Women in Transition – Menopause and Body Composition in Different Populations

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A B S T R A C T

Human biology has provided valuable and applicable points of view to contribute towards human welfare, when it has analyzed changes in the transitional phases of the ontogenetic process. The purpose of this presentation coincides with WHO recommendations to study the modifications suffered by the female body during her stage of reproductive aging in different environments. We study and compared three different groups of women living in the cities of Madrid (Spain), Havana (Cuba) and in Tuxpan, a village in the State of Michoacán (Mexico). Three groups differed with respect to their socio-economic levels, food habits, social organization and culture. We used the same anthropometric techniques, recommended by the IBP, and same tools to assess the women's reproductive life, demography and socio-economic condition. All three groups coincidences regarding the remodelation of their thorax, so after 55 years of age their waist-hip ratio surpassed the cut point of 0.80, associated whit higher risk for chronic cardiovascular disorders. However, examined groups differed, for instance, the rural Mexican women altered their bone density earlier, five years before the urban samples. Next, Mexican women of younger ages maintained high levels of their body mass index above the cut point for overweight.

Introduction

Menopause has been characterized, endocrinologically, by a diminishing ovarian activity; biologically by a loss in fertility and clinically by alterations in the menstrual cycle as well as other diverse symptoms. It's a rather complex process, a critical endocrine, metabolic and vegetative phase, which comes along with the body's own aging process[1–4].

Several somatic disruptions and pathological states more or less disturb this process through a lessened hormonal flux, an increased incidence of diabetes, cardiovascular ailments, obesity, hypertension, osteoporosis, as well as benign and malign tumors. Sanitary-economic research has thereby shown that women between 50 and 60 years of age originate a major part of health costs[5]. In 1990 467 million women beyond 50 (postmenopausal) were estimated worldwide, a number expected to triplicate by the year 2030, due a higher life expectancy. According to a World Bank study[6], the current world average life expectancy age is 75 years.

Menopause ages differ from one population to another[7,8] depending upon mesological and genetic factors. Who experts relate delays in the menopausal age to better socioeconomic conditions, for it does not happen equally among every type of women.

Our goal was to study menopausal aging and changes in body composition using population samples from three different countries with divergent socioeconomic conditions.

Material and Methods

Our transversal research encompassed both pre-menopausal as well as postmenopausal women. In order to achieve a more precise analysis, the sample was divided into groups according to chronological age – by 5-years intervals –, from which those having experienced surgical menopause were excluded. In full, we examined 1 614 women ranging from 40 to 60 years of age, divided into three samples: two of whom were urban – from Madrid, Spain (n = 600), and Havana, Cuba (n = 684) – and one came from Tuxpan, a rural township in Mexico (n = 330).

Data on cultural, socioeconomic, nutritional and reproductive history was gathered through a multiple survey. Anthropometrical parameters were especially taken into account. Anthropometrical readings (height, weight, waist, hip, as well as bicipital, tricipital, subscapular and suprailliac adipose folds) were, moreover, obtained using a technique recommended by the International Biological Program. These were the indexes produced: BMI = Body Mass Index; HWI = Hip-Waist Index; CB = Body Density, and F% = Fat Percentage. Basic statistics and variance analysis results were obtained using SPSS statistic software.

Results

Analyzing body remodeling and thoracic adipose tissue distribution, we found several coincidences between the three groups, especially among women beyond 55 years old, in which all of our readings tended to increase.

Inter-group differences (Tables 1–6) were therefore very acute among Mexican women, being short and heavy. Madrid women were conversely taller, except those 40 to 45 and 51 to 55 years old, who were akin to the same Cuban sample. Body weight values in both samples were, besides, quite alike. However, meaningful intra-group dissimilarities were found in height.

Body Mass Index analysis indicated a great resemblance among Madrid and Havana women, a < 25 reading, notwithstanding that the younger and elderly groups barely overstep the normality limit. Due to its obesity, Mexican group has thus a higher BMI.

Excepting from among the 40 to 45 and 56 to 60 years range (outside of which abnormality sets in), the Madrid women hip-waist index was generally lower than 0.8. Fat Percentage values among Spanish women were, though, the lowest, except among the 55 to 59 years group wherein this ratio tended to increase. The Cuban sample, however, showed intermediate values. Conversely,

TABLE 1

SOMATIC AND BODY COMPOSITION VARIATION IN MADRID (TOTAL AND BY AGE GROUPS)

	Total		Age groups							
			40–45		46–50		51–55		56–60	
N	378		87		108		105		78	
Height	156.73	5.08	158.04	5.02	157.41	6.55	155.54	6.40	154.58	5.33
Weight	62.03	7.90	58.68	6.60	62.87	8.0	62.57	8.5	64.02	8.7
BMI	25.50	3.16	23.53	2.44	25.35	3.23	25.91	2.99	26.87	4.09
HWI	0.79	0.06	0.77	0.06	0.79	0.06	0.80	0.06	0.082	0.06
Body density	1.0251	0.01	1.031	0.01	1.030	0.01	1.026	0.01	1.022	0.01
% Body fat	33.27	3.82	29.66	3.99	32.42	3.90	35.43	3.61	35.59	3.70

TABLE 2

SOMATIC AND BODY COMPOSITION VARIATION ACCORDING TO MENOPAUSE STATUS
IN MADRID

	Pre-menopause		Post-menopause		Variance F	Significance
Height	157.36	5.90	155.32	5.68	3.92	0.05
Weight	60.76	8.55	62.34	9.18	4.88	0.05
BMI	24.45	2.99	26.11	3.31	2.29	n.s.
HWI	0.782	0.06	0.803	0.05	6.81	0.001
Body density	1.029	0.01	1.020	0.01	3.79	0.05
% Body fat	30.92	4.50	34.57	3.82	2.87	0.05

TABLE 3

SOMATIC AND BODY COMPOSITION VARIATION IN HAVANA (TOTAL AND BY AGE GROUPS

	Total		Age groups							
			40–45		46–50		51–55		56–60	
N	684		170		173		172		169	
Height	155.78	5.91	158.06	5.40	156.12	5.90	155.86	4.80	153.08	5.98
Weight	62.76	12.49	58.00	12.58	62.60	11.00	62.15	12.25	61.32	13.80
BMI	25.16	4.80	23.80	4.71	24.40	3.8	26.54	4.84	25.89	4.75
HWI	0.83	0.008	0.79	0.01	0.80	0.01	0.85	0.09	0.86	0.09
Body density	1.034	0.01	1.023	0.02	1.036	0.01	1.037	0.01	1.038	0.01
% Body fat	33.72	6.70	30.5	5.70	34.35	4.8	33.10	6.4	36.93	6.01

the Mexican group showed the highest due its overweightness.

Dividing the overall sample by physiological age (Table 6) reveals at a glance striking differences between pre-menopausal and postmenopausal women in height, weight, and body composition. The first and third statistical level readings of the Mexican sample were 0.0001 and 0.01 each. Besides, these peasant women stood out in inter-group differences.

TABLE 4

SOMATIC AND BODY COMPOSITION VARIATION ACCORDING TO MENOPAUSE STATUS
IN HAVANA

	Pre-menopause		Post-menopause		Variance	
					F	Significance
N	289		303			
Height	157.3	4.9	153.34	5.18	3.922	0.05
Weight	61.70	12.6	62.92	12.25	2.084	n.s.
BMI	24.50	4.01	25.67	4.78	1.408	n.s.
HWI	0.83	0.09	0.86	0.02	4.342	0.05
Body density	1.03	0.01	1.03	0.01	0.492	n.s.
% Body fat	32.82	5.2	33.95	4.4	0.051	n.s.

TABLE 5

SOMATIC AND BODY COMPOSITION VARIATION IN TUXPAN (TOTAL AND BY AGE GROUPS

	Total		Age groups								Signifi-cance
			40–45		46–50		51–55		56–60		
N	299		74		79		81		65		
Height	148.93	5.76	151.06	5.30	149.21	6.31	148.36	5.75	147.28	4.84	0.01
Weight	65.78	12.48	68.12	14.79	66.58	30.12	65.87	10.95	63.58	11.30	n.s.
BMI	29.60	5.13	29.86	5.67	29.89	5.96	29.81	4.44	29.16	4.47	n.s.
HWI	0.87	0.65	0.92	0.09	0.81	0.1	0.814	0.100	1.99	1.13	n.s.
Body density	1.01	0.0012	1.01	0.0014	1.01	0.00138	1.00	0.0012	1.01	0.0011	0.05
% Body fat	38.96	6.2	37.61	6.81	38.98	6.57	41.16	6.01	39.29	5.36	0.05

TABLE 6

SOMATIC AND BODY COMPOSITION VARIATION ACCORDING TO MENOPAUSE STATUS
IN TUXPAN

	Pre-menopause		Post-menopause		Variance	
					F	Significance
N	102		197			
Height	157.3	4.9	153.34	5.18	29.46	0.001
Weight	61.70	12.6	62.92	12.25	22.21	0.001
BMI	24.50	4.01	25.67	4.78	0.32	n.s.
HWI	0.83	0.09	0.86	0.02	8.84	0.01
Body density	1.03	0.01	1.03	0.01	0.93	n.s.
% Body fat	32.82	5.2	33.95	4.4	0.59	n.s.

TABLE 7
NATURAL AND SURGICAL MENOPAUSE AGE (YR) IN MADRID, HAVANA AND TUXPAN

	Natural					Surgical					Average	
	X	SD	Min.	Max.	Ds	X	SD	Min.	Max	Ds		
Spain	50.11	0.81	33	60	4.81	44.66	1.82	30	60	5.82	49.92	0.99
Cuba	49.45	0.49	32	58	5.09	41.57	1.06	23	58	8.08	48.83	0.02
Mexico	46.02	0.41	34	56	4.88	42.70	1.39	30	56	7.60	45.47	0.88

The Cuban sample displayed meaningful contrasts: just 0.005 in height and HWI with a F = 3.92, p < 0.05 and F = 4.34, p < 0.05 values respectively. Comparing them to the Spanish women leads to a significant similarity to other readings wherein postmenopausal women always showed higher values excepting in bone density, a phenomenon not evident in the Mexican sample.

Table 7 shows the average age of both surgical and natural menopause. The Mexicans exhibited the lowest menopause age, followed by the Cubans and finally the Spaniards.

Conclusions

Menopause is a natural physiological phenomenon experimented by every woman arriving to the end of her reproductive cycle which, too, entails other cultural and nutritional parameters that modify body composition, weight gain, fat percentage and bone density readings. Height loss during aging is also significant[10,11].

Adipose tissue increase and migration to the upper thorax bring about high morbidity and mortality rates due to degenerative illnesses, such as cardiovascular ailments, diabetes, and obesity, among others[12,13]. These features were seen in our three samples proving their vulnerability. However, according to our results, Mexican peasant women were most exposed to them owing their destitute living conditions, manifest in their meager diet, in spite of which they show overweightness and thereby high fat percentages.

Health services should take care of this problem in the future. The postmenopausal female population is rising. With life expectancy at 75 years and the average age of our sample at a 47 to 49.9 year spectrum, a third of these women's life will be most likely spent nursing these health problems[5].

So, through anthropometric measuring we were able to distinguish changes between three female population samples, urban as well as rural, establishing how social, economic and cultural parameters influence their differences[14].

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ŽENE U TRANZICIJI: MENOPAUZA I GRAĐA TIJELA U RAZLIČITIM POPULACIJAMA

S A Ž E T A K

Humana biologija pružila nam je vrijedna i primjenjiva stajališta kojima je moguće doprinijeti blagostanju čovjeka, kada se analiziraju promjene u prijelaznim fazama ontogenetskog procesa. Cilj ove prezentacije podudara se s preporukama SZO o istraživanju promjena kojima je izloženo tijelo žene tijekom reproduktivnog starenja u različitim okolišima. U ovom su prikazu uspoređene tri različite skupine žena koje žive u Madridu (Španjolska), Havani (Kuba) i Tuxpanu (selu u državi Michoacan u Meksiku), koje se razlikuju u socio-ekonomskom položaju, prehrambenim navikama, socijalnoj organizaciji i kulturi. Korištene su identične antropometrijske tehnike (IBP) te tehnike kojima je procijenjen reproduktivan život žena, demografski i socio-ekonomski uvjeti. Ova tri uzorka koincidirala su u odnosu na remodelaciju grudnog koša, te je nakon dobi od 55 godina omjer: opseg struka/opseg kukova prešao granicu od 0.80, što se povezuje s povećanjem rizika za razvoj kroničnih bolesti kardio-vaskularnog sustava. No ove tri skupine razlikovale su se, između ostalog, u tome što su ruralne Meksičke žene mijenjale gustoću kostiju ranije, i to pet godine prije druga dva urbana uzorka. Nadalje, među ženama mlađe dobi bio je veći broj onih kojima su povišene razine BMI prelazile graničnu vrijednost kojom se definira pretilost.