity are more common in younger age group as compare to older age which may be the additional factor for developing IHD in younger women. Hypertension and DM are most common risk factor in women with IHD but no difference is found in different age groups. Smoking, PCI and CABG are very less frequent in women in this area.

RECOMMENDATIONS

We need some strategy to enhance the awareness about ischemic heart disease and its risk factors in women. We should emphasize and educate more on cardiovascular risk modifications, preventive measures and early detection of high risk women. We should need to develop national guideline for women with ischemic heart disease.

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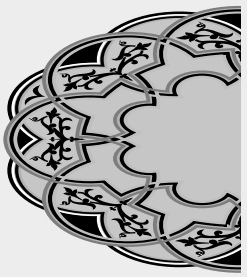

"Mistakes are proof that you're trying."

Unknown

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Dr. Shahadat Hussain Ch.	Data collection, entries and analysis, Content and result writing and plagiarism	
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