Research Article

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Assessment of Quality of Life in Menopause among Women Who had been Pregnant and gave Birth Compared to Nulliparous Women

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ABSTRACT

With the increase in life expectancy, one-third of a woman's life is related to her post-menopausal life. It is known that 30 to 40% of women experience moderate to severe climacteric symptoms during the perimenopause or in the first postmenopausal years. Gender steroid levels, including endogenous estrogens, are transiently increased in pregnancy. However, it has not been investigated whether this increase, due to parity, has an impact on the later quality of life in menopause.

Purpose: The purpose of the study was the self-assessment of the quality of life of menopausal women in correlation with their parity.

Sample & Method: The study was conducted on a sample of 120 perimenopausal and postmenopausal women for one year, in the gynecological outpatient clinic of the University Hospital in Crete. Data was collected by using questionnaires: The Menopause Quality of Life questionnaire (MENQOL) and HFRS (Hot Flush Rating Scale), in combination with somatometric and socio-demographic data, including parity.

Results: The analysis of the MENQOL questionnaire data showed that nulliparas experienced more severe menopausal symptoms than women who gave birth with statistical significance p=0.024. Additionally, the results of the evaluation of the frequency of vasomotor symptoms, with HFRS, showed that the higher the parity was, the lower the hot flashes (p= 0.027). Respectively, there was a difference in psychological (p= 0.003) and sexual (p= 0.017) symptoms between nulliparous women and those who became pregnant, as the former experienced more severe discomfort. Finally, obesity emerged as an independent risk factor for climacteric symptoms.

Conclusions: Childbearing during a woman's reproductive life appears to have a positive impact on her subsequent quality of life during menopause, reducing the discomfort resulting from vasomoto, psychological and sexual symptoms.

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Introduction

Menopause is a normal physical process characterized by cessation of menstruation, amenorrhea, because of decreased estrogen and progesterone production usually between the ages of 45 and 55 [1]. The menopause normally is established when the woman experiences one year of amenorrhea [2]. With increasing life expectancy, one-third of a woman's life span is life after menopause and a large proportion of the female population correspondingly has no ovarian function [3,4].

Menopause occurs through two processes. Firstly, gonadotropin-responsive ovarian follicles diminish in number due to atresia and ovulation, and secondly, the few oocytes that remain do not respond to gonadotropins [5,6]. Lower levels of sex hormones (estrogen and progesterone) are also produced and cause menopausal symptoms [7].

Menopausal symptoms can be unpleasant, especially because they occur at a time when women have important social, familiar and professional roles. The hormonal alterations that begin during the transition period can affect many systemic organs. More specifically, signs and symptoms of menopause include disturbances related to the central nervous system, changes in body weight, cardiovascular and musculoskeletal changes, urogenital atrophy and sexual dysfunction. The physiological basis of these manifestations is complex and is related, but not exclusively, to the estrogen decrease [8]. The findings, derived primarily from prospective population studies, showed that racial, geographic, and individual factors influence the occurrence and severity of

these symptoms. In addition, recent research has highlighted how certain menopausal symptoms can be associated with the onset of other disorders and therefore could serve as predictors of future health risks in postmenopausal women [9].

About 30-40% of women report that menopausal symptoms reduce performance in the workplace, and the most bothersome symptoms are hot flashes, insomnia, fatigue, and difficulty concentrating [10,11].

The menopausal symptoms a woman experiences are triggered as mentioned above by many factors, including demographic factors (age, race, and ethnicity), psychological factors (stress), health behaviors (smoking and physical activity), and somatometric factors (body mass index). Infertility and reproductive history have been reported in a small number of studies to affect the onset of menopause and the prevalence of menopausal symptoms [12].

Another prospective study including 728 postmenopausal women demonstrated that nulliparous women, were found to be half as likely to report hot flashes as women who had at least one child. They also reported less vaginal dryness [13].

Finally, on the contrary, in a 2011 cohort study conducted in Philadelphia has been found, that nulliparous infertile women were much more likely to experience a decrease in libido and were twice as likely to report vaginal dryness than women who had children. However, a statistically significant effect was found only for Caucasian women and not for African-American women. In this study, there was also no statistically significant association of pregnancy or female infertility with hot flashes [14].

Thus, it is considered necessary for further studies to be conducted, to determine the relationship between pregnancy during reproductive life and menopausal symptoms in women's later life. Menopausal symptoms greatly affect women's quality of life and can significantly degrade it. Thus, in the present study, the quality of life of women who became pregnant was investigated in comparison to nulliparous women, to show whether nulliparity is associated with a greater prevalence of menopausal symptoms. No similar research has been conducted before in Greece.

A greater understanding of the relationship between reproductive history and menopausal symptoms could help the communication between health care providers and their premenopausal patients concerning the menopausal symptoms and their management.

Materials and Methods

The aim of this study was to investigate the quality of life of postmenopausal women who have delivered at least once compared to nulliparous menopausal women. More specific objectives were the correlation of the parity or nulliparity with the frequency of vasomotor symptoms and the other menopausal symptoms (physical, psychological, vasomotor, sexual). Additionally, another objective of the study was the investigation of the body mass index as an independent factor of worsening of menopausal symptoms.

The study sample consisted of 120 women, of which 103 were 45-62 years old and were postmenopausal. They attended the regular outpatient gynecological clinics and the menopause clinic of the University Hospital in Crete and two private clinics in Athens. The inclusion criteria for the study were:

- Women aged 45 – 62 who have not had a menstrual period in the last 2 to 7 years

- They were not taking hormone replacement therapy
- They spoke the Greek language
- They had not had a hysterectomy
- They did not suffer from chronic diseases such as thyroid disease, hypertension and diabetes mellitus (uncontrolled by treatment)
- They did not suffer from polycystic ovary syndrome before menopause

To make additional comparisons, questionnaires were also collected from a control group of 17 women, 40-54 years old, who were not in menopause and met the above criteria (controls). During the research period, 120 women completed questionnaires that were considered valid, 60 of whom were nulliparous and 60 who had become pregnant. 103 of them (85.8%) were menopausal while 17 (14.2%) were perimenopausal.

Also, each woman filled in the question fields referring to somatometric parameters (weight in kg and height in m) based on which the Body Mass Index (BMI) was calculated according to the formula: BMI = weight (kg) / (height)2 (m2), (SI).

The measurement tools in addition to the questionnaire that includes questions on the women's somatometric and sociodemographic data, including the number of interest were: a self-administered questionnaire that assesses the presence and severity of menopausal symptoms and the extent to which they negatively affect quality of life the Menopause specific quality of life questionnaire (MENQOL) and the HFRS (Hot Flush Rating Scale) for hot flashes which were distributed simultaneously to the participants [15,16].

MENQOL was the main research tool. It was chosen as it is considered the most widely used weighted tool to assess the quality of life in menopause. Its Greek version was used.

Statistical analysis was performed by using SPSS V.25.0 and excel 2016.

Results
Social Demographics and Somatometric Factors
Social Demographics
The average age of the women involved in the study was 53 years with a standard divergence of 4.5 years. The younger age reported was 42 years and the older 62 years. 99.1% of participating women were Greek women, 64.2% of participants said they were working and the remaining 35.8% did not work. In terms of their educational level, 31.3% said technical school graduates, 42.6% high school graduates, 11.3% university graduates, 5.2% had a MSc, the same percentage had a PhD and the remaining 4.3% were elementary graduates. On their marital status 31.9% of women were married, 25.2% married with children, 24.4% unmarried, 11.8% were divorced, 4.2% said they live with their partner and the remaining 2.5% were widows. Regarding their smoking habits, 64.7% of women said they did not smoke, 17.6% that they smoke a lot, 16.8% smoke a little and the remaining 0.8% smoke too much.

Finally, in terms of their physical exercise, 64.1% of women said they did not exercise during the last 6 months and the remaining 35.9% that they are training.

Regarding women's interest rates, 50% of women said they had no childbirth, 25% had 2 births, 11.7% had 3 births, 10% had 1 childbirth and the remaining 3.3% had 4 births (Table 1). The

weight of children at birth ranged from 1720 kg to 4200 kg, while most women gave birth with normal delivery (72.2%) and 25.9% with caesarean section.

Table 1: Parity of Participants in the Study

Parity	No	%
0	60	50,0
1	12	10,0
2	30	25,0
3	14	11,7
4	4	3,3
Total	120	100,0

BMI
The average BMI of women was 26.61 with a standard deviation of 5.34. The smallest BMI was 17.3 and the largest 44.08. 36.5% of women were obese (1st degree), 32.2% were normal, 28.7% were obese (2nd degree) and the 2.6% were obese (3rd degree) (Table 2).

Table 2: BMI of Participants in the Study

	No	%
Normal weight (18,5-23,5)	37	32,2
1st degree of obesity (23,6-28,6)	42	36,5
2nd degree of obesity (28,7-40)	33	28,7
3rd degree of obesity (>40)	3	2,6
Total	115	100,0
Total	120	100,0

Scale Results for Quality Life in Menopause (MENQOL) and Hot Flashes Scale
MENQOL Scale

Table 3 shows the means of the four factors grouped and the overall frequency of menopausal symptoms

Table 3: Distribution of Symptoms of Sample Women according to MENQOL Questionnaire

	N	Minimum	Maximum	Mean	Std. Deviation
Vasomotor symptoms	120	0	21	8,61	6,46
Psychosocial symptoms	120	0	47	19,48	12,81
Physical symptoms	120	0	109	51,08	26,34
Sexual symptoms	120	0	21	9,10	6,86
Total symptoms	120	0	189	88,27	43,97

HFRS (Hot Flush Rating Scale)
This questionnaire concerns the hot flashes felt by women and the following table shows the average obtained for each question (Table 4).

Table 4: Distribution of Symptoms of the Women in the Sample according to the HFRS Scale (Hot Flush Rating Scale)

	N	Minimum	Maximum	Mean	Std. Deviation
To what extent do you find hot flashes/ night sweats to be a problem?	115	1	3	1,93	,856
How exhausted do you feel with your hot flashes?	115	1	3	1,82	,768
How often do your hot flashes interfere with your daily routine?	115	1	3	1,78	,747
How well do you deal with them?	115	1	3	1,84	,744
How well do you feel you control your hot flashes?	113	1	3	1,86	,730
How much has your sleep been disrupted by night sweats?	114	1	3	1,79	,758

Control of Research Hypotheses
Research Hypothesis 1: Pregnancy is Related with the Overall Incidence of Menopausal Symptoms
To clarify the above research hypothesis, a comparison of means (t-test) of the MENQOL scale was made between nulliparous menopausal women and menopausal women who became pregnant (Table 5).

Table 5: Mean Values of Menopausal Symptoms among Nulliparous Women and Women Who became Pregnant and Gave Birth atleast Once

	Participants	N	Mean	Std. Deviation	Std. Error Mean
Vasomotor MENQOL	Nulliparous women	60	10,35	6,235	,805
	Women who became pregnant	60	6,87	6,258	,808
Psychosocial MENQOL	Nulliparous women	60	23,25	12,827	1,656
	Women who became pregnant	60	15,70	11,723	1,513
Physical MENQOL	Nulliparous women	60	53,10	24,484	3,161
	Women who became pregnant	60	49,07	28,133	3,632
Sexual MENQOL	Nulliparous women	60	10,58	7,181	,927
	Women who became pregnant	60	7,62	6,241	,806
Total score MENQOL	Nulliparous women	60	97,2833	41,55376	5,36457
	Women who became pregnant	60	79,250	44,80641	5,78448

From the table above, we conclude that the average value of nulliparous women in the frequency of menopausal symptoms is 97.28 (S.A.=41.55), while the women who became pregnant had an average value of 79.25 (S.A.=44, 81). Nulliparous women had a mean value of 23.25 for Psychosocial Symptoms and women who became pregnant had a mean value of 15.70. Nulliparous women had a mean of 53.10 for physical symptoms and women who became pregnant had a mean of 49.07. Nulliparous women had an average of 10.58 for Sexual Symptoms and women who became pregnant had an average of 7.62. Nulliparous women on Total Symptoms had a mean value of 97.28, whereas women who became pregnant had a mean of 79.25.

Table 6: Comparison of Menopausal Symptoms between Nulliparous Women and Women Who Conceived

		Levene's Test for Equality of Variances		t-test for Equality of Means						95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference		Lower	Upper
Vasomotor MENQOL	Equal variances assumed	,046	,831	3,054	118	,003	3,483	1,140		1,225	5,742
	Equal variances not assumed			3,054	117,998	,003	3,483	1,140		1,225	5,742
Psychosocial MENQOL	Equal variances assumed	1,980	,162	3,365	118	,001	7,550	2,243		3,108	11,992
	Equal variances not assumed			3,365	117,057	,001	7,550	2,243		3,107	11,993

Physical MENQOL	Equal variances assumed	1,246	,267	,838	118	,404	4,033	4,815	-5,501	13,568
	Equal variances not assumed			,838	115,794	,404	4,033	4,815	-5,503	13,570
Sexual MENQOL	Equal variances assumed	3,226	,075	2,415	118	,017	2,967	1,228	,534	5,399
	Equal variances not assumed			2,415	115,751	,017	2,967	1,228	,534	5,400
Total MENQOL	Equal variances assumed	,552	,459	2,286	118	,024	18,03333	7,88916	2,41065	33,65602
	Equal variances not assumed			2,286	117,336	,024	18,03333	7,88916	2,40974	33,65693

From the above table (Table 6) it was shown that there is statistical significance between the variables as sig.=0.024 [t(118)=2.286]. More specifically, it appears that nulliparous menopausal women have more severe menopausal symptoms than menopausal women who have become pregnant.

Research Hypothesis 2: The Number of Parity Correlates with the Frequency of Symptoms (Physical, Psychological, Vasomotor, Sexual)

Table 7: Mean Score of Menopausal Symptoms by Category Based on Number of Deliveries

		N	Mean	Std. Deviation
Vasomotor MENQOL	0	60	10,35	6,24
	1	12	8,58	7,81
	2	30	6,17	5,81
	3	14	7,21	6,20
	4	4	5,75	5,91
	Total	120	8,61	6,46
Psychosocial MENQOL	0	60	23,25	12,83
	1	12	17,25	13,68
	2	30	16,37	12,67
	3	14	12,79	8,05
	4	4	16,25	11,38
	Total	120	19,48	12,81
Physical MENQOL	0	60	53,10	24,48
	1	12	61,83	36,50
	2	30	43,70	25,09
	3	14	46,00	25,73
	4	4	61,75	22,97
	Total	120	51,08	26,34
Sexual MENQOL	0	60	10,58	7,18
	1	12	8,08	6,71
	2	30	9,00	6,54
	3	14	5,29	5,06
	4	4	4,00	3,74
	Total	120	9,10	6,86

Tables 7 shows that regarding the vasomotor symptoms, the women who were nulliparous collected M.O. 10.35, women with 1 delivery collected M.O. 8.58, women with 2 deliveries collected M.O. 6,17, women with 2 deliveries collected M.O. 7.21 and women with 4 deliveries collected M.O. 8.61.

Regarding psychological symptoms, women who were single collected M.O. 23,25, women with 1 delivery collected M.O. 17,25, women with 2 deliveries collected M.O. 16,37, women with 2 deliveries collected M.O. 12.79 and women with 4 deliveries collected M.O. 16.25.

Regarding the physical symptoms, the women who were sterile collected M.O. 53.10, women with 1 delivery collected M.O. 61.83, women with 2 deliveries collected M.O. 43.70, women with 2 deliveries collected M.O. 46 and women with 4 deliveries collected M.O. 61.75.

Regarding sexual symptoms, the women who were sterile collected M.O. 10.58, women with 1 delivery collected M.O. 8.08, women with 2 deliveries collected M.O. 9, women with 2 deliveries collected M.O. 5.29 and women with 4 deliveries collected M.O. 9,10.

Table 8: Comparison of Mean Symptoms between the Group of Nulliparous Women and the Group of Women Who Conceived by Category

		Sum of Squares	df	Mean Square	F	Sig.
Vasomotor MENQOL	Between Groups	420,751	4	105,188	2,660	,036
	Within Groups	4547,840	115	39,546		
	Total	4968,592	119			
Psychosocial MENQOL	Between Groups	1872,351	4	468,088	3,049	,020
	Within Groups	17653,574	115	153,509		
	Total	19525,925	119			
Physical MENQOL	Between Groups	4083,050	4	1020,762	1,496	,208
	Within Groups	78470,117	115	682,349		
	Total	82553,167	119			
Sexual MENQOL	Between Groups	452,443	4	113,111	2,525	,045
	Within Groups	5152,357	115	44,803		
	Total	5604,800	119			

From the table above, obtained through the Anova statistical test, it appears that there is statistical significance, in terms of the difference in the average symptoms between nulliparous women and women who became pregnant for three out of the four symptom categories, specifically in vasomotor, psychological and sexual symptoms

Research Hypothesis 3: Number of Parity Correlates with Vasomotor Symptoms (Hot Flashes)
To investigate the above research hypothesis, Pearson Correlation r was conducted. From this comparison, a correlation emerged between the frequency of vasomotor symptoms (Flashes) and the number of deliveries. More specifically, r=-0.207, sig.,027 was obtained, i.e. it is found that there is a slight negative correlation between the variables, i.e. as births increase, hot flashes decrease (Table 9).

Research Hypothesis 4: Low or High BMI is an Independent Predictor of Worsening Menopausal Symptoms

Table 9: Correlation of Total Frequency of Hot Flashes as Measured by the HFRS Scale in Relation to the Number of Deliveries

		Number of Deliveries	Total_HFRS
Number of deliveries	Pearson Correlation	1	-,207*
	Sig. (2-tailed)		,027
	N	120	115
Total HFRS	Pearson Correlation	-,207*	1
	Sig. (2-tailed)	,027	
	N	115	115

Table 10: Comparison of Total Menopausal Symptoms as Derived from the MENQOL in Women of Different BMI

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Normal weight (18,5-23,5)	37	71,4324	36,25798	5,96078	59,3434	83,5214	,00	157,00
1st Grade of obesity(23,6-28,6)	42	91,5000	44,27037	6,83107	77,7044	105,2956	2,00	189,00
2nd Grade of Obesity (28,7-40)	33	109,0909	43,70524	7,60811	93,5937	124,5881	17,00	177,00
3rd Grade of Obesity (>40)	3	83,0000	36,37307	21,00000	-7,3557	173,3557	41,00	104,00
Total	115	89,8696	43,57641	4,06352	81,8198	97,9194	,00	189,00

From the table above (Table 10), it can be seen that women belonging to the 2nd degree obesity had a higher average of menopausal symptoms (109.09, T.A.=43.71), followed by women with 1st degree obesity (91.50, T.A..=44.27), women with 3rd degree obesity (83, T.A.=36.37) and finally women with normal weight (71.43, T.A.=36.25). It should be noted though that the number of women in the highest obesity scale was too low to draw a valid conclusion.

Discussion
Nulliparous menopausal women were found to have statistically significantly more menopausal symptoms compared to women who had a childbirth based on their responses to the MENQOL self-administered questionnaire, with the mean value for total menopausal symptoms for the nulliparous menopausal women being 97.28, while for women who became pregnant 79.25 (p=0.024).

When comparing mean symptom values between menopausal women, regardless of the number of interests, and perimenopausal women (controls), no statistically significant difference emerged. This can be interpreted as the control group used women aged 40 to 54 who had menstruated within the last year but are considered perimenopausal and the symptoms, of perimenopause are equivalent or greater in intensity to those of early menopause [17,18].

Regarding vasomotor symptoms (hot flashes), which can be associated with menopause and were investigated with the HFRS scale, it was found that as the number of deliveries increases, they decrease. That means, they present a negative correlation with the number of interest (p=0.027). This may be related to the transient increase in estrogen during pregnancy, which probably contributes to a smoother hormonal transition at menopause. This is supported by the literature according to which strong fluctuations in sex hormone levels are associated with more severe vasomotor symptoms [19].

When investigating the correlation between the number of deliveries and the four dimensions of the MENQOL questionnaire, i.e. vasomotor, psychological, physical and sexual symptoms, a statistically significant difference was found in the mean values of symptoms in three out of the four sectors of the questionnaire (vasomotor, psychological and sexual symptoms) among nulliparous postmenopausal women compared to those who have had children.

This study does not confirm the research hypothesis that as the number of births increases, the total menopausal symptoms decrease in later life, as no statistical significance emerged. More specifically, women with 3 deliveries showed the lowest average value of symptoms (M.O. 71.29), followed by women with 2 deliveries (M.O. 75.23), women with 4 deliveries (M.O. 87, 75), women with one delivery (M.O 95.75) and finally with the highest frequency of total symptoms the nulliparous (M.O 97.28).

Regarding the somatometric data of the women, a comparison was made of the mean values of the symptoms of the women with different body mass index. From this control it was established that the increased body mass index seems to be an independent risk factor, as women with obesity of the 2nd and 1st degree declared more intense symptoms, a fact which is also confirmed by previous studies [19,20].

Compared to previous studies, it seems that the present results do not agree with the results of the prospective study conducted by Hess et al. in 2008, which concluded that nulliparous women were half as likely to report hot flashes as women who had at least one child [9]. However, they agree with the results of the cohort study conducted by Nelson et al. in 2011 where it was found that nulliparous infertile women were significantly more likely to experience decreased libido and were twice as likely to report vaginal dryness than women who had children, which mean that they experienced more sexual symptoms [8].

Conclusions
The nulliparous perimenopausal and menopausal women who participated in this study appear to experience menopause-related discomfort more intensively compared to those who gave birth during their childbearing years. Therefore, the quality of life of nulliparous postmenopausal women appears to be worse than that of women who have conceived.

Recommendations
Based on the findings of the present study, some suggestions can be made to improve the quality of life and psychology of menopausal women and to reduce the frequency of hot flashes.

More specifically, because an increased body mass index appears to worsen menopausal symptoms, maintaining a balanced diet and regular exercise during the menopause transition can significantly improve women's quality of life [21-24].

As the present study found that childbearing improves the quality of life of menopausal women by reducing vasomotor, psychological and sexual symptoms, it should be promoted by the state, which should take measures that facilitate working mothers (both in the public and private sectors), so that motherhood does not become a brake for a woman who at the same time wishes to develop professionally.

Finally, women who experience symptoms that negatively affect their quality of life in menopause should be guided to contact the appropriate health professionals, so that they can receive the corresponding counseling according to their case and their symptoms, e.g. avoiding high temperatures for hot flashes or medication (hormone replacement therapy, antidepressants, etc. [25-27].

Conflicts of Interest: The authors report no conflicts of interest.

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