

ORIGINAL ARTICLE

Physical activity, early first delivery and residence as parameters for breast cancer prevention: an observational study

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Summary

Purpose: To determine the impact of physical activity, obesity, history of maternity, residence and socioeconomic status on the prevention of breast cancer (BC).

Methods: We established a questionnaire in order to record several potential parameters associated with BC in women aged between 30 and 60 years. The parameters evaluated in the present study were physical activity (years and days per week), obesity, age of menarche, age of first delivery, breast feeding, family history of BC, vegetarian diet, residence and socioeconomic status.

Results: A total of 120 women who worked in administrative jobs in large hospitals in Athens entered the study. Eleven of

them had a history of BC. The multivariate logistic regression analysis revealed as independent risk variables for BC the following: family history of BC ($p < 0.001$), absence of physical activity ($p < 0.001$), first delivery after 35 years ($p = 0.011$) and residence in city center ($p = 0.036$).

Conclusion: According to our results, because women who have family history of BC, sedentary and delivery after 35 years have higher risk to develop BC, risk reduction methods for these groups may need to be identified and implemented. Further studies are needed for the confirmation of our results.

Key words: breast cancer, prevention, physical activity, residence, maternity history

Introduction

Breast cancer (BC) is the main cause of death for women worldwide. Some risk factors, such as family history, can't be eliminated, whereas there are some others that definitely can be avoided [1]. Several researchers have published data concerning the association between physical activity,

obesity, menarche, and maternity history with BC [2,3].

The aim of the present study was to investigate the potential impact of physical activity, obesity, maternity history, residence, vegetarian diet and socioeconomic status on the prevention of BC.

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Methods

We established a questionnaire in order to record several potential parameters associated with BC in women aged between 30 and 60 years. The parameters evaluated in the present study were physical activity (years and days per week), obesity, age of menarche and menopause, age of first delivery, breast feeding, family history of BC and socioeconomic status. The inclusion criteria for the study were as follows:

- Women with age ranging between 30 and 60 years.
- Women working in either public or private sector in Athens.
- Women with excellent performance status.
- At least one delivery.

Exclusion criteria were: women with psychiatric disease, without Greek as native language and comorbidities like immunodeficiency, diabetes, orthopedic disease and cardiac malfunction.

The study was designed according to the Declaration of Helsinki as a statement of ethical principles for medical research involving human subjects. All subjects

signed an informed consent before study entry. Moreover, the anonymity of the subjects was confirmed by a database that was made for the above purposes, in which only the principal investigator had the authority to look through. The study took place between March 2016 and April 2017.

The questionnaire was offered to 135 women who were working in administrative jobs of large hospitals either in public or private sector in Athens, Greece. Finally, 120 women filled it thoroughly and eventually entered the study. The rest of the subjects either filled it partially or denied to participate.

In terms of the questionnaire, we have encoded some parameters for practical reasons to be included in the analysis.

The cut-off point for the menarche was taken as 14 years, while in a similar way the cut-off point for the first delivery was taken as 35years. For the socioeconomic status, the following grading was used: 1 for high school, 2 for university and 1 for low and 2 for high income. The final score was the summation of the above.

Statistics

The significance level of p value was set at 0.05. For assessing the potential impact on the incidence of BC of all relevant factors, logistic regression analysis was performed. The regression model was conducted in two stages. In stage one, a univariate regression analysis was estimated individually for each possible significant factor. In stage two, all significant factors from univariate analysis were entered into a forward stepwise selection routine (likelihood ratio criterion, χ^2 model, p for entry=0.05). All statistical analyses were performed with the SPSS ver. 10 software (Chicago, IL, USA).

Results

The subject characteristics are shown in Table 1. Among all women, 62 (51.7%) were postmenopausal. The univariate and multivariate analysis are shown in Table 2. In univariate analysis, family history, physical activity, early menarche, late first

Table 1. Subjects' characteristics

Variables	N=120
Median age, year (range)	44 (31-60)
Breast cancer, n (%)	11 (9.2)
Family history of breast cancer, n (%)	25 (20.8)
Obesity, n (%)	37 (30.8)
First delivery (<35 years), n (%)	12 (10)
Number of children (only mean value)	1.43
Early menarche (<12years), n (%)	23 (19.2)
Breast feeding (yes/no), n (%)	14 (11.7)
Residence	
City vs. countryside, n (%)	78 (65)
Vegetarian diet, n (%)	11 (9.2)
Socioeconomic status	
High school vs. University, n/n	41/79
Low income vs. high income, n/n	59/61

Table 2. Univariate and multivariate analysis

Parameter	Univariate analysis			Multivariate analysis		
	Odds ratio	95% CI	P	Odds ratio	95% CI	P
Family history of breast cancer	3.45	2.11 - 4.82	<0.001	2.75	1.93 - 3.82	<0.001
Physical activity	2.94	1.97 - 3.78	<0.001	1.84	1.23 - 2.89	<0.001
Obesity	1.16		0.086	-		
Early menarche (<12 years)	1.29	1.11 - 2.30	0.022	1.16		0.14
First delivery (>35 years)	2.12	1.46 - 3.87	0.006	1.49	1.13 - 2.21	0.011
No breast feeding	1.12		0.15	-		
Vegetarian diet	1.37	1.14 - 1.89	0.036	1.15		0.16
Residence (city center vs countryside)	1.47	1.09 - 2.81	0.0132	1.22	1.09 - 2.41	0.036
Socioeconomic status	1.06		0.57	-		

95% CI: 95% confidence interval

delivery and city residence showed a significant impact to the incidence of BC ($p < 0.05$). In multivariate analysis, family history of BC, physical activity, early first delivery and city residence showed a significant impact on the incidence of BC, however, early menarche lost its significant value.

Discussion

Breast cancer is considered the bugbear for every woman. The development of BC is a multifactorial process [2,3]. Family history of BC remains the main predictive factor for this disease [1], while in our study had the highest odds ratio (OR) (2.75 OR; $p < 0.001$). On the other hand, physical activity appears to be protective and should be encouraged in all ages, while it reduces the levels of circulating estrogens in the organism, enhances the immune function and has preventive action against BC [4]. Moreover, in a previous study it was observed a statistically significant ($p = 0.022$) inverse association of mammographic breast density measured by the BIRADS classification method and recreational exercise with an OR = -0.10 [3]. In our study the physical activity maintained the preventive significance in both univariate and multivariate analysis.

Early menarche (before the age of 12 years) is positively related with BC. Our analysis showed a significant impact in univariate analysis, although no significant impact was noted in multivariate analysis.

First birth at the age of 35 years is associated with 40% higher risk as compared with a first birth before the age of 20 years [5]. Moreover, first time full pregnancy seems favorable factor for BC prevention [6]. Our results showed also a significant risk for BC in both univariate and multivariate analysis for delivery after 35 years. Breast never used for lactation is at risk to become cancerous [7], however in our study no significant impact was noted in terms of breast feeding.

Obesity and high consumption of animal fat are associated with BC risk, particularly in post-

menopausal women [4]. Additionally, Mediterranean and plant-based food can lead to long-lasting prevention against BC [8]. Our findings did not show any significant impact of obesity. On the contrary, there was significant risk of 1.37 ($p = 0.036$) in vegetarian food for univariate but not for multivariate analysis.

Women living in metropolitan cities, where there is no dark at nights, have an increased risk of BC related to the melatonin produced by pineal gland suppressed by light and obviously producing estrogens, potentially leading to carcinogenesis [9]. Moreover, the lifestyle and diet in metropolitan cities might also be related with increased risk of BC [10]. Our multivariate analysis revealed a significant risk of 1.22 ($p = 0.036$) for women who lived in metropolitan cities.

BC is also associated with higher socioeconomic status, mainly with higher education level, since most of the patients have no children under the age of 35 [11,12]. On the other hand, in our study no significant risk was noted in both univariate and multivariate analysis.

The limitations of our study are that it included a small number of patients and was based on a questionnaire.

Beyond any well-known risk factors [1,2,6,13], and based on our findings, we conclude that women who have family history of BC, sedentary and delivery after 35 years, have higher risk for BC development, therefore risk reduction methods for these groups may need to be identified and implemented. Further studies are needed to confirm our results.

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Conflict of interests

The authors declare no conflict of interests.

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