The Epidemiological Study of Female Breast Cancer in relation to age groups In Qena Governorate

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Abstract

Background: Breast cancer is a significant global public health issue. In Egypt, Among female malignant tumors, it's the most prevalent cancer.

Objectives: Determine age group of high incidences of breast cancer and assess breast cancer risks in different ages.

Patients and methods: A retrospective analysis among 510 women with proved breast cancer at our department. An interviewer-administered questionnaire and medical records from archive were used to collect data.

Results: Ages ranged from 32-79. Maximum incidence of breast cancer 28.8% is found in women aged 50-59. Majority of examined women were married 90.8%, and 32.9% were premenopausal. Mean BMI was 26.3 ± 2.9. Among women in study, 29% had personal or familial breast cancer history, 35.7% were regular users of oral contraceptives. ER: +VE, PR: +VE, HER2: -VE was the most frequent immunophenotyping. T2N1M0 was the most frequent grade. There was a strong correlation between genetic predisposition to breast cancer, overweight, menstruation at young age, and using oral contraceptives. Breast cancer rates were compared between Women of Various Ages: Obesity, single marital status, low socioeconomic status was seen for women ages 31-50 and 51-79. Oral contraceptive use, early menarche, positive family history of breast cancer, were all significant predictors of breast cancer in women aged 29–30.

Conclusion: Women between age of 50-59 have a 28.8% higher likelihood of acquiring breast cancer, then 40–49-year-old women is 28%. Our research showed that early menarche, obesity, oral contraceptive use, and family history of the disease were important predictors of breast cancer.

Keywords: Breast cancer; Epidemiology; Qena.

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Introduction

Breast cancer is the most common lethal malignancy accounting for nearly 23% of all female cancers worldwide, with more than a million new cases each year. The incidence rates of Breast cancer vary worldwide, with high rates in North America, Northern and Western Europe, intermediate rates in South America and Southern Europe, and low rates in Africa and Asia **(Parkin et al., 2006)**.

Risk factors include the onset of menarche, the age of initial full-term pregnancy, parity, breastfeeding duration, and age of menopause. However, these established factors only account for slightly more than half of the overall breast cancer risk **(Dey et al., 2010)**. Furthermore, age has a pivotal role in determining the likelihood of occurrence, given that the majority of instances manifest in individuals aged 55 years and above. Furthermore, the presence of a first-degree relative who has been diagnosed with breast cancer increases a woman's risk by almost double. Breast cancers that arise from hereditary gene mutations, particularly in the BRCA1 or BRCA2 genes, account for an estimated 5-10% of cases **(Alshammari, 2021)**. Individuals harboring these genetic abnormalities are confronted with a lifetime risk of breast cancer ranging from 55% to 65% and 45%, respectively. Moreover, there exists a 70% probability of acquiring breast cancer by the time they reach the age of 80 **(Feng et al., 2018)**.

The lifestyles (eating habits, physical inactivity, smoking, alcohol consumption, obesity, etc.) as well as reproductive characteristics of women can also increase their risk of developing breast cancer. It has been well established in the literature that changing reproductive patterns including late childbearing low parity and shorter period of breastfeeding increase the risk of breast cancer **(Balekouzou et al., 2017)**.

Breast cancer is typically divided into lesions that begin in the ductal epithelium (inner lining) and those that begin in the lobular epithelium, which transports milk to the ducts, based on their histological appearance. According to the World Health Organization, based on cell type, proliferation rate, and architectural features, there are 21 different breast cancers based on their histological characteristics. Up to 75% of breast cancer cases are diagnosed as invasive ductal carcinoma, also known as IDC, whereas 15% are diagnosed as invasive lobular carcinoma (ILC) **(Makki, 2015)**.

The aim of our study was to determine the age group which has high incidence of breast cancer, and to assess risk factors of breast cancer in different age groups.

Patients and methods

This study was performed on 510 Egyptian women with newly diagnosed breast cancer were enrolled in the study after presenting at the Outpatient Clinic Oncology and Nuclear medicine, Qena Faculty of Medicine, South Valley university. This study took place in the period from June 2022 to December 2022.

Ethical approval code: SVU-MED-ONM027-1-21-12-299.

I. Inclusion criteria:-
- Patients proved as having histologically confirmed breast cancer.
- Aged between 18 and 79 years old (at start of the study).

II. Exclusion criteria:-
- Patients who <18 years old or >79 years old.
- Male gender.
- Malignancy of other organs
- Females with double malignancy
- Females with benign beast lesions.

Data collection

This study made use of two methods:

Tool I: A structured Interviewing Questionnaire: Written in Arabic so that it would be accessible to whoever was being studied. It entails three parts as the following:

- **Part 1: Personal characteristics** of women which include age, occupational history, level of education, Socioeconomic status, Place of residence, the number of family members …. etc.
- Socioeconomic status was assessed using the Modified Kuppuswamy's socioeconomic scale **(Saleem and Jan, 2019).**
- **Part 2: General risk factors:** This encompasses factors like smoking history, alcohol and substance usage, familial breast cancer history, physical activity level, exposure to significant stress within the past five years, and anthropometric measures. Participant height (in centimeters) and weight (in kilograms) were assessed while standing without footwear and heavy clothing. The Body Mass Index (BMI) was calculated and categorized according to guidelines provided by the World Health Organization.
- **Part 3: Menstrual and reproductive history:** this involves variables such as marital status, number of childbirths, age at first pregnancy, age at menarche, menopausal status, history and duration of breastfeeding, usage of oral contraceptive pills (OCPs) along with their duration of use, experiences with infertility, history of abortion, presence of benign lumps, occurrences of breast biopsies, and any hormone therapy received.
- Early age of menarche was defined as menopause in female aging ≤ 11 years (**Mishra et al., 2019**).

Tool II: Data collect from department archive: Tumor-related information including breast cancer staging using the tumor, lymph node, and metastasis staging system according to the AJCC 7th Edition. **(AJCC, 2010)**. The pathological data assessed included tumor site, histopathological type, tumor grade, tumor stage, and lymph node involvement. The histopathological type, grading, and tumor budding scoring were done. Data collect from department archive. Tumors were classified as localized when they were found only in the organ of origin, regional when they spread to neighboring organs and tissues, and distant when they reached distant organs and lymph nodes. Immunohistochemical proxies for estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor 2 (HER2) status were used to classify breast cancer subtypes. Details on the procedures and medications used in treatment were recorded.

Statistical analysis

Data entry and analysis will be made by using SPSS 26.0 Version. Mean, proportion and percentage will be calculated. Logistic regression analysis and Mantel-Haenszel test were used. A significance level of 0.05 was chosen for the analysis.

Results

A total of 510 breast cancer patients participated in our study; They ranged in age from 32 to 79 years old at the time of diagnosis (mean age: 50.24 ± 11.464 years). About 42.5% were from North Qena, while 57.5% were from South Qena. The females studied were divided into five groups, with the age group 50-59 years having the highest prevalence of breast cancer (28.8%), followed by the age group 40-49 years (28%) and then the age groups 29-39 (20.6%) and 60-69 years (15.5%), and the age group 70-78 years having the lowest prevalence (7.1%). 46.5% of the studied females had a low socioeconomic level, while 53.5% had a moderate one. Most of the studied females were married (90.8%). 32.9% of the studied females were premenopausal, while 67.1% were postmenopausal (**Table.1**).

Table 1. Socio-demographic characteristics of the females under study (N=510)

Variables		NO.	Percent %
Age of patients (years)	Mean ± SD	53.38 ± 11.432	
	Median (range)	52 (32-79)	
Age groups (years)	30-39 years	60	11.8%
	40-49 years	138	27.1%
	50-59	158	31%
	60-69	110	21.6%
	70-79	44	8.6%
Age at diagnosis (years)	Mean ± SD	50.24 ± 11.464	
	Median (range)	50 (29-78)	
Age groups at diagnosis	29-39 years	105	20.6 %
	40-49 years	143	28 %
	50-59 years	147	28.8 %
	60-69 years	79	15.5 %
	70-78 years	36	7.1%
Residence	North Qena	217	42.5%
	South Qena	293	57.5%
Socioeconomic level	Low	237	46.5%
	Moderate	273	53.5%
Marital status	Married	463	90.8%
	Single	23	4.5%
	Divorced	24	4.7%
Age at menarche (years)	Mean ±SD	12.98 ± 1.333	
	Median (range)	13 (11-15)	
menopause	Premenopausal	168	32.9%
	Postmenopausal	342	67.1%
Age at menopause (years) (n=342)	Mean ± SD	49.33 ± 3.462	
	Median (range)	49 (44-56)	

165 (32.4%) of the females studied had normal body weight, 277 (54.3%) were overweight, and 68 (13.3%) were obese. The average BMI value was 26.333 ± 2.9349. In 148 (29%) of the examined females, a familial history of breast cancer was present and accounted for. 35.7% of the ladies polled had used oral contraceptives (**Table.2**).

Table 2. Health care characteristics of the studied females (N=510)

Variables		NO.	Percent %
BMI	Normal	165	32.4%
	Overweight	277	54.3%
	Obese	68	13.3%
	Mean ± SD	26.333 ± 2.9349	
	Median (range)	26.3 (21-33.6)	
Family history of breast cancer	Positive	148	29%
	Negative	362	71%
Oral contraceptive use	Yes	182	35.7%
	No	328	64.3%

The findings of the current study revealed that invasive duct carcinoma was the most common type affecting 88.6% followed by invasive lobular carcinoma affecting only 2.5% with mixed invasive duct and mucinous carcinoma being the least common type affecting 0.4% (**Table.3**).

Table 3. Pathological types of breast cancer among the studied females

Pathological types	NO.	Percent
Invasive duct carcinoma	452	88.6%
Invasive duct carcinoma with ductal carcinoma in-situ	12	2.4%
Invasive lobular carcinoma	13	2.5%
Invasive papillary carcinoma	8	1.6%
Mixed invasive duct and lobular carcinoma	8	1.6%
Mixed invasive duct and mucinous carcinoma	2	0.4%
Phyllodes tumor	3	0.6%
Undifferentiated carcinoma	2	0.4%
Invasive duct carcinoma with medullary feature	7	1.4%
Multicentric intra-cystic papillary carcinoma	3	0.6%

ER: +VE, PR: +VE, HER2: -VE was the most frequent immunophenotyping among the studied females (44.5%), followed by ER: -VE, PR: -VE, HER2: -VE (33.9%) (**Table.4**).

T2N1M0 was the most frequent among the studied females (23.1%), followed by T2N2M0 (13.7%) (**Table.5**).

Table 4. Biological subtypes of breast cancer among the studied women

Biological subtype	Number	Percentage
ER: -VE, PR: -VE, HER2: -VE	173	33.9%
ER: +VE, PR: +VE, HER2: -VE	227	44.5%
ER: -VE, PR: -VE, HER2: +VE	47	9.2%
ER: +VE, PR: +VE, HER2: +VE	27	5.3%
ER: +VE, PR: +VE, HER2: Equivocal	9	1.8%
ER: -VE, PR: -VE, HER2: Equivocal	3	0.6%
ER: -VE, PR: +VE, HER2: -VE	3	0.6%
ER: -VE, PR: +VE, HER2: +VE	2	0.4%
ER: +VE, PR: -VE, HER2: +VE	2	0.4%
ER: +VE, PR: -VE, HER2: -VE	3	0.6%
ER: +VE, PR: -VE, HER2: -VE	5	1%

Table 5. Staging of breast cancer among the studied women

Stage	Number	Percentage
T1N0M0	35	6.9%
T1N1M0	25	4.9%
T1N2M0	3	0.6%
T1N3M0	5	1%
T2N0M0	57	11.2%
T2N1M0	118	23.1
T2N2M0	70	13.7%
T2N3M0	32	6.3%
T3N0M0	16	3.1%
T3N1M0	33	6.5%
T3N2M0	23	4.5%
T3N3M0	15	2.9%
T4N0M0	5	1%
T4N1M0	2	0.4%
T4N2M0	10	2%
T4N3M0	3	0.6%
Stage 4	58	11.4%

The study found a substantial correlation between early age at menarche, obesity, Use of Oral Contraceptives, and a family history of breast cancer. Analyzing the likelihood of women developing breast cancer of varied ages using a logistic regression model were examined. Our results showed that the significant predictors for breast cancer among women who are between the ages of 31 and 50, as well as those who are between 51 and 79 were obesity, single marital status, moderate socioeconomic level ($P < 0.05$). Oral contraceptive use, early menarche, a familial history of breast cancer, and the most significant factor in developing breast cancer was a poor socioeconomic position for young women ages 29 and 30 (**Table.6**).

Table 6. Risk factors of breast cancer among the studied women

Variables		Odds ratio	95 % (CI)		P. value
			Lower	Upper	
Risk factors among women aged between 31 and 50 years					
BMI	Obesity	343.843	85.315	1385.78	**<0.001**
Marital status	Single	200.5123	43.106	932.698	**<0.001**
Socioeconomic level	Moderate	6.535	1.847	23.116	**0.004**
Residence	North Qena	1.812	0.660	4.971	**0.249**

Risk factors among women aged between 51 and 79 years					
BMI	Obesity	224.689	22.468	324.986	<0.001
Marital status	Single	119.054	11.9054	219.450	<0.001
Socioeconomic level	Moderate	5.602	1.579	19.877	0.008
Residence	North Qena	1.203	0.436	3.322	0.722
Risk factors among women aged between 29 and 30 years					
Oral contraceptive use	Yes	181.367	21.319	280.763	<0.001
Age at menarche	Early menarche	0.370	0.232	0.591	<0.001
Family history of breast cancer	Positive	5.508	1.981	15.319	0.001
Socioeconomic level	Low	6.535	1.847	23.116	0.004
Residence	South Qena	1.812	0.660	4.971	0.249

Discussion

Patients of this study had a mean age of 50.24 ± 11.464 years at time of diagnosis. Similarly, **Najjar and Easson (2010),** conducted a comprehensive literature evaluation of breast cancer reports in Arab countries, which included 28 articles. In total, 7455 patients participated in these studies. They found that 48 years old was the average age at which a woman was diagnosed with breast cancer.

Half of the patients in a large series of breast cancer cases in Lebanon were younger than 50, according to a study by **El Saghir et al.(2002),** with a mean age of 49.8. In another review and analyses of the 2004 Lebanese National Breast Cancer Registry, breast cancer constituted about 38.2% of all cancer cases among Lebanese females in the year 2004. The median age at diagnosis was 52.5 years. **Lakkis et al.(2010),** found that the average age of patients at diagnosis is estimated to be 52.5 years.

The current study revealed that Breast cancer incidence is highest between the ages of 50 and 59 (28.8%), followed by the age group 40-49 years (28%) and then the age groups 29-39 (20.6%).

The findings presented in this research were substantiated by a case-control investigation including a total of 174 individuals diagnosed with breast cancer and 348 controls who were matched in terms of age. A total of 522 female participants, with a mean age of 45.8 ± 13.4, were included in the study. The age at which the cases were diagnosed varied between 16 and 90 years. The average age for the control group was 45.79 ±13.3 years. Among the age groups, those between 50-59 years had the greatest prevalence of breast cancer at 27.6%, followed by those between 40-49 years at 24.7%. **(Balekouzou et al., 2017)**.

Dey et al., **2010,** used data from the population-based cancer registry of Gharbiah, Egypt to assess breast cancer incidence from 1999 through 2006. A total of 4794 female cases of BC with an average age of 50 (+11.4) years were identified. They showed that the age group 40-49 years having the highest prevalence of breast cancer (32.27%), followed by the age group 50-59 years (28.8%).

In a separate study, **Alshammari (2021),** conducted a registry-based analysis of reports from Saudi Arabia. The study period captured a total of 18017 cases among females in Saudi Arabia. The mean age across these cases ranged from 52 to 59 years. For females diagnosed with cancer, including breast cancer, the mean age ranged from 47 to 49 years.

In our study, most of the studied women (88.6%) had invasive ductal carcinoma, making it the most prevalent pathological subtype after invasive lobular carcinoma and invasive ductal carcinoma with ductal carcinoma in situ.

In accordance with our study, a retrospective analysis by **Darwish et al.(2017)** was conducted in Egypt based on

medical records from young females' patients aged <35 years with pathologically confirmed primary breast cancer. The most common pathological type was invasive duct carcinoma presented in 340 patients (83.7%).

The same histopathological type has also been found to be the most common in a cross-sectional study conducted on 200 females with carcinoma of the breast. The vast majority, 156 (95%), were diagnosed with invasive ductal carcinoma, followed by 8 (5%) with invasive lobular carcinoma **(Zahra et al., 2013)**.

A significant correlation was found between early age at menarche, obesity, oral contraceptive use, and positive family history with development of breast cancer using logistic regression analysis in the current study.

These findings were supported by **Monteiro et al.(2019)**, who discovered that having a menstrual period before the age of 12 substantially increased the risk of breast cancer.

Also, **Dossus et al.(2015),** found a similar correlation between early menarche and ILC of the breast. Furthermore, Early menarche is associated with an increased risk of breast cancer, according to research by **Tamrakar et al.(2016)**. In addition, a study in Morocco by **Laamiri et al.(2015),** indicated that early menarche is strongly linked to breast cancer in univariate level logistic regression analysis.

In a separate case-control study carried out by **El-Moselhy et al.(2017)**, involving a cohort of 400 patients diagnosed with BC. Variables linked to increased risk included attaining menarche before the age of 13, entering menopause at or after 50, and experiencing menstrual periods lasting 40 years or more. A substantial 56.5% of BC patients exhibited an age at menarche below 13 years, which was significantly linked to elevated BC risk. The use of hormonal contraceptives emerged as another notable risk factor.

Moreover, a family history of BC also demonstrated significant associations, as did a BMI of 30 or higher.

Also, corroborating our findings, a study conducted by **Alwan (2017)** among Iraqi patients revealed that 30% of individuals with breast cancer had a positive family history of cancer, with 18.5% having a family history specifically related to breast cancer.

In line with our results, analogous conclusions were drawn from studies in Saudi Arabia by **Alsolami et al. (2019)** and in Kazakhstan by **Toleutay et al. (2013)**. These studies highlighted a heightened likelihood of breast cancer among women with prolonged use of hormonal contraception.

Further corresponding with our own findings, **Qadire (2017)** case-control study involving Jordanian women, encompassing 418 breast cancer cases and 405 cancer-free controls, underscored that advanced age at marriage, having a first-degree relative diagnosed with breast cancer, and the utilization of hormone replacement therapy were all associated with an increased risk of developing breast cancer. The mean age of women in the breast cancer group was 49.2 years, while in the control group, it was 45.9 years. Predominantly, both groups comprised married women, with percentages of 90.1% in the case group and 93.5% in the control group.

Limitation of the study: The study may have relied on specific healthcare facilities or databases, potentially excluding individuals who did not seek medical attention or receive a breast cancer diagnosis. The sample size was limited and findings from Qena Governorate may not be generalizable to other regions due to variations in risk factors, healthcare access, and cultural differences.

Conclusion

Incidence of breast cancer is greatest in women aged50-59(28.8%), followed by those ages40-49(28%). Having a favorable family history, being overweight, using

oral contraceptives, and reaching menarche at a young age were all linked to an amplified possibility of breast cancer.

This study acquired information about various risk factors and their impacts on the incidence of breast cancer in different age groups allowing for identifying which age groups have the highest incidence and help in targeting screening, prevention, and

early treatment. Also, the study identified age-specific risk factors for breast cancer which may contribute to the development of targeted public health campaigns and educational programs aimed at reducing these risks.

Conflict of Interests: The authors report no conflicts of interest.

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