Research Article

Understanding The Comorbidities That Increase the Cardiovascular Risk in The Gynecologic Population of Our Hospital

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Abstract

Introduction: Obesity, diabetes mellitus (DM2), high blood pressure (HBP) and dyslipidemia are widely recognized factors of increased cardiovascular risk.

Objective: The primary objective of our study was to determine the prevalence of obesity, DM2, HBP and dyslipidemia in our hospital population
The secondary objective was to compare the above-mentioned risk factors between premenopausal (preM) and postmenopausal (postM) populations.

Materials And Methods: A descriptive, retrospective and cross-sectional study was conducted in 1,143 women aged 25 to 65 years domiciled in the Metropolitan Area of Buenos Aires (AMBA, for its acronym in Spanish), who participated in the "Campaign for the prevention of cervical cancer and early detection of breast cancer" carried out in 2020 by the Gynecology Service of Hospital de Clínicas "José de San Martín", University of Buenos Aires (UBA).
A survey was conducted to collect epidemiological data from patients. Blood pressure, weight and height measurements were performed in addition to the gynecological examination. The prevalence of different risk factors was estimated and compared according to the reproductive status using Fisher´s test.

Results: The body mass index (BMI) of 1138 patients out of a total population of 1143 patients was obtained. The average BMI was 28.66 Kg/m2; 37.17% of the patients had obesity (35.13% in premenopausal women [preM] versus 40.73% in postmenopausal women [postM]). Among a total of 1128 patients, the prevalence of DM2 was 4.08% (2.23% in preM versus 7.26% in postM). Among 1130 patients, 12.48% had HBP (5.87% in preM versus 23.85% in postM) and among 1131 women,2.47% reported dyslipidemia (1.26% in preM versus 4.57% in postM). When comparing the populations according to the menopausal status, a significant increase was found in the prevalence of obesity (p 0.03), DM2 (p <0.001), HBP (p <0.001) and dyslipidemia (p <0.001) in postmenopausal women.

Conclusions: We observed lower prevalence rates ofDM2 and HBP than in the general population. This may be attributed to the fact that the information was self-reported by patients and not confirmed by clinical examinations. However, we are surprised at the high prevalence of obesity in our population. All cardiovascular risk factors were statistically more prevalent in postmenopausal than in premenopausal women.

Introduction

According to the most recent data published by the National Ministry of Health of Argentina (MSN) for the years 2017/18, among the total deaths, the leading cause of death in women is cardiovascular mortality (48,690 women =29.20%). This means that one-third of women will die from cardiovascular disease, which will widely overtake cancer as a cause of death (30241 women =18.1%). For this reason, it is essential to identify cardiovascular risk factors including, but not limited to, obesity, DM, HBP, dyslipidemia, smoking, sedentary lifestyle and exposure to environmental pollutants [1].

Obesity has been identified as a major global public health problem, reaching epidemic proportions, with at least 2.8 million people dying each year for causes related to obesity or overweight. In the past, it was considered a high-income country problem, but now it also prevails in low- and middle-income countries. Latin America does not escape this reality. Thus, ac-

cording to the 2019 National Survey of Risk Factors (ENFR, for its acronym in Spanish) the prevalence of obesity in Argentina was 25.3% in the general population, which represents a relative increase of 21.6% over the 2013 ENFR. In women over 18 years of age, the prevalence of obesity in 2019 was 24.2% [2].

The most widely used measure to diagnose obesity is the body mass index (BMI), a simple index of the relationship between height and weight. BMI is calculated by dividing a person's weight in kilograms by the square of their height in meters (kg/m^2). For adults, the World Health Organization defines:
- Underweight: BMI< 18.49
- Normal weight: BMI 18.5-24.9
- Overweight: BMI 25- 29.9
- Obesity: BMI$\geq$ 30.

DM2 is continually on the rise globally. At present, 1 in 11 adults have diabetes (425 million people) and it is expected that by the year 2045, the number of people with diabetes will increase to629 million, an increase of 48%. In our country, 1 in 10 women have DM and nearly half of them are unaware of their diagnosis. Obesity (mainly abdominal obesity) is an evident risk factor for the development of DM and nowadays it is widely known that the presence of diabetes is not only associated with an increased cardiovascular risk, but also with an increased risk of developing various types of cancers [1].

HBP is another important cardiovascular risk factor. The prevalence of HBP increases with age, from 7.5% among adults aged 18 to 39 years to 33.2% among those aged 40 to 59 years, and 63.1% among adults aged 60 years and over. This pattern is similar among men and women. According to the National Health and Nutrition Survey (NHANES), the prevalence of HBP is higher among men than among women aged 18-39 years (9.2% compared with 5.6%, respectively) and 40-59 years (37.2% versus 29.4%), but among adults over 60 years old, the prevalence of HBP is higher in women than in men (66.8% versus 58.5%, respectively) [2]. In Argentina, the prevalence of HBP in women is 30.39%.4The higher percentage of HBP in postmenopausal women can be attributed to the loss of the protective effect of endogenous 17-β estradiol (which has vasodilatory, antiproliferative and antioxidant effects) associated with an increased insulin resistance leading to changes in body weight. In premenopausal women, the use of combined hormonal contraceptives (mainly containing synthetic estrogens) is the main cause of HBP [1].

Dyslipidemia also plays a very important role in the pathogenesis of cardiovascular disease. As with HBP, dyslipidemia mainly affects women in the postmenopausal period, since estrogens play a protective role during reproductive age. Thus, postmenopausal women usually exhibit a more atherogenic lipid profile, which increases the risk of cardiovascular disease.

Objectives
1. To determine the prevalence of obesity, type 2 diabetes, HBP and dyslipidemia in our hospital population.
2. To compare cardiovascular risk factors in premenopausal versus postmenopausal women.

Materials And Methods
This is a descriptive, retrospective and cross-sectional study conducted in women aged 25 to 65 years who participated in a free campaign for the secondary prevention of cervical cancer and early detection of breast cancer. This campaign was open to the entire community and was carried out by the Gynecology Service of Hospital de Clinicas José de San Martín, University of Buenos Aires (UBA) from March 9 to 13, 2020.The campaign was advertised on the media (including radio and television), social media and flyers delivered inside and outside hospital facilities. A total of 1143 women participated in the campaign.
Women were asked to read and sign an informed consent to participate in the study. The campaign included the following activities:

Completion of an anonymous questionnaire to evaluate women's knowledge on primary and secondary prevention of cervical cancer and early detection of breast cancer.
- Informative talks addressed to the general population delivered during the week the campaign was carried out.
- Ordering mammograms in women aged 40-65 years or in younger women at high risk of developing hereditary/familial breast cancer.
- Writing an ad hoc medical record for use in the campaign. Patients were interviewed to gather data on their relevant medical history, toxic habits, metabolic risk factors, obstetric and gynecologic history including history of screening for secondary prevention of cervical cancer and any treatments performed, and family history of cancer and metabolic disorders.
- Completion of a vaccination form to evaluate the patient's knowledge of and compliance with the national vaccination schedule. Patients with incomplete immunization schedules were referred to the vaccination site.
- Physical examination, blood pressure, weight and height measurement, and calculation of BMI.

- Gynecological examination
- Exo- and endocervical sampling for Papanicolaou smear.
- Sampling for human papillomavirus (HPV)testing.
- Colposcopy and cervical biopsy in patients with clinical suspicion of invasive cancer.
- Breast examination, ordering mammograms in women aged 40-65 years or in younger women at high risk of developing hereditary/familial breast cancer. Patients with findings suspicious of breast cancer were referred to the breast disease section.
This study will only analyze the data obtained from the interview designed to detect cardiovascular risk factors.

The prevalence of the various cardiovascular risk factors was estimated and compared according to the reproductive status using Fisher´s test.

Results
The BMI was obtained in 1138 women out of a total population of 1143 women. The average BMI was 28.66kg/m2 (SD 5.84) and the mean age was 44.63 years (SD 11.07). Among these women:
- 0.44% had underweight (5/1138)

- 27.94% had normal weight (318/1138)
- 34.45% had overweight (392/1138)
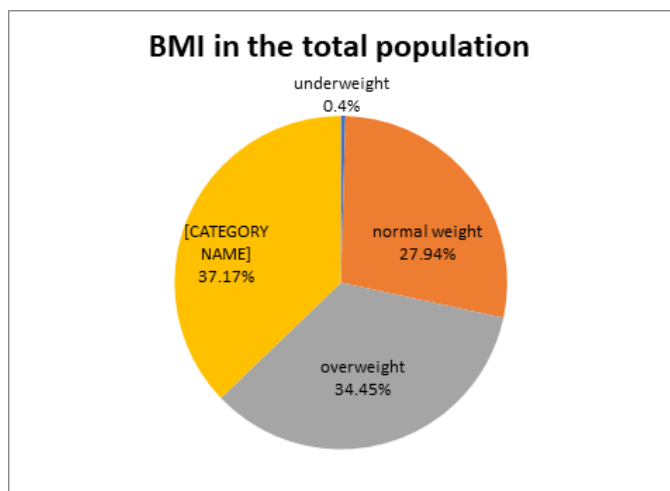- 37.17% had obesity (423/1138)

Figure 1: Distribution of BMI in the total population(n=1138).

The prevalence of other comorbidities in the population was the following:
- DM2: 4.08% (n=1128)
- HBP: 12.48% (n=1130)
- Dyslipidemia: 2.47% (n=1131)

The population was also divided into pre- and postmenopausal women. Of the 1143 women, 63.6% were premenopausal (n=727) and 36.4% were postmenopausal (n=416).

The mean age of premenopausal women was 38.15 (SD 7.84) and the BMI (n=723) was 28.18 kg/m2 (SD 5.86). Among these women:
- 0.55%had underweight (4/723)
- 32.23% had normal weight (233/723)
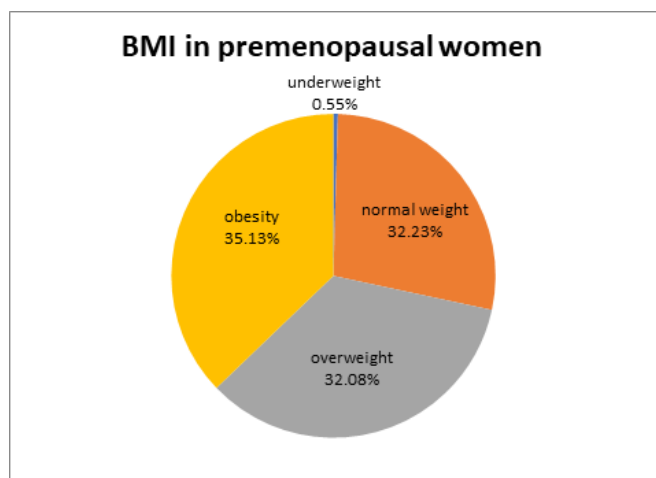- 32.08% had overweight (232/723)
- 35.13% had obesity (254/723)

Figure 2: Distribution of BMI in the premenopausal population (n=723).

The prevalence of other comorbidities in this group of women was as follows:
- DM2: 2.23% (n=715)

- HBP: 5.87% (n=715)
- Dyslipidemia: 1.26% (n=716)

The mean age of postmenopausal women was 55.9 (SD 5.28) and the BMI (n=415) was 29.51 kg/m2 (SD 5.71). Among these women:
- 0.24% had underweight (1/415)
- 20.48% had normal weight (85/415)
- 38.55%% had overweight (160/415)
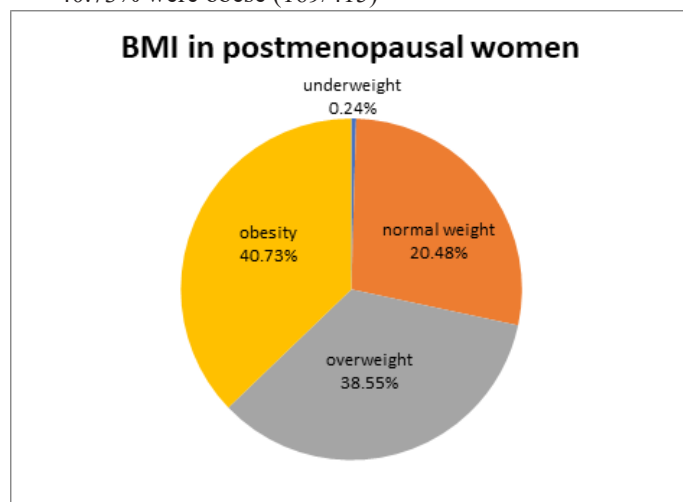- 40.73% were obese (169/415)

Figure 3: Distribution of BMI in the postmenopausal population(n=415).

The prevalence of other comorbidities in this group was as follows:
- DM2: 7.26% (n=413)
- HBP: 23.85% (n=415)
- Dyslipidemia: 4.57% (n=415)

Table 1: Prevalence of comorbidities in the whole study population, in subgroups divided according to menopausal status, and p value according to menstrual status.

Comorbidity	Total population (%)	Premenopausal women (%)	Postmenopausal women (%)	P PostM vs. PreM
Obesity	37.17	35.13	40.73	0.03
DM2	4.08	2.23	7.26	<0.001
HBP	12.48	5.87	23.85	<0.001
Dyslipidemia	2.47	1.26	4.57	<0.001

Discussion

The available evidence suggests that cardiovascular risk factors are less recognized and less aggressively treated in women than in men. However, the impact of obesity on the development of cardiovascular disease seems to be higher in women, as demonstrated by the Framingham Heart Study [5, 6].

In our study population, there was a high prevalence of overweight and obesity:34.45% of the total population was overweight and 37.17% was obese, which accounts for 71.62% of the patients enrolled in the prevention campaign. This highly exceeds the values found in the fourth ENFR survey, where self-reported excess weight (overweight + obesity) was 55% [2].

This finding might be due to the fact that this is a low-income population with a low to middle educational level, which is associated with an increased intake of high-calorie foods rich in fat and simple carbohydrates, and a low level of physical activity. Moreover, a significant increase in the prevalence of obesity has been observed when comparing postmenopausal women with those of childbearing-age. This can be explained not only by the drop in sex hormones but also by the physiological decrease in growth hormone secretion that occurs with increasing age (somatopause).

The risk of DM2 or HBP was not increased in our population compared with data published in our country, which can be due to the fact that these risk factors were self-reported by patients and many of them might have been unaware of the presence of these conditions.

In agreement with the published literature, DM2, HBP and dyslipidemia had a higher prevalence in postmenopausal than in premenopausal women. Thus, the prevalence of DM2 increased from 2.23% in premenopausal women to 7.26% in postmenopausal women (p<0.001), the prevalence of HBP rose from 5.87% to 23.85% (p<0.001) and, finally, the prevalence of dyslipidemia increased from 1.26% in premenopausal to 4.57% (p<0.001) in postmenopausal women.

It is well-known that the abrupt drop in estrogens in postmenopause associated with a gradual decrease in androgen secretion leads to abdominal fat deposit as a consequence of the "relative androgen excess". This will result in fat deposition in the abdominal region, with a higher rate of lipolysis and release of proinflammatory cytokines that cause insulin resistance [7].

Central obesity, HBP and dyslipidemia are part of the diagnostic criteria for the metabolic syndrome. This condition represents insulin resistance at its highest expression, increasing the risk of cardiovascular disease and diabetes by 2- and 4-fold, respectively [8]. This finding is consistent with the higher prevalence of DM2 in postmenopausal women (7.26%) versus premenopausal women (2.23%).

Even if in our study only the BMI was calculated, with values greater than 30kg/m2being widely recognized to be suggestive of the presence of insulin resistance, waist circumference and neck circumference are other two easy to measure clinical parameters that might be used in future studies for confirming the presence of insulin resistance [9].

Conclusions

Primary care in gynecology includes integral health care for women at all stages of their life: from adolescence, through sexual maturation, menopause and old age.

The annual gynecological visit is aimed at the prevention and early detection of genito-mammary diseases, secondary prevention of cervical cancer by the Papanicolaou test and early detection of breast cancer by mammography screening. It also involves counseling according to each woman's stage of life, prevention of sexually transmitted diseases, and counseling in preconception and family planning, as appropriate.

Gynecological medical care includes, apart from screening for diseases of the female genital system and reproductive status, dealing with bio-psycho-social issues that affect women at each stage of their life, as well as prevention and early detection of diseases and education in healthcare.

In our hospital population, there was an evident increase in the prevalence of obesity, which leads to an increased risk of cardiovascular disease, considered as the main cause of death among women.

Even if there was no higher prevalence of DM2, HBP or dyslipidemia, all cardiovascular risk factors were statistically significant in postmenopausal women when compared with findings in premenopausal women.

Each gynecologic visit provides a *"unique"* opportunity for educating women on female health care and promotion, screening for metabolic, cardiovascular and smoking risk factors as well as for any family history of cancer, and offering counseling on healthy habits, adequate diet and physical activity to prevent the development of obesity and associated risk factors with the aim of decreasing cardiovascular risk.

References
1. Consenso de Enfermedad Cardiovascular en la Mujer. Área "Corazón y Mujer". Sociedad Argentina de cardiología. Revista Argentina de Cardiología 2021;89
2. Vallejos, A., & Valenti, L. (2019). Cuarta encuesta nacional de factores de riesgo. Visión nefrológica de los principales resultados. Revista de Nefrología, Diálisis y Trasplante, 39(4), 271-278.
3. Fryar, C. D., Ostchega, Y., Hales, C. M., Zhang, G., & Kruszon-Moran, D. (2017). Hypertension prevalence and control among adults: United States, 2015-2016.
4. Delucchi, A. M., Majul, C. R., Vicario, A., Cerezo, G. H., & Fábregues, G. (2017). Registro Nacional de Hipertensión Arterial. Características epidemiológicas de la hipertensión arterial en la Argentina. Estudio RENATA 2. Revista argentina de cardiología, 85(4), 1-8.
5. Wilson, P. W., D'Agostino, R. B., Sullivan, L., Parise, H., & Kannel, W. B. (2002). Overweight and obesity as determinants of cardiovascular risk: the Framingham experience. Archives of internal medicine, 162(16), 1867-1872.
6. Geraghty, L., Figtree, G. A., Schutte, A. E., Patel, S., Woodward, M., & Arnott, C. (2021). Cardiovascular disease in women: from pathophysiology to novel and emerging risk factors. Heart, Lung and Circulation, 30(1), 9-17.
7. Torréns, J. I., Sutton-Tyrrell, K., Zhao, X., Matthews, K., Brockwell, S., Sowers, M., & Santoro, N. (2009). Relative androgen excess during the menopausal transition predicts incident metabolic syndrome in mid-life women: SWAN. Menopause (New York, NY), 16(2), 257.
8. De Paoli, M., Zakharia, A., & Werstuck, G. H. (2021). The role of estrogen in insulin resistance: A review of clinical and preclinical data. The American Journal of Pathology, 191(9), 1490-1498.
9. Caro, P., Guerra, X., Canals, A., Weisstaub, G., & Sandaña, C. (2019). Is neck circumference an appropriate tool to predict cardiovascular risk in clinical practice? A cross-sectional study in Chilean population. BMJ open, 9(11), e028305.