PREVALENCE OF METABOLIC SYNDROME IN PREMENOPAUSAL AND POST-MENOPAUSAL WOMEN

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ABSTRACT

Objective: To see the prevalence of metabolic syndrome in the premenopausal and postmenopausal women. Also to compare the different components of metabolic syndrome among the participants.

Material and Methods: Out of total 76 women selected, 18 premenopausal and 58 postmenopausal women were included in the study. Metabolic syndrome was considered according to National Cholesterol Education Program AT P III Asian modified criteria. After detailed examination and biochemical assessment different parameters of metabolic syndrome were reported. Data was analysed on SPSS version 20.

Results: Among postmenopausal women the prevalence of metabolic syndrome was 35.5% as compared to13.2% in premenopausal (P value 0.06). Higher frequency of hypertension, elevated waist circumference hyperglycemia, low HDL and hypertriglyceridemia levels were found in postmenopausal women as compared to premenopausal women.

Conclusion: The risk of metabolic syndrome has increased in postmenopausal women, with central obesity and low HDL as the most common components of metabolic syndrome.

Key Word: Premenopausal, Post menopause women, Metabolic Syndrome, Central Obesity, Low HDL.

INTRODUCTION

The absence of menstruation for 12 consecutive months is considered as Menopause.[1] In westernized countries the primary cause of death in women is cardio vascular disease (CVD),with the ratio of 2:1 women dying from CVD.[1,2] Atherosclerotic disease is very important issue faced by men and women, usually the disease appears 10 years later in women than men, specially the risk increases during the menopausal status.[1]

Myocardial infarction is hardly seen in women less than 45 years of age, but those women more than 55 years have more probability of having CVD than men The best explanation for this increase in CVD risk is estrogen deficiency.[2] Usaully the fat deposition in the females occur in the gluteo -femoral regions(gynoid shape) but with changing phases during the menopausal stages the deficiency of estrogen let the deposition of the fat in intra-abdominal region(android shape).[1] This central distribution of fat has been linked with increased risk of cardio vascular disease.[1]

Beside this most of the cross -sectional studies have shown alteration in the lipid profile of the postmenopausal women, this effect has also been linked to the deficiency of estrogen in the transitional phases of menopause.[3,4] Postmenopausal women have found to have increase in the levels of triglycerides and low high density lipoproteins(HDL) as compared to premenopausal women[1-4] All the risk factors associated with the cardiovascular disease are found as components of the metabolic syndrome. Thus metabolic syndrome is a complete summary of the cardiovascular diseases.[1,3]

The metabolic syndrome defined by the National Cholestrol Education Program Adult Treatment Panel III has given very practical diagnostic criteria which easily measure the risk factors.[1,3] Most of the studies conducted worldwide have shown 20% to 30% of women middle aged have been affected by metabolic syndrome.They finally face the complications of metabolic syndrome i.e cardiovascular diseases and Diabetes.[1,3] Physiological changes that occurs during menopause is a shift towards a more atherogenic lipid profile.[4] Latin American study showed that obesity, age, sedentary lifestyle, time of menopause and hypertension in menopausal women increase the chance of developing Metabolic Syndrome.[5,6] There are only very few studies available on the relationship of menopausal status and metabolic syndrome in Asian women. We aim to study the metabolic syndrome and its risk factors in selected postmenopausal and premenopausal women.

METHODS AND MATERIAL

The case control study was performed in CCU of the tertiary hospitals of Khyber Pakhtunkhwa. There were 38 women admitted in CCU ward as myocardial infarction patients.Similarly aged and sex matched 38 controls were taken from the attendants of the patients as well from the staff of the hospital. Among 76 women 18 were premenopausal and 58 were postmenopausal women.

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Menopause was considered as ammenorrhea for at least 12 consecutive months without any medical cause.[1] Women with any surgical or radiotherapy or chemotherapy origin of menopause were excluded. The pre-menopausal is time period of having menstrual irregularities and hormonal fluctuations beginning few years before the final cessation of menstruation occurs.[1]

All the participants filled a questionnaire including medical history, surgical history, menstrual history, drug history, family history and demographic information. A complete physical examination was done including blood pressure taken as average of three reading when the participants were sitting at rest. Anthropometric examination was also done including height and weight. The BMI was calculated by using the formula weight (kg) / height (m^2). Waist circumference was measured at the level of midpoint between the lower point on the rib cage and the iliac crest. Blood was collected for the biochemical assessments.

Ethical approval was given by ethical committee. All the participants gave the written consent. Premenopausal and Post-menopausal women were considered to have metabolic syndrome if they had three or more than three components according to ATP III Asian criteria.

1. Central obesity: waist circumference ≥ 80 cm
2. Hypertriglyceridemia: Serum triglycerides >/= 150 mg/dL.
3. Serum HDL-C < 50 mg/dL in women.
4. Hypertension: B.P >/= 130/85 mm Hg or on hypertension treatment.
5. Hyperglycemia: Serum fasting glucose >/= 110 mg/dL or on diabetic drugs.

All data was analyzed by SPSS 20 version. The frequencies of categorical variables were presented as percentage. The comparisons of variables were assessed by chi-square. A P-value < 0.05 was considered statistically significant.

RESULTS

In our study there were 18 (23%) premenopausal and 58 (76%) postmenopausal subjects. More than fifty percent of the females were above the age of fifty years.

The prevalence of metabolic syndrome was 35.5% and 13.2% in postmenopausal and premenopausal women respectively, showing almost significant result (p-value< 0.06). The overall prevalence seen in women participants was 49%. It was also found that most of the post and premenopausal women were overweight and obese (41%). And reduced physical activity was seen in 57% and 21% of postmenopausal and premenopausal women respectively.

The distribution of frequencies of the components of metabolic syndrome among the premenopausal and post-menopausal women has been shown in Table no2. Increased waist and low HDL were seen in 47.4% and 55.3% respectively in postmenopausal women as compared to 14.5% and 16% in premenopausal women respectively. Although the frequency of all five components of metabolic syndrome abdominal obesity, elevated blood pressure, low HDL cholesterol, high triglycerides, and high fasting glucose were increased in postmenopausal women as compared to the premenopausal women but these finding were not statistically significant except hyperglycemia which was nearly significant.

Table 1: Metabolic Syndrome in Pre Menopausal and Postmenopausal Participants

Participants	Metabolic syndrome		
	Non -Met. Synd	Metabolic Synd	chi square 3.301
Premenopausal	8 (10.5%)	10 (13.2%)	P value < 0.05
Postmenopausal	31 (40.8%)	27 (35.5%)	
	39 (51.3%)	37(48.8%)	

Table 2: Frequency of Different Components of Metabolic Syndrome in Pre and Post Menopausal Women

Components	Premenopausal	Postmenopausal	P-Value
Abnormal Triglycerides	09 (11.8%)	27 (35.5%)	0.79
Hypertension	06 (7.9%)	24 (31.6%)	0.54
Hyperglycemia	11 (14.5%)	21 (27.6%)	0.06
Increased waist	11 (14.5%)	36 (47.4%)	0.94
Abnormal HDL	12 (16%)	42 (55.3%)	0.63
Physical Inactivity	15 (20%)	51 (67%)	0.61

DISCUSSION

The prevalence of metabolic syndrome seen in women have wide range as it depends upon which criteria has been used to define metabolic syndrome as there are quite a number of definition beside this it also depends on the characteristics of the population chosen for study. Hence the prevalence ranges from 10.7 % in young Korean women by NECP criteria[7,8] to

74% in Birmingham study of postmenopausal women with coronary heart disease using IDF criteria.[9]

Our study revealed overall prevalence of metabolic syndrome by NECP ATPIII about 49% in the 76 women participants. Among postmenopausal women the prevalence of metabolic syndrome was 35.4%, higher than the pre-menopausal women(13.2%).Our result was consistent with Deibert et al[10] study which showed that the postmenopausal women had 36.1% prevalence of metabolic syndrome while only 22.7% seen in the premenopausal women. Similarly in a cross-sectional study conducted in Brazil also showed that the prevalence was higher in postmenopausal women as compared to pre-menopausal women, they included 323 pre and postmenopausal women, using two different definitions the results in postmenopausal women were 44.4% (NCEP) and 61.5% (IDF) as compared to 24%(NCEP) and 37% (IDF) of premenopausal women.[3] Using different methodology make differences in the result.

In different countries such as China, Canada, Austria, Iran and Germany prevalence of metabolic syndrome in postmenopausal women was as 37.34%.29.6%, 32.6%,31% and 36.1% respectively.[11,12,13] Sedentary lifestyle, eating habits, socio-cultural influences and different characteristics of the population give different prevalence results.[1]

Our study also highlighted different components of metabolic syndrome showing hypertension, hyperglycemia, elevated triglyceride, increased waist circumference and low HDL levels, the frequency of which were raised in postmenopausal women as compared to premenopausal women. Although only hyperglycemia was statistically significant. A study conducted in Brazil also showed similar results that the increased frequency of the five components in postmenopausal women as compared to premenopausal women, while hypertension and central obesity was statistically significant.[3]

One of the most prevalent component of metabolic syndrome in our study was central obesity with a frequency of 47.3%, in post-menopausal women similar findings were seen in the studies conducted in Argentina[3], Iran[14] and Babol[15]. In another studies in Ecuador[16] the most prevalent risk factor was hypertriglyceridemia. The other most prevalent component of metabolic syndrome in our study was low HDL 55% in frequency similar findings seen in studies of Iran[17], Korea18and Brazil[3] where low HDL-cholesterol level was also reported as most prevalent component in postmenopausal women. Lastly our study also showed that there was very much reduced physical activity and increased BMI in both premenopausal and post-menopausal women highlighting the fact that in underdeveloped countries there in less awareness of healthy lifestyle. Therefore women usually end up into metabolic syndrome and with important risk factors at an earlier age as well in their post-menopausal status. The limitation of our study was the small size of the sample ,which may have limited the power of results. Despite this the study has provided relevant results regarding prevalence and components of metabolic syndrome in post-menopausal and pre-menopausal women.

CONCLUSION

Central obesity and low HDL were the most important components of the metabolic syndrome seen in postmenopausal women. They are also important risk factors of cardiovascular diseases. Emergency health interventions are need such as modifying the life style to control these important risk factors such as central obesity, hypertension, and dyslipidemia and glucose intolerance so as to minimize the cardiovascular diseases. Further research is recommended in women of menopausal status especially of third world countries.

REFERENCES

1. Carr.M.C The Emergence of the Metabolic Syndrome With Menopause. J Clin Endocrinology & Metabolism 2003;88(6):2404–2411
2. Ogah Anyigor, Onwe PE ,Okike PI et .al. Coronary Artery Disease and Menopause: A Consequence of Adverse Lipid Changes. J D M S. 2015;14 (11).www.iosrjournals.org.
3. Figueiredo Neto JA, Figuerêdo ED, Barbosa JB, Barbosa FF, Costa GRC, Nina VJS, et al: Metabolic syndrome and menopause: Cross-sectional study in gynecology clinic. Arq Bras Cardiol 2010;95(3):339–45
4. Fernandez ML,Gabriela. A Postmenopausal Women Have Higher HDLand Decreased Incidence of Low HDL than Premenopausal Women with Metabolic Syndrome. Healthcare 2016; 4(20).
5. MurilloHidalgo LA, Chedraui PA, Morocho N, Alvarado M, Chavez D, Huc A. The metabolic syndrome among postmenopausal women in Ecuador. Gynecol Endocrinol. 2006; 22 (8): 447-54.
6. Collaborative Group for Research of the Climacteric in Latin America. The US National Cholesterol Education Program's Adult Treatment Panel III (NCEP-ATP III): prevalence of the metabolic syndrome in postmenopausal Latin American women. Climacteric. 2007; 10 (2): 164-70.
7. Hyun YJ, Kim OY, Jang Y, Ha JW, Chae JS, Kim JY, et al. Evaluation of metabolic syndrome risk in korean premenopausal women: not waist circumference but visceral fat. Circ J. 2008; 72 (8): 1308-15.
8. Oh JY, Hong YS, Sung Y-A, Barrett-Connor E. Prevalence and factor analysis of metabolic syndrome in an urban Korean population. Diabetes Care. 2004; 27 (8): 2027-32.
9. Brown TM, Vaidya D, Rogers WJ, Waters DD, Howard BV, Tardif JC, et al. Does prevalence of the metabolic syndrome in women with coronary artery disease differ by the ATP III and IDF criteria? J Womens Health (Larchmt). 2008; 17 (5): 841-7.

10. Deibert P, König D, Vitolins MZ, Landmann U, Frey I, Zahradnik HP, et al. Effect of a weight loss intervention on anthropometric measures and metabolic risk factors in pre- versus postmenopausal women. Nutr J. 2007; 6: 31.

11. Ponholzer A, Temml C, Rauchenwald M, Marszalek M, Madersbacher S: Is the metabolic syndrome a risk factor for female sexual dysfunction in sexually active women? Int J Impotence Res 2007; 20(1):100–104.

12. Ding QF, Hayashi T, Zhang XJ, Funami J, Ge L, Li J, et al: Risks of CHD identified by different criteria of metabolic syndrome and related changes of adipocytokines in elderly postmenopausal women. J Diabetes Complications 2007; 21(5):315–9.

13. Piché MÈ, Weisnagel SJ, Corneau L, Nadeau A, Bergeron J, Lemieux S: The WHO and NCEP/ATPIII definitions of the metabolic syndrome in postmenopausal women: are they so different? Metabolic Syndrome Related Disord 2006; 4(1): 17–27

14. Marjani A, Hezarkhani S, Shahini N: Prevalence of Metabolic Syndrome among Fars Ethnic Women in North East of Iran. World J Med Sci 2012; 7(1):17–22

15. Delavar MA, Lye MS, Khor GL, Hanachi P, Syed Hassan ST, Delavar MA, Lye MS, Khor GL, Hanachi P, Syed Hassan STB: Prevalence of metabolic syndrome among middle aged women in Babol, Iran. Southeast Asian J Tropical Med Public Health 2009; 40(3):612

16. Hidalgo LA, Chedraui PA, Morocho N, Alvarado M, Chavez D, Huc A: The metabolic syndrome among postmenopausal women in Ecuador. Gynecological Endocrinol 2006; 22(8):447–54

17. Marjani A, Moghasemi S: The Metabolic Syndrome among Postmenopausal Women in Gorgan. Int J Endocrinol 2012;202.

18. Kim HM, Park J, Ryu SY, Kim J: The effect of menopause on the metabolic syndrome among Korean women. Diabetes Care 2007;30(3):701–6.