

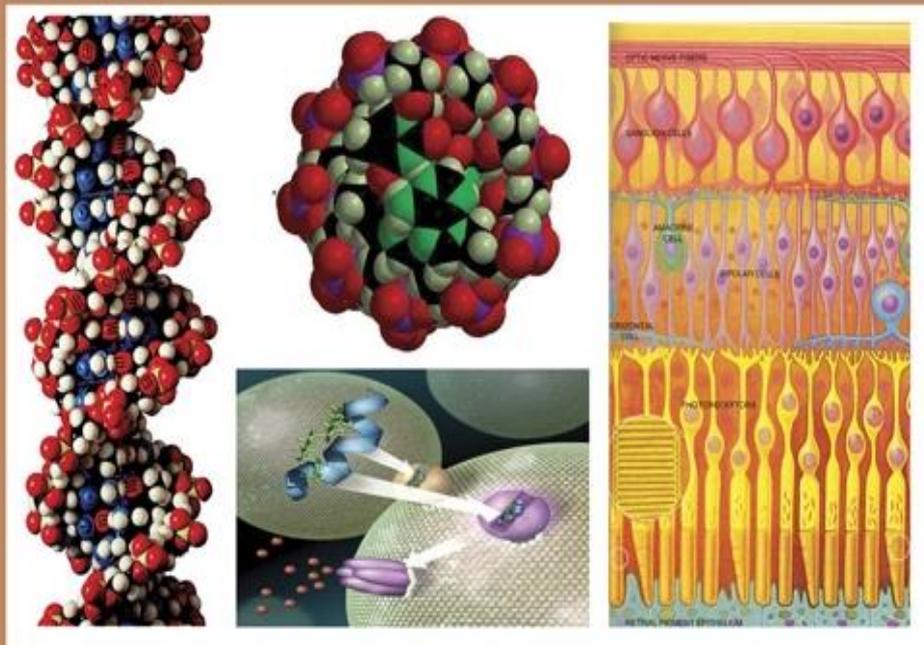


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Characterization of Epidemiological, Clinical, Histopathological and Nutritional Profile of Female Breast Cancer in Western Algeria: About A Case-Control Study

Zeggai Souad^{1*}, Moulessehou Soraya², Tiboura Ghania¹, Hamri Walid¹, Miche Khalida² and Mehyaoui Imane²

¹-Laboratory of Nutrition, Pathology, Agro Biotechnology and Health, Department of Biology, Faculty of Life Sciences, Djillali Liabes. 12 Rue Oulhaci Mokhtar. University of Sidi Bel Abbes, Algeria.

²- Laboratory of Biototoxicology, Department of Biology, Faculty of Life Sciences, Djillali Liabes. 12 Rue Oulhaci Mokhtar. University of Sidi Bel Abbes, Algeria

*E. Mail: souad.zeggai@yahoo.com

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ABSTRACT

Introduction: Breast cancer causes a profound upheaval of the body and mind. Dietary and lifestyle factors play a major role in the epidemiology of this pathology. **Objective:** The objective of this work was to characterize the epidemiological, clinical and histopathological profiles of the study population, and to analyze the hypothesis of a relationship between relatively high consumption of foods rich in fatty acids and breast cancer. **Subjects and methods:** We opted for a case-control study. It included 324 subjects. Data were collected from a basic questionnaire and a dietary survey. These data were completed following a review of the patients' medical records. **Results:** The average age of our patients was (49,66 ±10,72). Clinical data revealed a predominance of the location of breast carcinomas in the left breast (54,23%) compared to the right breast (43,84%). SBR classification showed that GII is the most common histopronostic grading, it accounts for (67,70%) of cases. Determination of Hormonal Receptor and HER2 status objectified a predominance of RH+/HER2- status with a rate of (59,45%). Patients with triple-negative status were (3,79%). Nutritional data revealed a positive association between a diet rich in fatty acids such as red meat (P=0,003) and dairy products (foods that are rich in long-chain Polyunsaturated Fatty Acids) and breast cancer. **Conclusion:** Of multiple origins, breast cancer is related to a set of factors. However, it is important to put lifestyle at the center of research because, currently, recent studies focus attention mainly on the association between high fat intake and breast cancer.

INTRODUCTION

Of all life-destroying cancers, breast cancer is the most common cancer in women in most countries. Every year, more than one million new cases occur worldwide, representing 30% of new cases of female cancer in industrialized countries and 14% in developing countries. It contributes to 8.6 million new cases and nearly 4.2 million deaths (GLOBOCAN, 2018).

It benefits from the most optimal management early detection and increasingly appropriate treatments, and the mortality rate from breast cancer has been decreasing in recent years. Despite this, breast cancer remains the first cause of death by cancer in women and therefore remains a real public health problem. Its incidence is increasing worldwide due to longer life expectancy, increased urbanization and adoption of Western lifestyles (Jéhannin-Ligier *et al.*, 2018).

In Algeria, breast cancer ranks first in terms of incidence and mortality, 21.5% per 100,000 at a rate of 12536 cases per year. The mortality rate is 12.5% per 100,000 at a rate of 38886 deaths per year. Thus, it remains the main reason for consultations in oncology (GLOBOCAN, 2020; IARC, 2020).

Currently, science does not know of a single cause for breast cancer. In fact, the disease is attributed to a series of risk factors. It is multifactor cancer. Some of these are known as modifiable risk factors (related to lifestyle), such as exposure to exogenous hormones, a sedentary lifestyle, weight gain,... etc. Others do not depend on lifestyle but are largely linked to genetics (non-modifiable or biological risk factors) such as early menstruation and late menopause, family and personal history. The risk of developing breast cancer is very uneven from one country to another, leading to the hypothesis that risk factors vary considerably from one population to another (Clavel-Chapelon and *al.*, 2008).

The links between breast cancer and nutrition are very old and difficult to estimate as its effects are complex. In the etiology of breast cancer, several epidemiological and experimental studies conducted throughout the world have led to the involvement of lifestyle factors, including nutritional factors. Indeed, diet, nutrition, metabolic and hormonal imbalances, excessive energy consumption, obesity, overweight and

physical inactivity contribute greatly to the increase in the incidence rate of cancer worldwide. (Gerber, 2009; Reik and *al.*, 2006;).

Within this problematic « Cancer and nutrition », the main objective of our study was to characterize the epidemiological, clinical, and histopathological profiles of the studied population, thus, to analyze the hypothesis of a relationship between the relatively high consumption of foods rich in fatty acids, and breast cancer.

MATERIALS AND METHODS

We opted for an epidemiological study of case-control type, it took place within the following services: Oncology and Senology of the Public Hospital Establishment (EPH) Dahmani Slimane, Gynecology of the Maternity and the Anticancerous Center (CAC) of Sidi Bel Abbes (Western Algeria). It included a population of 324 subjects: 162 patients with breast carcinoma and 162 control women presumed healthy. The selection of our study population was made according to well-defined criteria.

Data were collected from a basic questionnaire (including the socio-demographic, body (weight, height) and gynecological-obstetrical characteristics, family history of breast cancer, history of benign breast disease,... etc.) and a dietary survey (on the usual frequency of consumption of each food item from a predefined list). The clinical and anatomical-pathological characteristics of the pathology were collected from the patients' medical records. Informed consent was obtained from each person concerned.

Ethical Considerations:

All precautions aimed at respecting the anonymity and confidentiality of the information were rigorously respected. The consent of the women before the administration of the questionnaire was a rigorous element in our work.

Data Management and Statistical Analysis:

The data set was analyzed using SPSS 20.0 (Statistical Package for the Social Sciences, IBM Corporation; Chicago, IL. 2011). Descriptive statistics were produced to characterize the subjects. The distribution of socio-geographic, gynecologic-obstetric, lifestyle and dietary characteristics was compared between cases and controls by Student's t-test. A p-value <0.05 was considered statistically significant. Also, Excel software (Microsoft Excel 2007) was used for a schematic representation.

RESULTS AND DISCUSSION

Epidemiological Profile:

Age:

The results in Figure 1 indicate that the average age of our patients was (49,66 ±10,72) compared to that of controls which were (45 ± 11,13). Patients aged 46-

55 years and those aged 36-45 years have the highest frequencies with (30,9%) and (29%) respectively. These rates decrease with age. In our series, we found that the risk of breast cancer occurs relatively close to menopause, more precisely it occurs at the perimenopausal age when sex hormones are in disarray. Our results are not in perfect agreement with those of the *French E3N* cohort which emphasized an increased risk after menopause. The researchers analyzed the links between different behavioral risk factors and the occurrence of breast cancer in 67 634 women followed for 15 years. If these risk factors were linked to (39,9%) of the cases of cancer in young women, they were involved in (53,3%) of the cases that occurred after menopause. Overall, these results show the major role of behavioral factors in the occurrence of breast cancer after menopause (Dartois and *al.*, 2016).

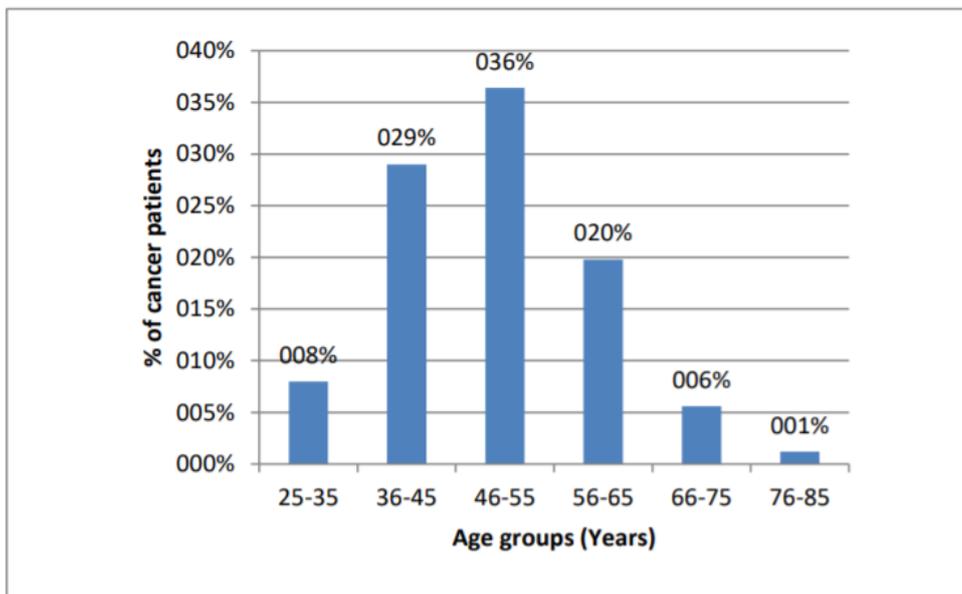


Fig 1. Distribution of cancer patients according to age.

Family History of Breast Cancer:

Again, we noted that more than half of the cases (70,4%) and (82,1%) of the controls had no family history of breast

cancer. However, 1st-degree family history was observed in (13,6%) of cases and (4,3%) of controls, and a 2nd-degree history in (12,9%) of patients and (8%) of

controls. These rates decrease when referring to 3rd- and 4th-degree family history. These results are considered statistically significant between the two groups ($p=0,011$) (Fig 2).

In contrast to our results, those of

the (CGHFBC, 2001) in an epidemiological study showed that the risk increases by 80% when there is one 1st degree history, by three times if two 1st degree histories coexist and by four times if there are three or more.

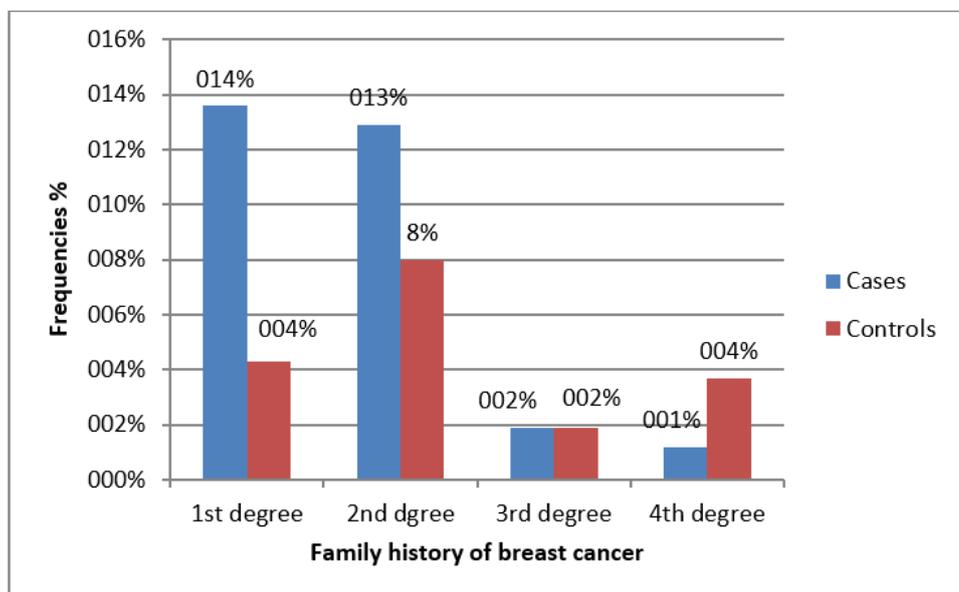


Fig 2. Distribution of patients and controls according to family history of breast cancer

BMI:

The body mass index (BMI) was collected from 145 patients, the mean is estimated at $(26.91 \pm 5.024 \text{ Kg/m}^2)$. Figure 3 showed a slight predominance of the appearance of breast cancer in patients with a normal weight (40%) followed by patients who are overweight (32,41%). The comparison of BMI between cases and controls did not show any significant difference ($p=0,586$).

The study by Jee *et al.* found that higher BMI could increase breast cancer risk in the Korean population. Conversely, the study by Palmer *et al.*, demonstrated that lower BMI was associated with breast cancer risk. However, no studies have examined the exact dose-response relationship between BMI and breast

cancer risk before. Unlike previous studies and recent evidence, this meta-analysis aimed to explore the dose-response relationship between BMI and breast cancer risk (Liu *et al.*, 2018).

Notably, further subgroup meta-analysis found that the relationship between BMI and breast cancer risk differed based on menopausal status. For premenopausal women, a higher BMI could decrease breast cancer risk. However, higher BMI is associated with increased breast cancer risk in postmenopausal women. This positive association was speculated to result from the higher level of estrogen derived from the aromatization of androstenedione within the larger fat reserves of women of higher BMI (Hankinson *et al.*, 1995).

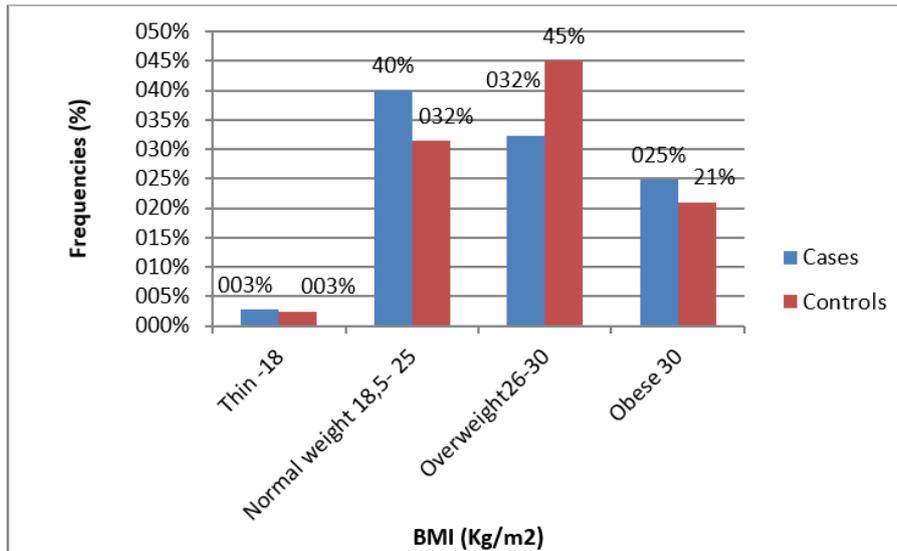


Fig 3. Distribution of patients and controls by BMI

Gynecological-Obstetrical Parameters:

The gynecological-obstetrical characterization is summarized in Table 1. No statistically significant difference was found between the two groups concerning the age of the first menstruation. The majority of women had their first menstrual period between 11 and 14 years (70,4%) for both groups. However, concerning the age at menopause, we noted a significantly higher difference ($p < 0.0001$) in cases over 50 years (35,8%) compared to controls (9,3%).

According to the literature, early age at menarche is considered as a risk factor for this pathology. Indeed, many studies show that the occurrence of the first menstrual period before the age of 12 years increases the risk of (RR of 3). The biological basis of this association corresponds to early and prolonged exposure to a hormonal climate, particularly estrogen and progesterone that exists during the period of ovarian activity (Merviel *et al.*, 2011).

A meta-analysis published in 2012 compiling 117 epidemiologic studies of 118,964 women who developed breast cancer and 306,091 control women, highlights that the risk increases by a

factor of 1.05 for each year of earlier puberty, and independently by a factor of 1.02 for each year of later menopause (CGHFBC, 2012).

It is true that multiparity has the advantage of protecting women against breast cancer. However, the reproductive period seems to have a double effect: the risk is increased immediately after delivery and then gradually decreases. Pregnancy causes accelerated differentiation of breast tissue and rapid proliferation of the epithelium. The changes initiated during the first pregnancy, especially if it occurred early, are accentuated by each subsequent pregnancy, and the development of breast cancer is related to the rate of proliferation of the breast epithelial cells and inversely to the degree of differentiation (Russo *et al.*, 2000). Moreover, in our study, we estimated a predominance of multiparity in cases and controls, whose rates are, respectively, the following: (79,6%) and (84,6%). Our data indicate that the late age of first pregnancy affects (22,2%) of cases and (13%) of controls.

In our population, most women were breastfeeding in the cases and controls with (60,5%) and (65,4%)

respectively, and a predominance of non-breastfeeding patients in the cases than in the controls with (39,5%) versus (34,6%). In general, the longer a woman breastfeeds, the more protected she is from breast cancer. The biological basis for an inverse association between breastfeeding and breast cancer risk is not fully understood. However, several mechanisms are plausible. Lactation produces endogenous hormonal changes, in particular a reduction in estrogen and an increase in prolactin production, which are thought to decrease the cumulative estrogen exposure in women. Therefore, lactation would suppress the onset and development of breast cancer (Nkondjok *et al.*, 2005).

The use of contraception was specified in the cases and controls by almost similar frequencies (71,6%) and

(74,7%), while (28,4%) of cases and (25,3%) of controls stated that they had never used a contraceptive method. These results are significant ($p= 0,027$) and show a frequency of breast cancer occurrence of about (43,8%) in cases where the duration of oral contraceptive use exceeds 5 years. Our results are reinforced by a meta-analysis of 54 studies, it appears that the use of a combined pill presents a relative risk of occurrence of breast cancer of 1,24 (Merviel *et al.*, 2011).

In addition, another more recent study (in a population of young women 24 to 43 years old) showed that oral contraception slightly increased the risk of breast cancer, but this increase was linked to a specific type of estrogen-progestin (the triphasic pill), hence the interest of a deeper investigation (Hunter *et al.*, 2010).

Table 1: Gynecological-obstetrical characterization of the study population.

	Cases N=162(%)	Controls N=162(%)	P*
Age of menarche	13,84 ± 1,74	13,69 ± 1,58	0,072
-11 years	0	05 (03,1)	
11-14 years	114(70,4)	114 (70,4)	
+14 years	48 (29,6)	43 (26,5)	
Menopause	47,05 ± 5,33	47,98 ± 4,14	<0,0001
Non menopausal	53(32,7)	52 (32,1)	
-48 years	35(21,6)	68 (41,9)	
48-53 years	16 (09,9)	27 (16,7)	
+ 53 years	58 (35,8)	15(09,3)	
Parity	3,21 ± 2,47	03,60 ± 2,66	0,510
Nulliparity	33 (20,4)	25 (15,4)	
Multiparity	129 (79,6)	137 (84,6)	
1-3 children	54(33,3)	57 (35,2)	
+3 children	75 (46,3)	80 (49,4)	
Age of 1st pregnancy	24,17 ± 5,91	23,07 ± 4,63	0,050
Never	33 (20,4)	25 (15,4)	
-22 years	48 (29,6)	56 (34,6)	
22-27 years	45 (27,8)	60 (37)	
+27 years	36 (22,2)	21 (13)	
Natural breastfeeding	7,13 ± 6,82	10,11 ± 7,16	0,009
Never	64 (39,5)	56 (34,6)	
Yes	98 (60,5)	106 (65,4)	
- of 6 months	37 (22,8)	19 (11,7)	
6 -12 months	27 (16,7)	32 (19,8)	
13-24 months	34 (21)	52 (32,1)	
+24 months	0	03 (01,8)	
Oral contraception	08,53 ± 6,75	11,75 ± 7,57	0,027
Never	46 (28,4)	41 (25,3)	
Yes	116(71,6)	121 (74,7)	
-5 years	45 (27,8)	28 (17,3)	
+5 years	71 (43,8)	93 (57,4)	

P* value <0.05 was considered statistically significant.

Clinical and histopathological profiles
Location of the tumor:

The location of a breast tumor differs from one patient to another. In our population, the left breast was the most affected by tumor invasion (54,23%) compared to the right breast (43,84%). The involvement of both breasts

simultaneously was much less important with a frequency of (01,90%). These results (Fig.4) do not confirm those of the study of (Mansouri, 2017) on a population affected by breast cancer where he estimated a predominance of location on the right breast with (48.9%) compared to the left breast (42, 2%).

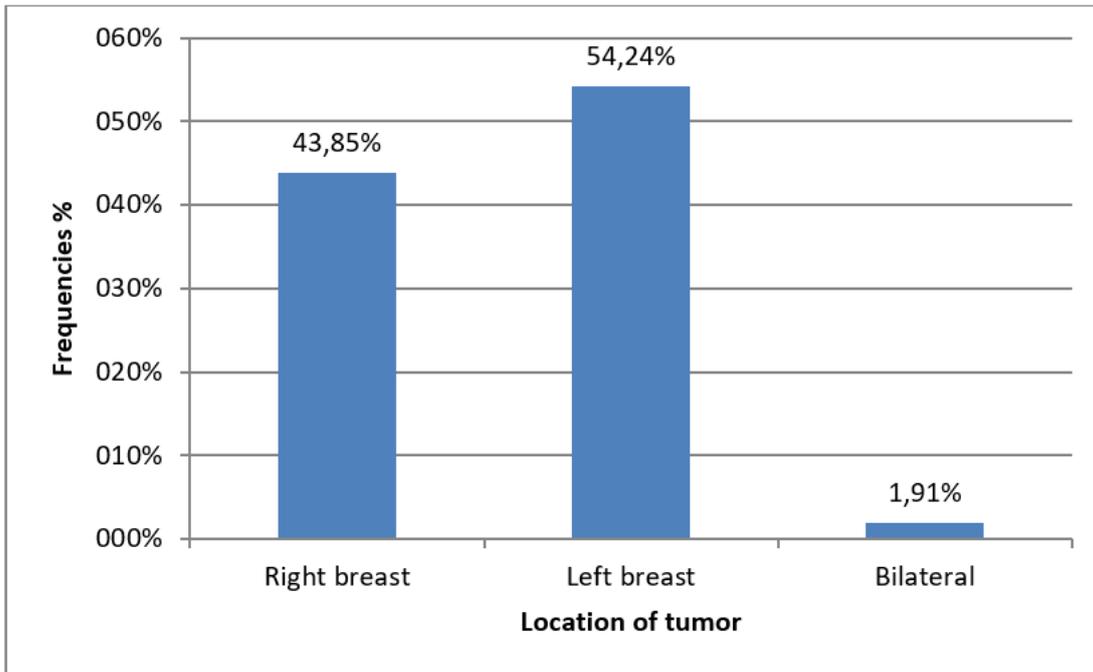


Fig 4. Distribution of cancer patients by location.

Histopronostic Stage:

According to Scarff-Bloom-Richardson (SBR) histopronostic classification, grade II was dominant (67.70%) followed by grade III (26.07%) while grade I represented only (6.23%). It should be noted that the histological grade (from I to III) of tumors is based on morphological parameters; it indicates the level of differentiation of cancer. Grade I cancers are better differentiated while grade III cancers are less differentiated.

Undifferentiated cancers usually have a more severe and rapid course than progression than differentiated cancers, but they are also generally more sensitive to treatment. (Marina, 2005).

Our results (Fig.5) are similar to those of (Abbass *et al.*, 2011) who estimated that the highest proportions were those of histological grades II and III: (56.1%) and (39.4%) respectively, while the proportion of histological grade I is low and it did not exceed (14%).

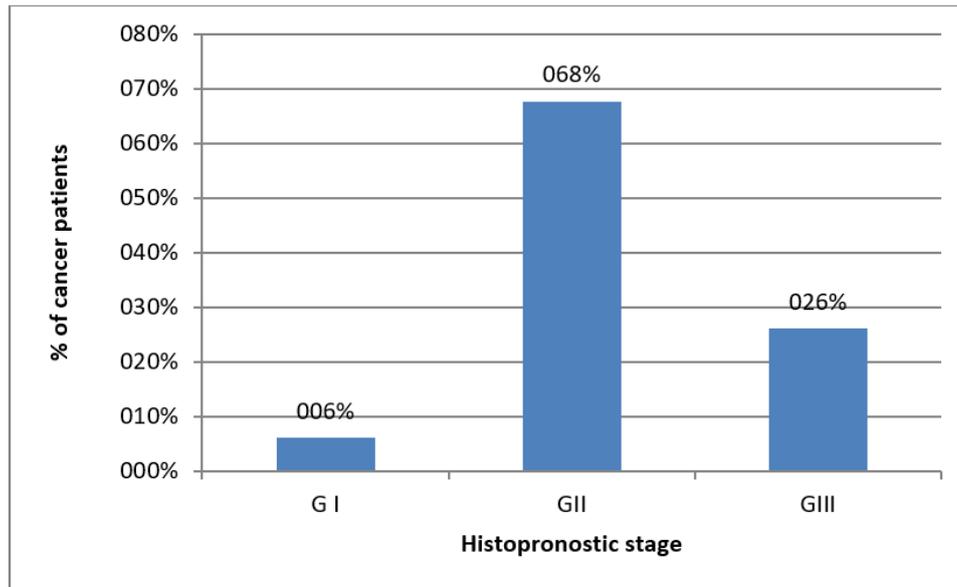


Fig 5. Distribution of cancer patients by SBR grading.

Expression of HR and HER2:

Determination of Hormone Receptor and HER2 status of breast carcinomas showed a predominance of RH+/HER2- status with (59,45%), followed by RH+/HER2+ status with (32,97%) of cases and RH-/HER2+ with (3,79%). Triple-negative patients were (3,79%).

Our results (Fig.6) are in agreement with those of (Hajji *et al.*, 2020) who explained that HR was positive in 68% of cases and HER2 was overexpressed in 29 patients (40,3%).

Nine patients (12.5%) had triple-negative tumors.

According to (Allemani *et al.*, 2004), patients with tumors positive for estrogen and progesterone receptor-positive tumors have a better survival rate than those without not having any.

In breast cancer, HER2 status is both a prognostic and predictive biomarker. Positive HER2 status is indeed associated with a poor prognosis in terms of recurrence-free survival and overall survival (Ferretti *et al.*, 2007).

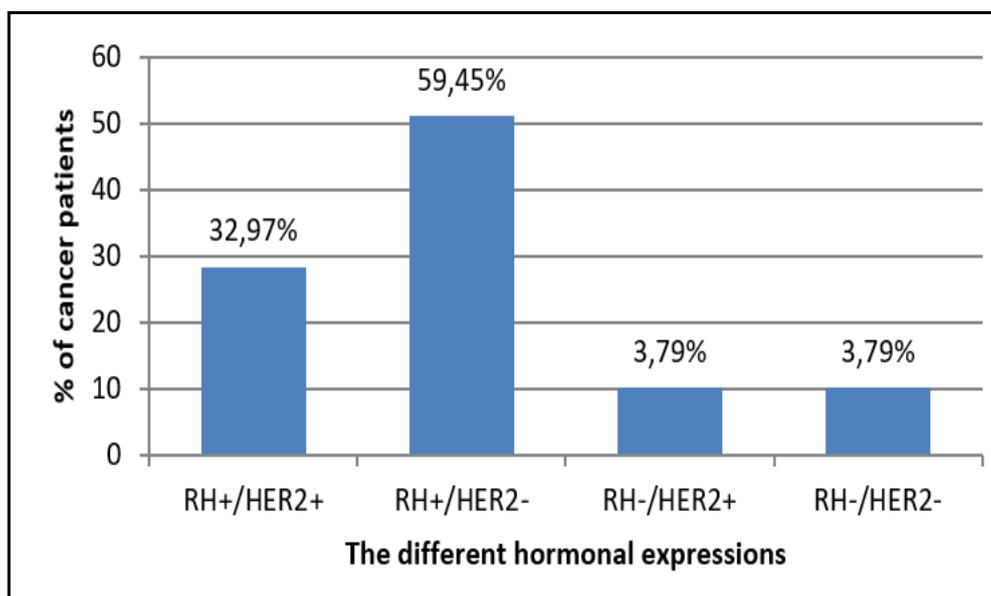


Fig 6. Distribution of patients according to HR and HER2 expression.

Nutritional Profile:

Analysis of food frequency expressed as the number of times per week shows that the consumption of red meat, cheese, fish, eggs, pastries, mayonnaise and oiselles is significantly increased ($p < 0,05$) in cases compared to controls. However, the other results did not show any significant difference for the other foods (milk, commercial dishes, butter, vegetable oil and animal fat) (Table 2).

First, we found a positive association between breast cancer risk and red meat consumption ($p = 0,003$). This result is observed, also, in other studies such as (Badid, 2012), (Fagherazzi, 2011) and (Taylor *et al.*, 2007). The latter concluded that meat consumption is convincingly associated with breast cancer risk.

Oleic acid (C18:1) is the dominant monounsaturated fatty acid (MUFA) in meats: it represents, depending on species and cut, 23 to 39% of total fatty acids. Thus, red meats contain two main saturated fatty acids (SFA) which are Palmitic Acid (C16:0), between 21 and 30 % of the total (SFA) and Stearic Acid (C18:0), between 4 and 21 % of the total (SFA), depending on species and cut. (Astrog *et al.*, 2003).

The role of meat in increasing breast cancer risk is thought to be due to the presence of (SFA). Animal fats increase the synthesis of bile acids and cholesterol by the liver, which is transformed into secondary bile acids (carcinogens) under the action of the bacteria of the intestinal microbial flora. These carcinogens are produced during the metabolism of nitrates, N-nitrosated carcinogens, or during cooking at high temperatures (barbecue, grilling, frying). Genetic polymorphism of heterocyclic amine metabolizing enzymes explains the different sensitivity to pre-carcinogenic compounds in meat and burned fat

(Bissonauth, 2009).

Second, regarding the consumption of dairy products and contrary to our study, which did not find any significantly questionable results concerning milk consumption, (Ganmaa *et al.*, 2005) in a study of more than 40 countries, showed that milk is largely responsible for the development of breast, ovarian and uterine cancers. The cause of this association can be summarized in the abnormally high level of estrogens in milk from pregnant cows.

Epidemiological studies have been conducted to investigate the effect of increased consumption of milk and dairy products on colorectal cancer, breast cancer and prostate cancer. Generally speaking, milk and dairy products contain some components that may reduce the risk (calcium, vitamin D, lactic acid bacteria,...) and others, on the contrary, increase the risk of cancer (Saturated Fatty Acids but also pesticides and growth factors such as IGF-1 known to be carcinogenic) (Rock, 2004).

Our results showed a significant difference ($p = 0,003$) in consumption of cheese, however, an inverse association with breast cancer risk was observed for total cheese consumption when comparing the highest and lowest quartiles in the work of (Djamil *et al.*, 2018).

On the other hand, the case-control study of (Kuriki *et al.*, 2007), on the link between fish/seafood consumption and breast cancer, raised a positive association related to a reduction in risk. In contrast to this study, our study emphasizes this same association by explaining that the risk is still high despite the fact that (46.3%) of patients consumed fish 2 to 3 times a week.

In a study conducted between 2007 and 2008 in Korea of 358 cases and 360 controls, Kim *et al.*, 2009) found by comparing the highest vs. lowest quartile

of fish consumption that high intake of fatty fish was associated with a reduced risk of sporadic breast cancer in women, ($p=0.001$) in pre-menopause, ($p=0,005$) in post-menopause.

Similarly, for eggs consumption, our results indicated that patients who consumed eggs 2 or 3 times a week were the most targeted by breast cancer (46.9%). In agreement with our results, those of (Missmer, *et al.*, 2002) suggested that breast cancer risk was slightly decreased in women who consumed < 2 eggs per week but slightly increased in women who consumed > or 1 egg per day.

According to the CIQUAL food composition table, the foods richest in lipids include fats (oils, butter, margarine, etc.), sauces (such as mayonnaises and non-alleviated dressings), and certain oilseeds (Brazil nuts, coconuts, hazelnuts, pine nuts) (ANSES, 2015).

Also, in our study, we were interested in the frequency of mayonnaise consumption and our results highlighted a significant difference ($p=0,014$) between cases and controls. In contrast to our results, the addition of mayonnaise to the seasoning in a study in Moscow was associated with a decreased risk of breast cancer. Again, mayonnaise is prepared mainly from sunflower oil, which is practically the only type of oil used in Moscow (Zaridze *et al.*, 1993).

Mayonnaise accounts for 6% of fat intake. Indeed, it is the main contributor to PUFA w-6 intakes and in particular linoleic acid (Tressou-Cosmao *et al.*, 2016). Wirfält *et al.*, 2002 in cohort study investigated the relationship between breast cancer and total PUFAs w-6, of which linoleic acid is the major component, this study showed a 3-fold increase in risk for the highest quintile of intake. Dietary fats, including Trans Fatty Acids (TFAs), have been one of the central topics of discussion in scientific literature and have received more attention from health professionals and the public than

any other nutrients in the food supply (Semma, 2002).

We focused on the consumption of industrial pastries that are considered a good source of TFAs, and we noted a slightly significant difference between the two groups ($p= 0.040$). Huang *et al.* mentioned that bread, bakery products, cereal, grain products and confectionery are the top three food groups that contain specific ingredients indicative of TFA (Huang *et al.*, 2020).

In agreement with our results, (Matta *et al.*, 2021) support the hypothesis that higher dietary intakes of TFAs, in particular elaidic acid, are associated with elevated breast cancer risk. Due to the high correlation between conjugated linoleic acid and palmitelaidic acid, we were unable to disentangle the positive associations found for these fatty acids with breast cancer risk. Further mechanistic studies are needed to identify biological pathways that may underlie these associations.

For the other foods that did not show statistically significant results, and that are considered as hydrogenated fats, it is suggested to avoid them, especially margarine, fried foods and commercial peanut butter, which are rich in Trans Fatty Acids. These fats may disrupt hormonal systems that regulate healing, lead to the destruction of defective membranes, and encourage the development of cancer.

The results obtained regarding the existence or not of an association between fat consumption and breast cancer are very heterogeneous and depend strongly on the type of epidemiological investigation (Badid, 2012).

Regarding the dietary intake of lipids and fats, it is established that the risk between carcinogenesis and dietary fats is mainly studied on the basis of the origin (animal or vegetable), the quantity (total), or the type of fatty acid.

Table 2: Nutritional characterization of the study population.

	Cases N= 162(%)	Controls N= 162(%)	P*
Milk	4,33 ± 1,05	4,27 ± 1,18	0,553
Chesse	3,55 ± 1,23	3,52 ± 1,34	0,003
Red meat	3,08 ± 1,20	3,15 ± 1,02	0,003
Chiken skin	2,51 ± 1,68	2,57 ± 1,69	0,987
Delicatessen	3,25 ± 1,38	3,20 ± 1,24	0,061
Fish	3,56 ± 0,98	3,21 ± 1,00	<0,0001
Eggs	3,67 ± 0,95	4,06 ± 0,98	<0,0001
Commercial dishes	2,07 ± 1,25	2,02 ± 1,30	0,247
Mayonnaise	2,80 ± 1,40	2,51 ± 1,42	0,014
Viennese pastry	3,00 ± 1,36	2,84 ± 1,55	0,040
Butter	2,95 ± 1,55	2,98 ± 1,61	0,396
Vegetable oil	4,80 ± 0,79	4,74 ± 0,90	0,915
Animal fat	1,37 ± 0,89	1,53 ± 1,11	0,115
Nuts, peanuts, seeds	3,59 ± 1,15	3,30 ± 1,32	0,014

P* value <0.05 was considered statistically significant

CONCLUSION

Breast cancer requires our constant attention, as it is a field that is constantly evolving and represents a strong focus for research. According to worldwide data, breast cancer is first cancer in women in terms of incidence and mortality.

Today, it is known that environmental factors and poor lifestyle habits are, in large part, responsible for the occurrence of breast cancer. Even more, it is the combination of a bad diet, especially a high intake of fatty acids that increases the risk of breast cancer.

After conducting this study, we were able to identify some risk factors that appear to contribute directly to the development of breast cancer, such as age, hormonal factors, lifestyle and diet. The involvement of each of these factors in breast carcinogenesis has also been proven in numerous studies.

Data of our study were globally in correlation with those of the literature, which leads to conclude that the epidemiological, clinical, and nutritional profiles of the mammary tumors in Algeria tends more and more to join that of the industrialized countries and that could be

explained by the westernization of way of life of the Algerian woman (delay of age at the marriage, reduction of the period of breast-feeding, frequent and long oral contraception), multiplication of the factors of stress and the recourse to various sources of lipidic.

In perspective, it is possible to refine this study by increasing the population size for certain risk factors, by carrying out a post-analysis follow-up of the patients and by taking into consideration the molecular classification of breast cancer so that more effective therapeutic approaches can be established.

Finally, it is important to note that a balanced and diversified diet, combined with regular physical activity and a healthy lifestyle have real effects on disease prevention.

REFERENCES

- Abbass, F.; Bennis, S.; Znati, K.; Akasbi, Y.; Amrani, J.K.; El Mesbahi, O. and Amarti, A. (2011). Le profil épidémiologique et biologique du cancer du sein à Fès-Boulemane (Maroc). *Eastern Mediterranean Health Journal*, 17(11).

- Astorg, P. ; Clavel-Chapelon, F. ; Gerber, M. ; Thiébaud, A. (2003). Acides gras alimentaires et cancers. *Agence Française de la Sécurité Sanitaire des Aliments (AFSSA)*. <https://www.anses.fr/fr/system/files/NUT-Ra-AGcancer.pdf>
- Allemani, C. ; Sant, M. ; Berrino, F. ; Aareleid, T. ; Chaplain, G. ; Coebergh, J.W. and *et al.* (2004). Prognostic value of morphology and hormone receptor status in breast cancer—a population-based study. *British Journal of Cancer*, 91(7):1263–1268.
- ANSES, (2015). Actualisation des apports nutritionnels conseillés pour les acides gras. *Rapport d'expertise collective*. https://www.anses.fr/fr/system/files/NUT2006_sa0359Ra.pdf
- Badid, N. (201). Stress oxydatif et profil nutritionnel chez une population de femmes atteintes de cancer du sein dans la région de Tlemcen. Thèse de doctorat en Nutrition Clinique. Université Aboubekr Belkaid de Tlemcen, pp 27. <http://dspace.univ-tlemcen.dz/bitstream/112/2262/1/Badid-Naima.pdf>
- Bissonauth, V. (2009). Mode de vie, habitudes alimentaires et cancer du sein: Etude cas-témoins chez les Canadiennes-françaises non porteuses de mutations des gènes BRCA. Thèse en vue de l'obtention du grade de Ph.D. en nutrition. Faculté de médecine de l'Université de Montréal, pp 245. https://papyrus.bib.umontreal.ca/xmlui/bitstream/handle/1866/2857/Bissonauth_Vishnee_2009_these.pdf?sequence=2&isAllowed=y
- Clavel-Chapelon, F. ; Touillaud, M. and Fournier, A. (2008). Quels risques, pour quelles femmes ? Facteurs de risque de cancer du sein. 30èmes journées de la SFSPM. La Baule.
- Collaborative Group on Hormonal Factors in Breast Cancer (CGHFBC), (2001). Familial breast cancer: collaborative reanalysis of data from 52 epidemiological studies of 58 209 women with breast cancer and 101 986 women without the disease. *Lancet*, 358:1389–99.
- Collaborative Group on Hormonal Factors in Breast Cancer (CGHFBC), (2012). Menarche, menopause and breast cancer risk : individual participant meta-analysis including 118964 women with breast cancer from 117 epidemiological studies. *Lancet Oncol*, 13: 1141-51.
- Dartois, L.; Fagherazzi, G.; Baglietto, L. ; Boutron- Ruault, M. (2016). Proportion of premenopausal breast cancer attributable to known risk factors: estimates from the E3N-EPIC cohort. *International journal of cancer*, 138 (10) : 2415-2427.
- Djamil, M.; Dounia B.; Wissem S. and al. (2018). Effect of dairy products intake on breast cancer risk: A case-control study in Algeria. *Nutrition Clinique et Métabolisme*, 32(3).
- Fagherazzi, G. (2011). Facteurs alimentaires, composantes du syndrome métabolique et risque de cancer du sein et de diabète de type II dans la cohorte E3N. Thèse pour l'obtention du doctorat en médecine. Faculté de médecine de l'université Paris XI. pp 256. <https://tel.archives-ouvertes.fr/tel-00718783/document>
- Ferretti, G.; Felici, A.; Papaldo, P.; Fabi, A.; Cognetti, F. (2007). HER2/neu role in breast cancer: from a prognostic foe to a

- predictive friend. *Curr Opin Obstet Gynecol*, 19(1):56–62.
- Ganmaa, D. and Sato, A. (2005). The possible role of female sex hormones in milk from pregnant cows in the development of breast, ovarian and corpus uteri cancers. *Med Hypotheses*, 65(6):1028-37.
- Gerber, M. (2009). Impact de l'alimentation sur le pronostic du cancer du sein. *Oncologie*, 11:236-242.
- Global Cancer Observatory (GLOBOCAN), (2018). Taux d'incidences standardisées sur la population mondiale du cancer du sein de la femme en 2018 (pour 100000).
- Global Cancer Observatory (GLOBOCAN), (2020). Incidence, Mortality and Prevalence by cancer site in Algeria., *IARC*.
- Hajji, A.; Toumi, D.; Daldoul, A.; Njima, N.; El Mhabrech, H. ; Faleh, R. (2020). Cancer du sein traité par chimiothérapie première : facteurs prédictifs du traitement radical (étude rétrospective à propos de 72 cas). *Pan African Medical Journal*, 36: 174. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7467888/>
- Hankinson, S.E.; Willett, W.C.; Manson, J.E. and al. (1995). Alcohol, height, and adiposity in relation to estrogen and prolactin levels in postmenopausal women. *Journal of National Cancer Institute*, 87(17):1297–1302.
- Hunter, D.J.; Kraft, P.; Jacobs K.B.; Cox, D.J.; Yeager, M.; Hankinson, S.E. et al. (2010). A genome-wide association study identifies alleles in FGFR2 associated with risk of sporadic postmenopausal breast cancer. *Nature genetics*, 39 (7) : 870-4.
- Huang, L.; Federico, E.; Jones, A.; Wu, J.H.Y. (2020). Presence of trans fatty acids containing ingredients in pre-packaged foods in Australia in 2018. *Australian and New Zealand Journal of Public Health*, 44: 419–420.
- International Agency for Research on Cancer (IARC), (2020). World estimated cancer incidence, all ages, females. *IARC Press*.
- Jee, S.H. ; Yun, J.E. ; Park, E.J. et al. (2008). Body mass index and cancer risk in Korean men and women. *International Journal of Cancer*, 123 (8):1892–1896.
- Jéhannin-Ligier, K. ; Dantony, E. ; Bossard, N. ; Molinié, F. ; Defossez, G. ; Daubisse-Marliac, L. ; Delafosse, P. ; Remo, and Uhry, Z. (2018). Projection de l'incidence et de la mortalité en France métropolitaine en 2017. *Rapport technique*. Ref: RAINCMETRO17.
- Kim, J. ; Lim, S.Y. ; Shin, A. ; Sung, M.K. ; Ro, J., Kang, H.S. et al. (2009). Fatty fish and fish omega-3 fatty acid intakes decrease the breast cancer risk: a case-control study. *BMC Cancer*, 9(1), 216.
- Kuriki, K.; Hirose, K.; Wakai, K.; Matsuo, K.; Ito, H.; Suzuki, T. et al. (2007). Breast cancer risk and erythrocyte compositions of n-3 highly unsaturated fatty acids in Japanese. *International Journal of Cancer*, 121: 377-385.
- Liu, K.; Zhang, W.; Dai, Z.; Wang, M.; Tian, T.; Liu, X.; Kang, H.; Zhang, S. (2018). Association between body mass index and breast cancer risk: evidence based on a dose–response meta-analysis. *Cancer Management and Research*, 10 : 143–151.

- Mansouri, A. (2017). Prise en charge du cancer du Sein métastatique HER2 positive, expérience du centre d'Oncologie et d'Hématologie. Thèse pour l'obtention du doctorat en médecine. Faculté de Médecine et de Pharmacie de Marrakech. N°216. <http://wd.fmpm.uca.ma/biblio/theses/annee-htm/FT/2017/these216-17.pdf>
- Marina, P. and Tafforeau, J. (2005). Opportunité de dépistage du cancer du sein chez les femmes de 40 à 49 ans ; état des connaissances et données disponibles pour le développement d'une politique de santé en Belgique. *IPH/EPI Reports* Nr. 2005 – 001. https://www.wiv-isp.be/epidemiologie/epifr/crospfr/sein_fr.pdf
- Matta, M.; Huybrechts, I.; Biessy, C.; Casagrande, C.; Yammine, S.; Agnès Fournier, A.; Olsen, K.S.; Lukic, M.; Gram, I.T.; Ardanaz, E. et al. (2021). Dietary intake of trans fatty acids and breast cancer risk in 9 European countries. *BMC Med*, 19, 81.
- Merviel, P.; Jouvance, O. ; Naepels, P. ; Fauvet, R. ; Cabry-Goubet, R. ; Gagneur, O. ; Gondry, J. (2011). Do there still exist risk factors for the breast cancer? *Gynecologie Obstétrique & Fertilité*, 39: 486–490.
- Missmer, S.A.; Smith-Warner, S.A.; Spiegelman, D.; Hunter, D.J. (2002). Meat and dairy food consumption and breast cancer: A pooled analysis of cohort studies. *International Journal of Epidemiology*, 31(1):78-85.
- Nkondjok, A. and Ghadirian, P. (2005). Facteurs de risque du cancer du sein. *Erudit. Médecine/Sciences*, pp 175-180.
- Palmer, J.R.; Adams-Campbell L.L.; Boggs, D.A. ; Wise, L.A. and Rosenberg, L. A. (2007). Prospective study of body size and breast cancer in black women. *Cancer Epidemiol Biomarkers Prev*, 16(9):1795–1802.
- Reik, G. and Fiander, A. (2006). The effect of lifestyle factors on gynaecological cancer. *Best Pract Res Clin Obstet Gynaecol*, 20 : 227-251.
- Rock, E. (2004). Qualité nutritionnelle des produits laitiers et santé humaine. INRA, Unité Maladies Métaboliques et Micronutriments, France. *Rencontre, Recherche. Ruminants*, 11 pp 44. http://www.journees3r.fr/IMG/pdf/2004_qualite_nutritionnelle_01_Rock.pdf
- Russo, J.; Hu, Y.F.; Yang, X.; Russo, I.H. (2000). Developmental, cellular and molecular basis of human breast cancer. *Journal of National Cancer Institute Monogr*, E7 : 17-37.
- Semma, M. (2002). Trans Fatty Acids: Properties, Benefits and Risks. *Journal of Health Sciences*, 48: 7–13.
- Taylor, E.F.; Burley, V.F. et al. (2007). Meat consumption and risk of breast cancer in the UK Women Cohort Study. *British Journal of Cancer*, 96(7) : 1139-1146.
- Tresso-Cosmao, J. ; Pasteau, S. ; Dartinet, S.D. ; Simon, N. ; Le Guillon, C. (2016). New data about dietary intake of fatty acids in the French population. *Oilseeds, fats Corps and Lipids*, 23(2) : 303-309. <https://www.ocl-journal.org/articles/ocl/abs/2016/03/ocl160001-s/ocl160001-s.html>
- Wirfält, E.; Mattisson, I.; Gullberg, B.; Johansson, U.; Olsson, H.; Berglund, G. (2002). Postmenopausal breast cancer is associated with high intakes of w-

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6 fatty acids (Sweden). *Cancer Causes Control*, 13: 883-893.
Zaridze, D.; Evstifeeva, T.; Babaeva, M. and Boyle, P. (1993). Fats

used in seasoning and breast cancer risk: A case-control study in Moscow, Russia. *Annals of Oncology* 4: 495-498, 19.

ARABIC SUMMARY

توصيف الملامح الوبائية والسريية والتشريح المرضي والتغذوي
سرطان الثدي لدى النساء في غرب الجزائر: حول دراسة الحالات والشواهد

زقاي سعاد^{1*} ، مول السهول ثريا² ، تيبورة غنية³ ، حمري وليد⁴ ، ميش خالدة⁵ ، محياوي إيمان⁶

^{1,3,4} مختبر التغذية وعلم الأمراض والتكنولوجيا الحيوية الزراعية والصحة ، قسم الأحياء ، كلية علوم الطبيعة و الحياة ، جيلالي ليايس. 12 شارع أولحاسي مختار. جامعة سيدي بلعباس ، الجزائر.
² مختبر السموم الحيوية - قسم الأحياء - كلية علوم الطبيعة و الحياة - جيلالي ليايس. 12 شارع أولحاسي مختار. جامعة سيدي بلعباس ، الجزائر.

المقدمة: يسبب سرطان الثدي اضطراباً عميقاً في الجسد والعقل، تلعب عوامل النظام الغذائي ونمط الحياة ، بما في ذلك النشاط البدني دوراً رئيسياً في وبائيات هذا المرض الخطير.
الهدف: كان الهدف من هذا العمل هو توصيف الملامح الوبائية والسريية والتشريح المرضي لمجتمع الدراسة ، وتحليل فرضية العلاقة بين الاستهلاك المرتفع نسبياً للأطعمة الغنية بالأحماض الدهنية وسرطان الثدي.
السكان والطرق: بناءً على هذه الفرضية ، اخترنا دراسة وبائية لحالات وشواهد ، تضمنت مجموعة من 324 شخص . تم جمع البيانات من استبيان أساسي و تحقيق غذائي (على التكرار المعتاد من استهلاك كل عنصر غذائي من قائمة محددة مسبقاً). تم الانتهاء من هذه البيانات بعد مراجعة السجلات الطبية للمرضى.
النتائج: أظهرت النتائج أن متوسط عمر المرضى كان (49 ± 10.72) وأن الفئة العمرية الأكثر تضرراً تراوحت بين 46 و 55 سنة (30.9%). كشفت دراسة المعطيات الإكلينيكية عن غلبة مكان الإصابة بسرطان الثدي في الثدي الأيسر (54.23%) مقارنة بالثدي الأيمن وتكراره (43.84%). أظهر توزيع حالات السرطان حسب تصنيف SBR أن GII هو التصنيف النسيجي الأكثر شيوعاً، حيث يمثل (67.70%) من الحالات. فيما يتعلق بتحديد الحالة الهرمونية و HER2 أظهرت نتائجنا غلبة HER2 + / RH- بنسبة (59.45%). كان المرضى ذوو الحالة السلبية الثلاثية (3،79%). كشفت البيانات الغذائية عن وجود علاقة إيجابية بين نظام غذائي غني بالأحماض الدهنية مثل اللحوم الحمراء (P = 0.003) والمايونيز (P = 0.014) ومنتجات الألبان (الأطعمة الغنية بالأحماض الدهنية المتعددة غير المشبعة طويلة السلسلة) وسرطان الثدي.
الخلاصة: من أصول متعددة ، يرتبط ظهور سرطان الثدي بمجموعة من العوامل مثل الجنس والعمر والعوامل الهرمونية. ومع ذلك من المهم وضع نمط الحياة في مركز البحث بعين الاعتبار ، و حالياً تركز الدراسات الحديثة على الانتباه بشكل رئيسي على العلاقة بين تناول كميات كبيرة من الدهون وسرطان الثدي.

الكلمات المفتاحية: سرطان الثدي، الملامح الوبائية، المعطيات الإكلينيكية، التغذية، الأحماض الدهنية .