THE EFFECTIVENESS OF A BODY MASS REDUCTION PROGRAM IN OBESE WOMEN IN PERIMENOPAUSAL AND MENOPAUSAL AGE COMPARED WITH THE EFFECTIVENESS OF SUCH A PROGRAM IN YOUNGER (18–44 YEARS OF AGE) WOMEN LIVING IN POLAND

Ostrowska L.[1], Lech M.M.[2]

[1]Department of Hygiene and Epidemiology in Medical University of Bialystok

[2]School of Public Health in State Postgraduate Center of Medical Education, Warsaw, Poland

SUMMARY

Objective: The aim of the work was: to compare the effectiveness of body mass reducing program in women of perimenopausal (and menopausal) age with the effectiveness of such a program when it was applied to women aged 18–44 years.

Methods: The paper deals with observation study of the group of obese patients recruited and treated in Bialystok's Clinical Center for Cardiology and Body Mass Reduction. The authors summarize 12 months of clinical observation (as it was initially planned) of the two groups of obese women, taking part in the special body mass reduction program; Group I – 81 women in perimenopausal and menopausal age, Group II – 107 women in 18–44 years of age. The proposed treatment contained diet, physical exercises, psychological support and pharmacotherapy.

Results: The positive reaction for the treatment of obesity was less visible in obese women in perimenopausal and menopausal age, than in the group of obese women in 18–44 years of age (change of BMI in the group of younger women was –3.44 kg/m^2 vs. –2.65 kg/m^2 in older women). As it was observed, the weaker reaction for the proposed treatment in the group of older women, was not related to lower BMR, than in the group of younger obese women. Provisional result shows that use of HRT (Hormonal Replace Therapy) may probably result in better response of body mass reduction in perimenopausal and menopausal women.

Conclusion: The high dropout of the patients included into the study does not allow to formulate unequivocal conclusions but it seems that body mass reduction program for women in perimenopausal and menopausal age should concentrate on building the motivation of the patients, HRT may play some role in improvement of effectiveness of such program but this should be confirmed by further studies.

Key words: obesity, body mass reduction, menopause, effectiveness, observational study

Address for correspondence: M. M. Lech, School of Public Health, 61 Kleczewska Str., 01-826 Warsaw, Poland. E-mail: medardlech@poczta.onet.pl

INTRODUCTION

Many authors believe that obesity was one of the most important epidemics around the end of the 20th century (1). On the basis of research, it is known that over 22% of adult inhabitants of the United States are obese and additional 32% are overweight (2, 3). The study by pol-MONICA provided similar data for the adult population of Warsaw, 22.4% of males, and 29% of females are obese (4). Similarly, the nationwide study of Polish citizens by Central Statistic Office of Poland carried out during the census of 1996 confirmed that almost 30% of Poles older than 15 years of age, are people who are either overweight or obese (5).

A trend of a progressive increase in body weight is often observed throughout the climacteric period of women's life all over the world (6, 7, 8). For epidemiologists and clinicians, it is obvious that the overweight and obesity are associated with an increased risk of cardiovascular diseases and metabolic disorders. Obesity is also a known risk factor for certain cancers (in particular colon, endometrial, and breast cancer). Obesity, especially in the elderly, leads to the appearance of bone and joint disease. It has been shown that obese people do not live as long as their lean counterparts (9), and furthermore, that obesity and overweight increases the risk of hypertension, stroke, myocardial infarction, and gallstones (6). In many instances, obesity leads to a decreased quality of life and diminished self-appreciation in people (patients). The latter often leads to a negative attitude and reduces the will to live, and can also cause neglect of ones' health and appearance. It is known that overweight women have a decreased sense of self-worth, less frequently make use of prophylactic health care checks and, probably due to this reason, cancer is often detected – in these cases – at an already advanced stage, compared to not overweight women (10).

Women in perimenopausal age, experience a decrease in estrogen concentration in blood, which is accompanied by a decrease in the concentration of serotonin, cholecystokinin (the "satiety hormone"), and β-endorphin (11). During this period of

life there is a rise in serum lipid concentration and an increased resistance to insulin (12). This, along with other factors, could be the effect of weight gain in women in perimenopausal and menopausal age.

The increase in adipose tissue at around this time increases the risk of hyperestrogenism, and the resulting consequences (such as endometrial cancer, breast cancer, and colon cancer). According to the study carried out by the State Central Institute for the Maternal Health of Poland (13), as many as 66% perimenopausal and menopausal women are either overweight or obese. Another problem associated with the menopause is a tendency toward a lowered mood, and even depression (10) which is sometimes accompanied by an increase of appetite or even hyperphagia. The progressively aging Polish population and the increase in the numbers of overweight persons, persons with hypertension, or type 2 diabetes is a challenging problem for health care services, and similarly for national budget. The implementation of programs aimed at reducing body weight is a method of primary prevention whose value cannot be underestimated (14). When discussing the issue of reducing the body weight in perimenopausal women, attention should be drawn toward the role of hormone replacement therapy (HRT). Studies on this topic do not provide consistent evidence which would confirm whether or not the use of HRT leads to a reduction in body mass (15, 16). Modern/contemporary methods of body mass reduction have long since abandoned the idea of simply reducing the calorie intake. Such programs nowadays use a holistic/multidisciplinary approach, which involves a medical doctor, physiotherapist, dietician, and psychotherapist (17). The pharmacological treatment of obesity thanks to the central and peripheral actions of medicines used in this treatment has, for a long while, been safe and effective (18). There is evidence of the positive effect of sibutramine (decrease of satiety, increase of resting energy expenditure and thermogenesis) on body mass reduction in obese females (19). Despite the availability of many methods of obesity treatment, epidemiological data cannot be found which would show a decline in the percentage of obese people in our society (17). Because the frequency of appearance of obesity and overweight is significantly greater in women of menopausal age, compared with that of younger women and of men, efforts targeted toward this group should produce the greatest impact for the general population health.

The aim of this work was:

- to compare the effectiveness of body mass reducing program in women of perimenopausal (and menopausal) age with the effectiveness of such program when it is applied to women aged 18–44 years.

MATERIALS AND METHODS

The study was performed on a group of women who approached the "Podlaskie Clinical Center for Cardiology and Body Mass Reduction" in Bialystok (eastern part of Poland) during the period 1st January 2001 to 31st December 2001 about obesity and its associated diseases treatment. All patients underwent a full medical examination and a detailed history was taken. Their body mass and height were measured, together with an evaluation of their state of nutrition, from which the Body Mass Index (BMI) was calculated. The amount of adipose tissue, lean tissue, the content of water (20, 21) were measured using bioelectrical impedance (MALTRON BF-905 apparatus produced by Intimex). The Basal Metabolic Rate (BMR) was estimated using the data obtained from bioelectrical impedance measurements. The distribution of fat around the body was assessed using the "waist/hip ratio" (WHR). It is generally accepted that a ratio exceeding 0.8 (WHR>0.8) classifies female patients as having a central, android fat distribution, and a value of WHR≤0.8 as hip-thigh, a peripheral – gynoid fat distribution.

The study was approved by the Institutional Review Board, as designated by Helsinki Declaration II and all participants gave their written informed consent before the evaluation.

Our study included adult women with a BMI≥30 (overweight women who were not obese; were excluded). Patients, depending on their age, were divided into two groups; the study group (Group I) – patients of "menopausal age" (age ≥45 years), and the control group (Group II) – patients aged 18–44. The Group I consisted of 81 women, and the Group II consisted of 107 women. Patients from both groups were instructed the following:

- To begin a mass reducing diet (maximum 1000–1500 kcal/day).
- To increase physical activity (3 sessions per week, lasting at least 30–45 min, in accordance with a program developed and monitored by a medical doctor and physiotherapist).
- To use pharmacotherapy (in chosen, selected cases that were not responding to diet and physical activity only).
- To attend for monthly medical check-up (done by a medical doctor).

The results of the study regarding the body parameters of patients (and the completion of the weight reduction program) are presented as a mean and standard deviation (SD). A comparison of the parameters achieved (before and after treatment) for both groups was performed to determine the effectiveness of treatment. For statistical analysis, Student's t-test was used (significance was when $p<0.05$).

RESULTS

The characteristics for both the experimental group of 81 obese women of menopausal age (Group I) and the control group of 107 obese women aged 18–44 (Group II) are presented in Table 1. The majority of patients in both groups have central fat distribution (WHR>0.8); 77.8% of women from Group I (n=63) and 74.8% of women from Group II (n=80). Gynoid obesity appeared in 22.2% of patients from Group I (n=18) and 25.2% of patients from Group II (n=27).

During the first two months, 45.7% of women from Group I (the experimental group) (n=37), and 16.8% of women (n=18) from Group II (the control group) withdrew from the study.

Patients continued to resign from the study; 13.6% of patients from Group I and 22.4% of patients from Group II gave up after the second follow-up visit. After the third visit 19.7% of patients from Group I and 22.4% of patients from Group II had not continued the study. After the fourth visit 7.4% from Group I and 15.0% from Group II resigned from participating on the study. From the fifth visit onwards 13.6% from Group I and 23.4% from Group II had stopped participating.

An evaluation of the effectiveness of the treatment was per-

Table 1. *Basal characteristics of patients in Group I (study) and Group II (control)*

	Women in Group I (n = 81)			Women in Group II (n = 107)		
	mean	range	SD	mean	range	SD
Age (completed years)	53.40*	45–72	6.72	32.40*	18–44	7.62
Body mass (kg)	96.50	70.0–177.5	18.39	95.40	74.0–147.0	15.08
Height (cm)	160.40*	143.0–176.0	6.05	163.40*	150.0–179.0	5.93
BMI (kg/m^2)	37.50	30.1–62.9	6.25	35.70	30.1–54.8	4.96
Waist circumference (cm)	105.60*	83.0–148.0	13.49	100.30*	81.0–127.0	11.28
Hip circumference (cm)	123.60	103.0–181.0	14.34	120.00	102.0–155.0	11.45
WHR	0.85	0.7–1.0	0.06	0.84	0.7–1.02	0.06
Contents of fat tissue in body (%)	40.40	30.9–51.0	5.42	42.15	23.2–53.6	6.20
Total fat tissue mass (kg)	37.20	23.0–57.0	7.87	40.60	19.0–75.0	10.88
BMR (kcal/24h)	1650.90	1415.0–2063.0	144.35	1670.10	1415.0–2122.0	147.68

**The differences are statistically significant (Student's t-test, p<0.05)*

Table 2. *Basal characteristics of patients in Group I (study) and Group II (control) before and after treatment*

	Women in Group IA (n = 44)			Women in Group IIA (n = 89)		
	mean	range	SD	mean	range	SD
Number of follow-up visits	3.80	2–12	2.14	4.00	2.0–12.0	2.25
Body mass before treatment (kg)	93.92	70.0–177.5	20.31	95.85	74.0–144.0	±14.58
Body mass after treatment (kg)	87.20	65.0–166.5	20.65	86.67	62.5–126.0	±14.07
Body mass reduction (kg)	6.69*	0.6–20.2	4.96	9.18*	0.0–22.2	±5.50
% of reduction of body mass	7.37*	0.6–22.0	5.50	9.65*	0.0–26.34	±5.79
BMI before treatment	36.88	30.1–62.9	6.23	35.88	30.1–51.1	±4.66
BMI after treatment	34.20	26.1–59.0	6.45	32.55	24.4–47.7	±4.51
Change in BMI	–2.65**	from–0.1 to–8.3	1.96	–3.44**	from 0.0 to–8.9	±2.08
% reduction of BMI	–7.32*	from–0.25 to–20.7	5.40	–9.55*	from 0.0 to–24.2	±5.50

**Differences between Groups statistically significant (Student's t-test, p<0.05), **Differences between Groups not far from statistically significant (Student's t-test, p<0.05)*

formed only in patients who had attended at least two follow-up visits. These patients formed Group IA (44 patients those from the experimental group who had at least two follow-up visits) and Group IIA (89 patients those from the control group, who had at least two follow-up visits). The mean number of visits for the Group IA was 3.8 (± 2.14), and for the Group IIA was 4.0 (±2.25). The difference in the number of visits between both groups was not statistically significant.

The BMR (basal metabolic rate) was calculated and compared in both groups, and no statistically significant differences were found between the obese women in perimenopausal age, when compared with obese women aged 18–44 years (this is well illustrated in Table 1).

The parameters for weight loss were measured and compared for both groups of women. The results are presented in Table 2.

In Group IA, 70.5% (n=31) of patients have central fat distribution before treatment, and 29.5% (n=13) of patients have peripheral fat distribution. In Group IIA 73.0% (n=65) of women have central fat distribution before treatment, and 27.0% (n=24) have peripheral fat distribution (type of buttock-thigh obesity). In Group IA, twenty six (59.1%) women had ceased menstruating and they have reached postmenopausal status, whilst the remaining eighteen (40.9%) women menstruated regularly (however sometimes the menses appeared on other than expected days) and they were in their perimenopausal period. Only eight postmenopausal women used hormone replacement therapy (in total, 18.2% of women from Group IA).

The treatment of obesity consisted of a diet, increased physical activity, OTC products (herbs which optimize metabolism, organic chromium, chitosan, bulking agents), and pharmacotherapy (sibutramine or orlistat). The diet and increased physical activity was used to treat obesity in 61.7% (n=50) patients from Group I (amongst these were all who had resigned after the first visit) and 36.5% (n=39) patients from Group II. The differences between the groups were of statistical significance. We found that for patients of menopausal age, it was harder to perform an increased level of physical activity (for example; active participation in obesity support groups, gym and water exercises).

The effectiveness of treatment of obesity by dietary methods, increased physical activity, OTC medication, or pharmacotherapy for the Groups IA and IA are presented in Table 3.

Three different treatment programs were used in the study with different resulting effects.

Program No. 1: Caloric restriction and increased activity was

Table 3. *Ef*

Treatment strategy	Group IA (n = 44)					Group IIA (n = 89)				
	n	%	mean body mass reduction (kg)	range of body mass reduction (kg)	SD	n	%	mean body mass reduction (kg)	range of body mass reduction (kg)	SD
1. Diet + increase of physical activity	13	29.6	4.08	1.0–11.5	3.49	21	23.6	4.57	0.0–8.6	1.98
2. As above + OTC products	14	31.8	5.98	1.2–11.6	3.78	18	20.2	6.06	0.9–15.6	3.50
3. As above + pharmacotherapy	17	38.6	9.29	0.6–20.2	5.67	50	56.2	12.20	2.5–22.2	5.13

Table 4. *Body Mass Index in women in Group IA and IIA*

BMI	Women in Group IA (n=44)				Women in Group IIA (n=89)			
	before treatment		after treatment		before treatment		after treatment	
Overweight BMI (25–29.9 kg/m^2)	n=0	(0%)	n=12	(27.3%)	n=0	(0%)	n=30	(33.7%)
Obesity (BMI 30–39.9 kg/m^2)	n=33	(75.0%)	n=27	(61.4%)	n=72	(80.9%)	n=53	(59.6%)
Pathological obesity(BMI≥40)	n=11	(25.0%)	n=5	(11.3%)	n=17	(19.1%)	n=6	(6.7%)

applied in treating obesity in 29.6% (n=13) of patients from the group IA. A mean weight loss of 4.08 kg was achieved in these women. The same program was applied in 23.6% (n=21) patients from Group IIA, where the mean weight loss of 4.57 kg was achieved. The differences between the groups were not of statistical significance.

Program No. 2: Caloric restriction, increased physical activity and the use of OTC products were applied in treating 31.8% (n=14) of patients from Group IA. A mean weight loss of 5.98 (±3.78) kg was achieved. The same program was applied in 20.2% (n=18) patients from Group IIA, with a mean weight loss of 6.06 (±3.5) kg achieved. These results did not significantly differ between the groups.

Financial problems were amongst the reasons why a number of patients did not undertake or discontinued from using OTC (over-the-counter) products as the treatment of choice.

Program No. 3: Caloric restriction and pharmacotherapy were applied in 38.6% (n=17) women from Group IA, and 56.2% (n=50) women of Group IIA, resulting in a mean weight loss of 9.29 (±5.67) kg and 12.2 (±5.13) kg respectively. The difference in the amount of weight lost between both groups, although visible, was not statistically significant (due to the low number of participants in these groups).

We observed the greatest average loss of body weight in patients applying a diet, coupled with increased physical activity and pharmacotherapy (Program 3), similarly for the Groups IA and IIA. This Program was found to be the most effective method of treating obesity, and its accompanying results statistically significantly differed when compared with Programs No.1 and No. 2 (for both groups).

We found that based on our observations there was a difference in the physical appearance (state of nutrition, assessed by the BMI). The results are compiled and presented in Table 4. 27.3% of patients from Group IA and 33.7% of patients from Group IIA turned from being obese to overweight, whilst 11.3% of patients from group IA and 6.7% from group IIA went from being pathologically obese to obese. The differences between the groups were not statistically significant.

After the treatment was completed, results of women from both Groups were analyzed to find changes in the location/distribution of adipose tissue, using the WHR (ratio of waist to hip circumference). In Group IA:

- WHR >0.8 before treatment and after treatment was observed in 11.4% (n=5) of those studied,
- WHR ≤0.8 before and WHR >0.8 after treatment was observed in 4.5% (n=2) of those studied,
- WHR >0.8 before and after treatment was observed in 60.7% (n=54) of those studied,
- WHR ≤0.8 before and after treatment was observed in 23.6% (n=21) of those studied.

We also assessed the percentage in reduction of body weight after treatment. It was observed, that among subjects falling into Group IA, 43.2% (n=19) of patients lost <5%; 27.3% (n=12) lost 5–10%, and 29.5% of women (n=13) lost more than 10% of their body mass.

In Group IIA reduction of body mass by <5% in 23.6% subjects, 5–10% in 30.3% subjects and >10% in 46.1% subjects respectively was observed.

We performed a comparison of parameters determining weight reduction before and after treatment of obesity in the individual groups. The details regarding this issue are presented in Table 5.

It is shown that the process of reduction of the body mass for both groups lead to a reduction in the BMI and the waist and hip circumferences. These differences were not statistically significant.

Due to the fact that the advances made during the program of weight reduction can also be the result of external factors, the group of women studied were further divided into two subgroups; Group IAA (patients who used HRT) and Group IAB (the remainder of the participants from group IA). The differences between the subgroups are presented in Table 6.

At first sight, considerable differences are seen between patients in the groups we studied. The women who used HRT more frequently consulted a doctor (mean 5.25 visits, compared with 3.53 visits in women who did not use HRT). Women who used HRT had a lower final body mass, and a lower BMI and WHR, which was characterized by a smaller waist and a smaller hip

Table 5. *Characteristics presenting effectiveness of body mass reduction strategies in study Group (IA) and in the control Group (IIA)*

	Characteristics	Before implementation of strategy	After completing the body mass reduction strategy	Differences statistically significant, p<0.05
Group IA (n=44)	Body mass (kg)	93.920 (±20.31)	87.21 (±20.65)	0.000000
	BMI (kg/m^2)	36.880 (±6.23)	34.23 (±6.45)	0.000000
	Waist circumference (cm)	102.840 (±14.51)	97.84 (±15.64)	0.000000
	Hip circumference (cm)	122.030 (±14.89)	116.10 (±13.93)	0.000000
	WHR	0.838 (±0.07)	0.837 (±0.07)	0.806594
Group IIA (n = 89)	Body mass (kg)	95.85 (±14.58)	86.67 (±14.07)	0.000000
	BMI (kg/m^2)	35.88 (±4.66)	32.55 (±4.51)	0.000000
	Waist circumference (cm)	101.35 (±12.01)	95.82 (±12.19)	0.000000
	Hip circumference (cm)	120.06 (±11.16)	115.06 (±11.39)	0.000000
	WHR	0.84 (±0.08)	0.83 (±0.08)	0.000279

Table 6. *Effectiveness of s□T)*

Characteristics	Women without HRT Group I AB (n=36)			Women with HRT Group I AA (n=8)		
	mean	range	SD	mean	range	SD
Body mass before entering to the study (kg)	96.20	73.5–177.5	21.58	83.67	70–92.8	7.69
Body mass after completing the study (kg)	89.87	65.1–166.5	21.88	75.27	65.0–83.1	5.32
Body mass reduction (kg)	6.32	0.6–20.2	4.62	8.40	1.2–19.0	6.35
% of body mass reduction	6.86	0.6–22.0	5.16	9.67	1.56–20.47	6.76
BMI reduction (kg/m^2)	2.49	0.1–8.3	1.83	3.38	0.47–7.45	2.48
BMI reduction in %	6.80	0.25–20.69	5.01	9.66	1.54–20.55	6.79
Decrease of waist circumference (cm)	4.87	0.0–14.0	3.87	5.50	0.0 –14.0	4.34
Decrease of hip circumference (cm)	4.63	0.0–17.0	3.49	–5.75	0.0 –22.0	6.86

circumference. The weight reduction program in these patients was much more effective when compared with patients who didn't use HRT. Not all these observations could be subjected to statistical analysis, due to the small number of women studied, and in particular, the small number of women using HRT.

Although we used only those patients in the group of women studied who presented for a medical consultation at least twice, the authors decided to monitor what happened to the remaining (drop-outs) 38 women of menopausal age who resigned from the program, and did not proceed to the Group IA. For this purpose we used a varied technique: we sent a short questionnaire to all 38 patients (where questions regarding the reason why they resigned were included, and we asked them to give details regarding the parameters of their body shape, weight, etc.). For some of these women, the information was achievable only by a telephone interview. An important point that needs to be mentioned is that in the questionnaire we asked patients to tell us their actual body weight (we didn't ask patients to weigh themselves!). However, we asked patients to measure their waist and hip circumferences.

In total, thanks to this method, we collected information from a further 33 patients (87% of women to whom we sent a questionnaire). The majority of these resigned from the Program due to a lack in motivation (eight women), or insufficient financial resources (seven women), four women dropped out due to a decline in their health (two patients during this time had breast operations), one needed an operation for varicose veins, and another had frequent, recurrent chest infections. Six patients completely gave up dieting (their attitude is in best way presented by; "this doesn't make any sense", "I won't lose weight anyway"), and eight patients decided to lose weight by other means.

According to the information which our patients gave, fourteen of these women during the trial period lost weight (average 5.11 kg) and fourteen gained weight (on average 5.95 kg), there was no change in body mass in five women during the last year. These data are not in accordance with the information regarding their hip and waist measurements. Only ten women reported a leaner waist (an average reduction of 7.3 cm) and 22 women reported an increased waist (average increase of 4.5 cm). Nine women reported a decreased hip circumference (mean reduction 3.1 cm) and 22 reported a larger hip circumference (average increase 6.2 cm). Some patients described a simultaneous weight loss, accompanied by an increase in the waist and/or hip circumference. A vice-versa situation was not reported.

DISCUSSION

There is a number of limitations of this study, at first this was an observational study of the group of women-volunteers wanting to reduce their body mass, counting on the help of the private

medical services. Although the fees paid by patients were very low (except for medicines which were not subsidized by national health insurance system), some of patients could not afford even these small sums to pay for gym or slightly higher prices of low--calories food. This was one of the reason of high dropout rate and possible biases related to giving up of physical activity or pharmacotherapy by some patients. Authors of the study admit that this was not pure study with "study" and "control" group, there was no one single study procedure which was performed in the study group, and intentionally not performed in a control group, the results of the study are rather presenting the holistic results of the intention of body mass reduction in the group of menopausal and perimenopausal women in comparison with the results of the use of similar program of body mass reduction in younger women. The results of our study have obvious limitations related to high dropout rate, especially in the group of perimenopausal and menopausal patients.

Most societies are aging at a fast rate, and continually more women are alive and active for more than 30–40 years after their final menstruation. During these 30–40 years these women have an increased tendency towards developing cardiovascular disease, osteoporosis, type 2 diabetes, and malignancies (in particular breast cancer, endometrial and colon cancer). Obesity is a risk factor for most of these diseases. This is why there can be no doubt that losing excess body mass in obese women in perimenopausal and menopausal age is of great importance with respect to the prevention of many diseases and for decreasing the mortality from such diseases (17, 22).

As apparent from the literature, there are some effective methods of body mass reduction in obese women of perimenopausal and menopausal age (16, 23), our study have not confirmed equal effectiveness of a body mass reduction program with the same program used in younger obese women. The effectiveness of body mass reduction program is lower in obese women of perimenopausal age than when the same program is applied to women aged 18–44 years. Occurred differences could result from the poorer motivation of women of menopausal age, and their inferior financial status. There are limitation related in our method of estimation of BMR (the BMR was estimated from bioelectric impedance measurements and body weight), but it is well known that the more reliable methods are very difficult to use in clinical settings (24, 25). We did not, however (taking into consideration above limitations), confirm that obesity in menopausal women results from a decreased rate in metabolism.

Due to the short period (12 months) during which the obese women were monitored in their course of body mass reduction, it was impossible to determine the long term outcomes of implemented programs. Future studies will need to elaborate why women stop participating in such a study. Results of this study make it apparent, that information campaigns carried out by mass media addressing the general population and aimed at the necessity of leading a healthy lifestyle (applying a healthy diet and exercise) do not lead to a reduction in the numbers of people who suffer from obesity, and with regard to this issue, do not increase the health status of the general population.

There can be no doubt that an important point arising from this study is that more centers should carry out a well structured body mass reduction programs for women, designed in such a way that these can be completed by women entering the menopause. One of the important aspects of such a program should be its funding. The latter should be effectuated through public health insurance. The majority of studies undertaken in Poland (26), which have dealt with the issue of the effectiveness of treatment of obesity in women, have not concentrated on women of menopausal age, and these studies typically followed women through a period of only three months (27). The study lasted one year, and was an exception concerning the design of the study, compared to other Polish studies.

On the basis of the results of our study, we can assert, that the effectiveness of applying the same program of weight reduction in women of menopausal age and in younger women, does not give the same result. Better results (although not of statistically significant) were achieved by women younger than 45 years. One of the possible explanations of such a result could be due to a decrease in the basal metabolic rate (BMR) of women at around the time of the menopause and the decrease of physical activity with aging (28). Some authors state that the loss of lean tissue has an important effect on body mass gain at the time of middle and post middle age with a resultant decline in the rate of metabolism of around 1–2% for each decade (29). The study does not confirm that the reason for the "weaker" effect of the program is the result of a difference in the basal metabolic rate between groups of women who are of menopausal age, and those of younger age (taking into consideration limitations of BMR as the estimations based on bioelectrical impedance measurements and BMI the above described result need to be reconfirmed in the further studies). Attention is drawn to the fact that our study, like many others, compared two groups of women which differed in age and did not study the same cohort of women through several decades.

Maybe the lower efficacy of the program, when applied to women of perimenopausal and menopausal age, was the result of a decrease in motivation, and considering socioeconomic factors, the worse financial situation of older women, who cannot afford to buy (expensive) OTC products, and could not allow even a symbolic entrance fee for gyms and swimming pools. This hypothesis can be supported by the fact that younger – perimenopausal – women, and presumably those who were better off, and they used HRT, found it easier to lose weight. On the other hand, however, these women had a lower weight to begin with, which could have also influenced the outcome. Thanks to the attempt to determine the missing data concerning the weight loss of patients who dropped out from the study, it became apparent that most studies which use questionnaires (5), especially those addressing women, and assessing the prevalence of overweight and obesity in the general population (without weighing patients, measuring their waist and hip circumference, and determining the level of adipose tissue) have poor credibility. A shortcoming of this study arose from the fact that we were unable to determine the extent to which HRT may affect body mass loss in women at around the time of menopause (due to the small number of women studied who used HRT), and whether or not it leads to a greater degree of body mass reduction. But as it is known from the other studies that menopausal acceleration of body weight and body fat can be counteracted by oral HRT (16). However the results of these studies are not conclusive and our provisional results should be confirmed in further studies.

REFERENCES

1. Laurier D, Guiguet M, Chau NP: Prevalence of obesity: a comparative survey in France, the United Kingdom and the United States. Int J Obes 1992;16:565–72.
2. Flegal KM, Caroll MD, Kuczmarski RJ, Johnson CL: Overweight and obesity in the United States: prevalence and trends, 1960–1994. Int J Obes 1998;22:39–47.
3. Kuczmarski RL, Flegal KM, Campbell SM, Johnson CL: Increasing prevalence of over-weight among US adults. JAMA 1994;272:205–211.
4. Program Pol-MONICA Warszawa. Kompleksowa ocena stanu zdrowia ludności Warszawy w roku 1993 i jego zmian w latach 1984–1990. Część V. Inst Kardiologii, Warszawa 1995 (in Polish).
5. Porównanie sytuacji zdrowotnej ludności Polski i wybranych krajów europejskich w roku 1996. GUS, 1998 (in Polish).
6. Field AE, Coakley EH, Must A: Impact of overweight on the risk developing common chronic diseases during a 10-year period. Arch Int Med 2001;161:1581–3.
7. Poehlman ET, Tchernof A: Traversing the menopause: changes in energy expenditure and body composition. Coron Artery Dis 1998;9(12):799–803.
8. Wing RR, Mathews KA, Kuller LH, Meilahn EN, Plantinga PL: Weight gain at the time of menopause. Arch Intern Med 1991;151(1):97–102.
9. Stevens J, Cai J, Pamuk ER: The effect of age on the association between body-mass index and mortality. NEJM 1998;338:1–7.
10. Wee CC, McCarthy EP, Davis RB, Philips RS: Screening for cervical and breast cancer: Is obesity an unrecognized barrier to preventive care? Ann Intern Med 2000;132:697–704.
11. Milewicz A: Wybrane endokrynologiczne aspekty otyłości pokarmowej. Endokr Pol 2001;52(3Suppl1): 79–85 (in Polish).
12. Simkin-Silverman LR, Laurey R, Meilahn EN. et al: Women's Health Lifestyle Project: A randomized clinical trial: Results at 54 months. Circulation 2001;103(1):32–37.
13. Pertyński T, Połać I: Otyłość u kobiet w okresie pomenopauzalnym, Menopauza – Sympozjum Menopauza 2000, Łódź 9–11 marca 2002, Instytut Centrum Zdrowia Matki Polki – Bibl Nauk Tom III, Wyd ADI, 2000 (in Polish).
14. Lech M: Refundacja programów redukcji masy ciała jako inwestycja w zdrowie Endokr Pol 2001;52(3-Suppl1):161 (in Polish).
15. Espeland MA, Stefanick MI, Kritz-Silverstein: Effect of postmenopausal hormone therapy on body weight and waist and hip girths. Postmenopausal Estrogen-Progestin Interventions Study Investigators. J Clin Endicrinol Metab 1997;82(5):1549–56.
16. Walsh KM, Leen E, Lean MEJ. The effect of sibutramine on resting energy expenditure and adrenaline-induced thermogenesis in obese females. Int J Obes 1999;23:1009–15.
16. Gambacciani M, Ciaponi M, Cappagli B, De Simone L: Prospective evaluation of body fat distribution in early postmenopausal women with and without hormonal replacement therapy. Maturitas 2001;39:125–132.
17. Zahorska-Markiewicz B. An information on the Project ordered by the Ministry of Health and the State Committee for Scientific Research, "Optimisation of therapeutic management in obese persons, based on phenotype features – results of metabolic, psychological and anthropometric studies". Endokr Pol 2001;52(3-Suppl1):242.
18. Glazer G: Long-term pharmacotheraphy of obesity 2000. A review of efficacy and safety. Arch Intern Med 2001;161:1814–24.
20. Lukaski HC: Methods for the assessment of the human body composition: traditional and new. Amer J Clin Nutr 1987;46:537–56.
21. Segal KR, Van Loan M, Fitzgerald PI: Lean body mass estimation by bioelectrical impedance analysis – a four site cross-validation study. Amer J Clin Nutr 1988;47:7–14 (in Polish).
22. Allison DB, Fontaine KR, Manson JE: Annual deaths attributable to obesity in the United States. JAMA 2000;282:1530–8.
23. Simkin-Silverman LR, Wing RR: Weight gain during menopause. Postgrad Med 2000;108(3):47–50.
24. Cox-Reijven PL, Soeters PB: Validation of bio-impedance spectroscopy: Effect of degree of obesity and way of calculating volumes from measured resistance values. Int J Obes 2000;24:271–280.
25. Pietrobelli A, Nunez C, Zingaretti G. et al: Assessment by bioimpedance of forearm cell mass: a new approach to calibration. Eur J Clin Nutr 2002;56:723–28.
26. Olszaniecka-Glinianowicz M, Zahorska-Markiewicz B, Skubacz M: Wpływ trzymiesięcznej kompleksowej kuracji odchudzającej na identyfikację zachowań żywieniowych otyłych kobiet. Endokr Pol 2001; 52(3-Suppl1):165 (in Polish).
27. Skałba P, Dyrek B, Urban T: Wybrane wskaźniki gospodarki lipidowej w surowicy krwi otyłych kobiet z zespołem hiperandrogenizacji jajnikowej. Gin Prakt 2002;10(1):43–46 (in Polish).
28. Heymsfield SB, Gallagher D, Poehlman ET, Wolper C, Noas K: Menopausal changes in body composition and energy expenditure. Exper Gerontol 1994;29(3–4):377–389.
29. Ryan AS, Pratley RE, Elahi D: Resistive training increases fat-free mass and maintain RMR despite weight loss in postmenopausal women. Appl Physiol 1995;79(3):818–23.

Received February 12, 2004
Received in revised form and accepted November 9, 2004