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wjbmedsc@gmail.com / wjbms.lko@gmail.com

RESEARCH PAPER

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Risk factors in Sudanese Breast Cancer patients in Radiation and Isotopes Centre Khartoum (RICK) – Sudan

Osman Abdallah E. Elnoubi

Najran University College of Applied Medical Science, Microbiology Department, KSA

ABSTRACT

Breast cancer is the most common among female comprises about (18%) of all female cancers, with (1.7) million new cases in the world each year. Recently some studies reported that approximately (18%) of cancer cases can be linked to to some risk factor like age, sex, social habits. The objectives of this study were to investigate the relation between breast cancer in Sudanese patient and certain risk factor in the area of the one hundred forty three females diagnosed with histopathological examinations to have breast cancer (n=100 patients) or breast inflammatory conditions (n=43 patients) were employed in this study. The risk factors associated with breast cancer were taken from patient's records. The data were subjected to analytical and descriptive statistical analysis. Out of the cases screened for breast pathology, 41(29%) patients were found to have, invasive ductal carcinoma, 21(15%) invasive lobular carcinoma, 12(8%) invasive micropapillary carcinoma, 26(18%) medullary carcinoma and 43(30%) have inflammatory breast conditions. Significant relationship between breast cancer types and other risk factor such as, age (P=0.0012), breast feeding (P= 0.0430), stage of BC and practicing of exercises (P = 0.0024), duration of illness (P=0.0285), family history (P=0.0432) finally strong significant relation between breast inflammatory conditions and any type of breast cancer was founded (P =0.0000). In conclusion, the findings of this study provide strong association between some risk factors and BC in Sudan.

Key wards: Breast cancer, RICK, Risk factor and Radiation.

INTRODUCTION

Breast cancer is the most common among female comprises about (18%) of all female cancers, with (1.7) million new cases in the world each year,

Several risk factors for BC have been well documented however, for the majority of women presenting with BC it are not possible to identify specific risk factors. (Bernardo Vetal 2007. Bernstein L, Henderson BE, Hanisch R, etal 2005). A familial history of BC increases the risk by a factor of (2 or 3) the risk increases to (9-fold) for first-degree relatives of premenopausal women with bilateral BC. Up to (5-fold) increases in risk have been found for women with multiple first-degree relatives with BC, moreover there are rare familial syndromes such as Li-Fraumeni, in which there is an association with BC at a young age. Some mutations, particularly in (*BRCA1*, *BRCA2*) and (*P53*) result in a very high risk for BC women with *BRCA1* mutation are estimated to have lifetime risks about (80%) of developing BC and characterized by elevated cancer risk at younger ages.

Also the risk factors for BC may be divided into preventable and non-preventable BC like other forms of cancer can result from multiple environmental and hereditary risk factors. The term "environmental" means any risk factor that is not genetically inherited. For breast cancer, the list of environmental risk factors includes the individual person's development, exposure to microbes, "medical interventions dietary exposures to nutrients, energy and toxicants, ionizing radiation, and chemicals from industrial and agricultural processes and from consumer products reproductive choices, energy balance, adult weight gain, body fatness, voluntary and involuntary physical activity, medical care, exposure to tobacco smoke and alcohol, and occupational exposures, including shift work" as well as "metabolic and physiologic processes that modify the body's internal environment. (Bocci G, Fasciani Aetal . 2012) . Some of these environmental factors is part of the physical environment, while others (such as diet and number of pregnancies) are primarily part of the social, cultural, or economic environment.(Bottini A, Berruti A, etal, 2012). Although many epidemiological risk factors have been identified, the cause of any individual BC was most often unknowable. Epidemiological research informs the patterns of breast cancer incidence across certain populations, but not in a given individual. Approximately (5%) of new BC is attributable to hereditary syndromes, and well-established risk factors accounts for approximately (30%) of cases. (Bostick PJ, Morton DL, Turner RR , etal 2010) .

Objectives

In Sudan, there are considerable numbers of BC, but there is no evidence highlighted the relation between these cancers and *the risk factors*. Therefore this study will investigate these relations.

- To find out the relation between BC with risk factors such as age, socioeconomic status, family planning, type of tissue, weight, marital status.

MATERIALS AND METHODS

One hundred forty three females diagnosed with histopathological examinations to have breast cancer (n=100 patients) or breast inflammatory conditions (n=43patients) were employed in this study. The risk factors associated with breast cancer were taken from patient's records. The data were subjected to *analytical and descriptive statistical analysis*.

RESULT

Table 1. Distribution of BC types with mean age.

Type of breast cancer	Obs	Mean age	Variance	Std Dev
Invasive ductal carcinoma	41	3.0976	.3902	.6247
Invasive lobular carcinoma	21	3.0000	.3158	.5620
Invasive micropapillary carcinoma	12	2.9167	.2652	.5149
Medullary carcinoma	26	2.4615	.3385	.5818
P= 0.0012				

This **table (1)** find out the statistical significant between breast cancers and the mean age of the patients.

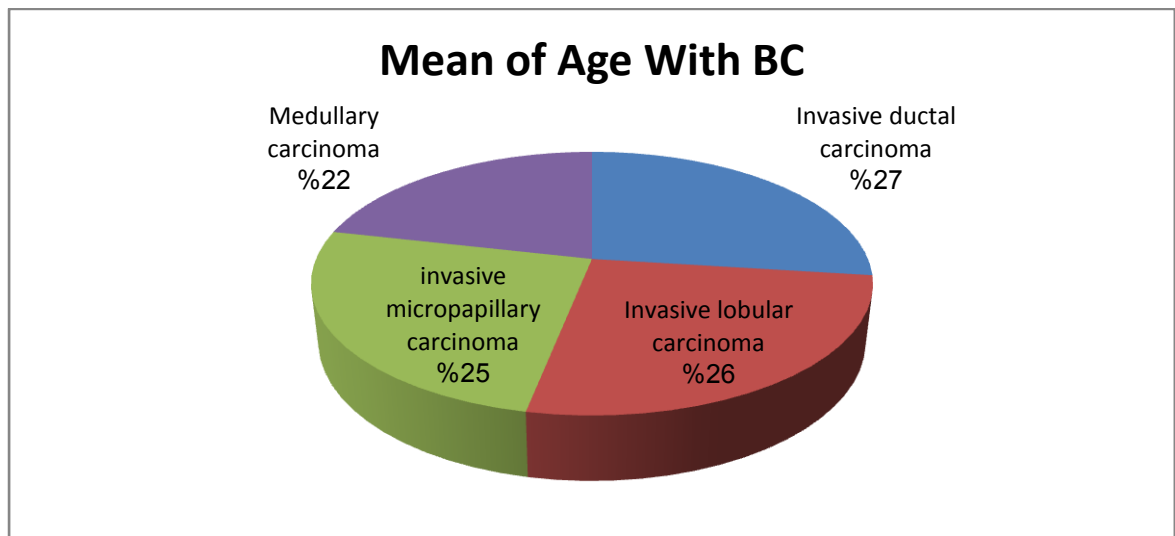


Figure 1. Description the mean age with BC types.

Table 2. Distribution of lymphoid involvement with the stage of BC.

Stage of breast cancer	Lymphoid involvement		
	Yes	No	Total
Stage 0	21(21%)	0(0%)	21
Stage I	29(29%)	0(0%)	29
Stage II	49(49%)	1(2%)	50
Total	99	1	100
(Chi square =0.8914) P= 0.3451			

This table shows the relation between stages of breast cancer and lymphoid involvement; whereas in Stage II there is more lymphoid involvement positive cases **table (2)**

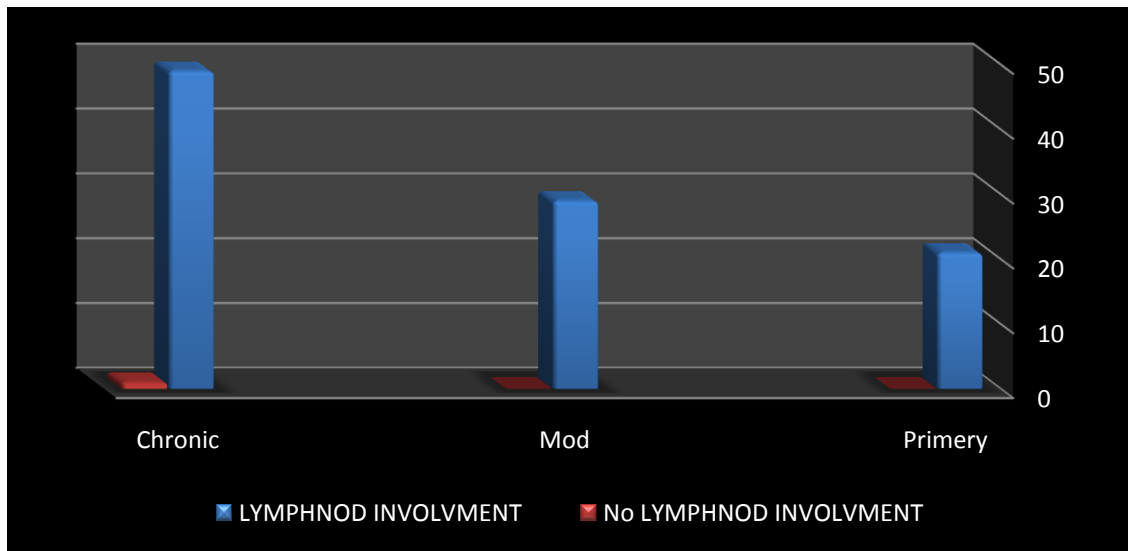


Figure 2. Description the lymphoid involvement with BC stages.

Table 3. Distribution of BC types by breast feeding.

Breast feeding criteria	Type of breast cancer				Total
	Invasive ductal carcinoma	Invasive lobular carcinoma	invasive micro papillary carcinoma	Medullary carcinoma	
less than 1 year	26(37.7%)	11(15.9%)	9(13.04%)	23(33.3%)	69
One year	12(46.2%)	8(30.8%)	2(7.7%)	3(11.5%)	26
More than one year	3(60%)	1(20%)	1(20%)	0(0%)	5
Total	41	20	12	26	100

(Chi square= 9.0052) P= 0.0430

This table shows the relation between the types of breast cancer and breast feeding and there is high incidence rate of each breast cancer types in less breast feeding patients **table (3)**.

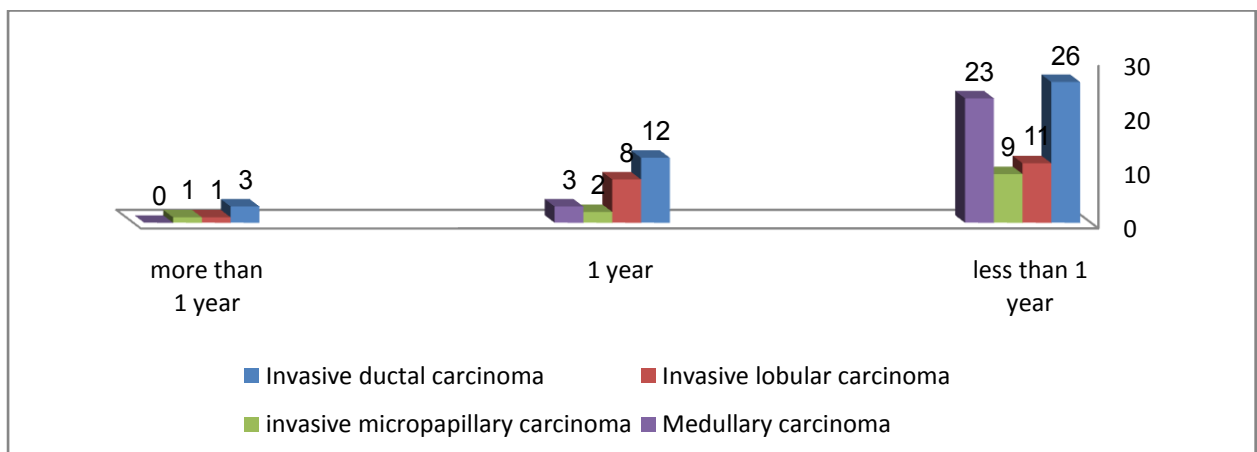


Figure 3. Description of BC type with breast feeding.

Table 4. Distributions of BC types by menstrual period.

Menstrual period	Type of breast cancer				Total
	Invasive ductal carcinoma	Invasive lobular carcinoma	invasive micro papillary carcinoma	Medullary carcinoma	
Early	1(9.1%)	3(27.3%)	2(18.2%)	5(45.5%)	11
Normal	21(46.7%)	7(15.6%)	5(11.1%)	12(26.7%)	45
Late	19(43.18%)	10(22.7%)	5(11.4%)	9(20.5%)	44
Total	41	20	12	26	100

(Chi square =3.5995) P=0.4629

The above table describing the relationship between menstrual period and breast cancer types whereas there is high percentage of each types of breast cancer in late menstrual period patients **table (4)**

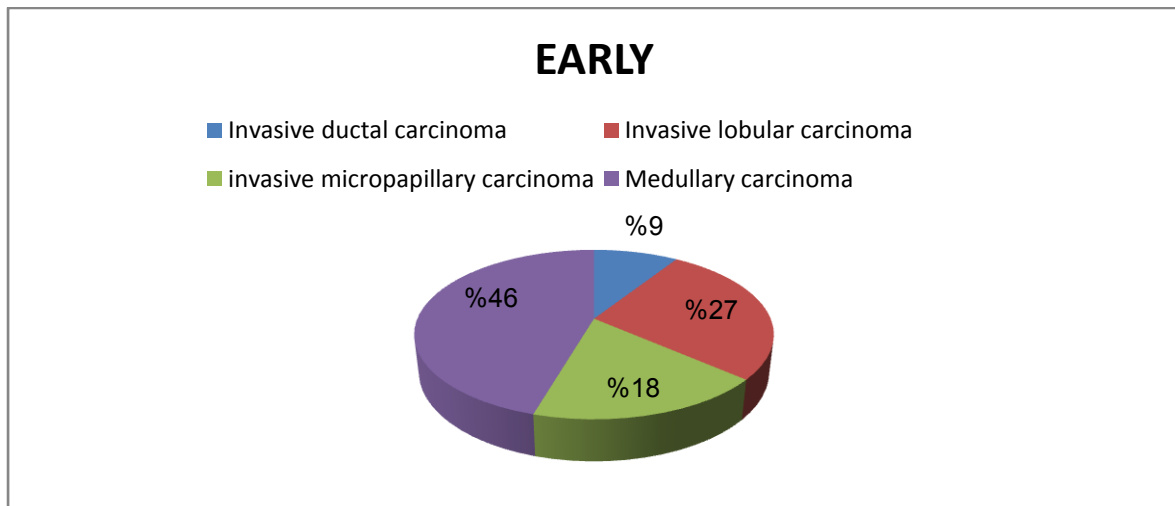


Figure 4. Description of BC types with menstrual period.

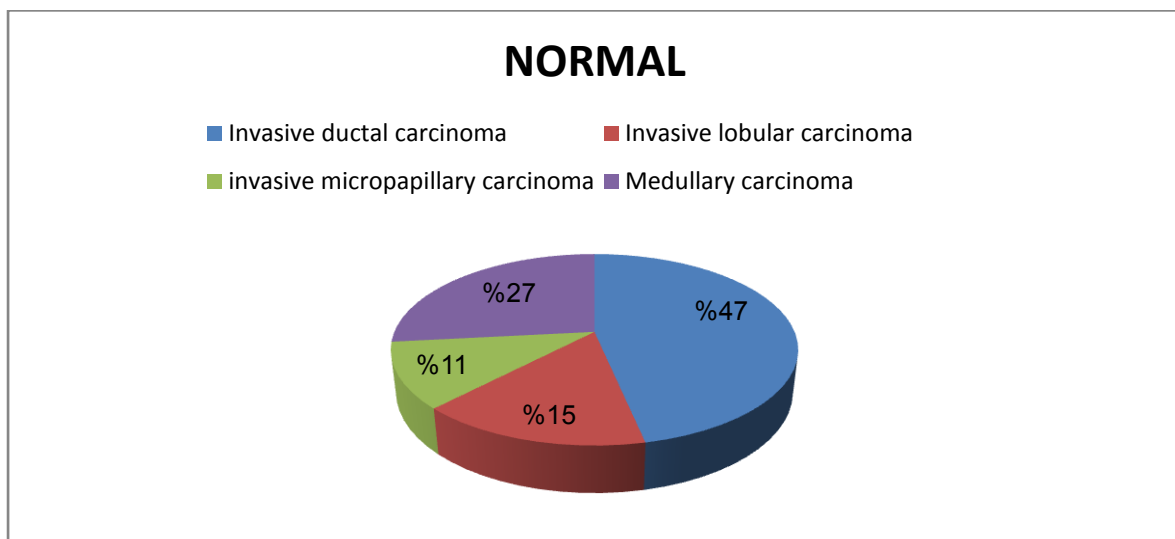


Figure 5. Description of BC type with menstrual period.

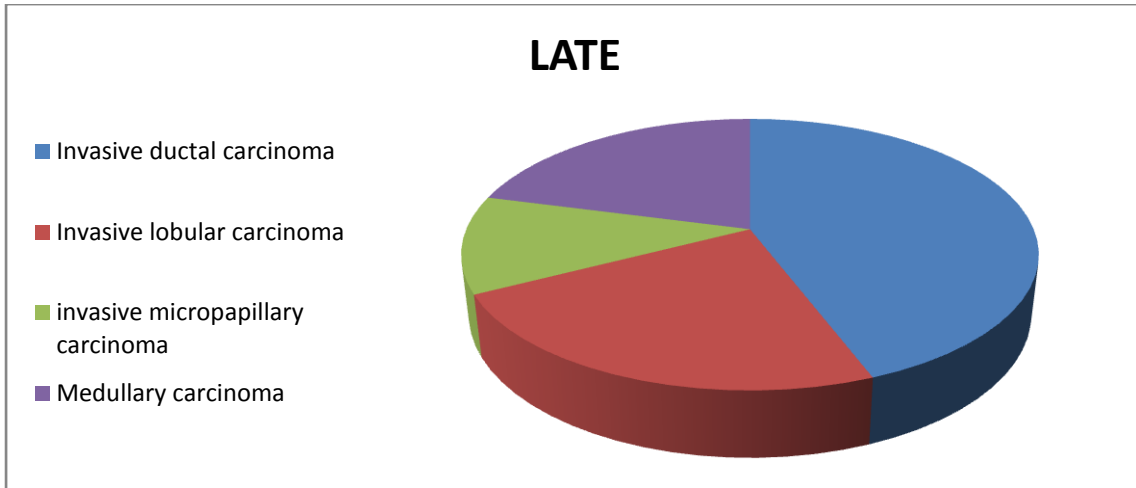


Figure 6. Description of BC types with menstrual period.

Table 5. Distribution of BC types with lymphoid involvement.

Lymphoid involvement	Type of breast cancer					
	Invasive ductal carcinoma	Invasive lobular carcinoma	Invasive papillary carcinoma	micro	Medullary carcinoma	total
Yes	41(41.4%)	21(21.2%)	12(12.1%)		25(25.3%)	99
No	0	0	0		1	1
Total	41	21	12		26	100

(Chi square =2.8462) P=0.5839

In the above table invasive ductal carcinoma is more common among patient with lymphoid involvement than other breast cancer types table (5).

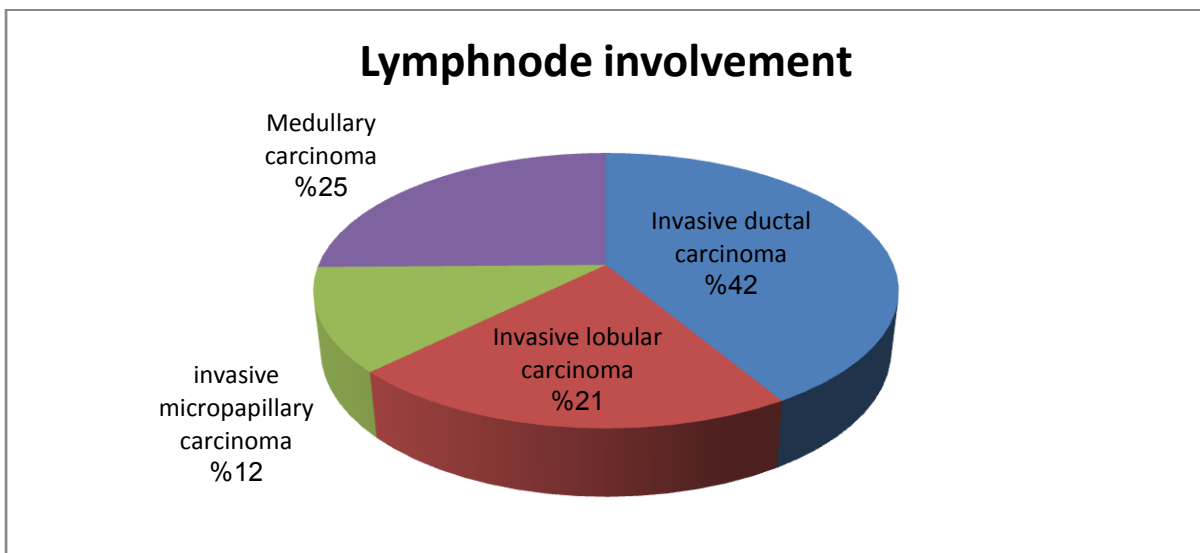


Figure 7. Description of BC types with lymphoid involvement.

Table 6. Distribution of BC stages with exercises practicing.

Stage of breast cancer	Exercises practicing		
	Yes	No	Total
Stage 0	6(28.6%)	15(71.4%)	21
Stage I	2(10%)	18(90%)	20
Stage II	1(1.7%)	58(98.3%)	59
Total	9	91	100
(Chi square = 9.2368) P=0.0024			

In this table high incidence of breast cancer found in no exercises practicing patients **table (6).**

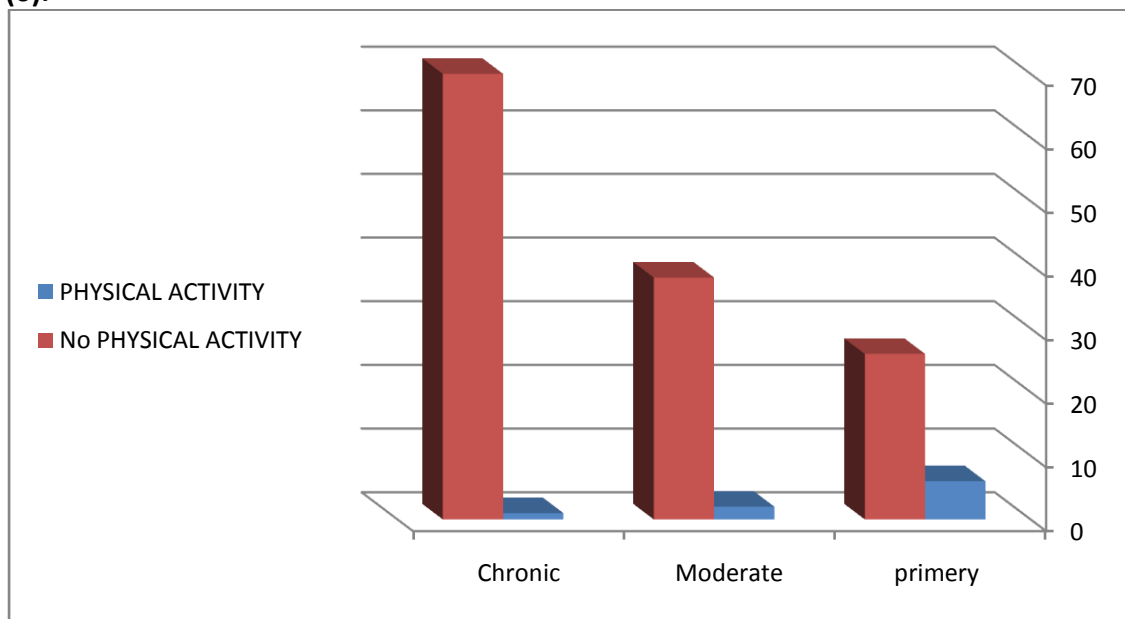


Figure 8. Description of Exercises practicing with the BC stages.

Table 7. Distribution of BC types by the duration of illness in years.

Duration of illness/ years	Type of the breast cancer				Total
	Invasive ductal carcinoma	Invasive lobular carcinoma	invasive micro papillary carcinoma	Medullary carcinoma	
(1-2)	11(28.9%)	9 (23.7%)	2(5.3%)	16 (42.1%)	38
(3-4)	23(50%)	8(17.4%)	7(15.2%)	8(17.4%)	46
(5-6)	7(43.8%)	4(25%)	3(18.8%)	2(12.5%)	16
Total	41	21	12	26	100
P= 0.0367 (T .test)		(Chi square=10.8332) P=0.0285			

The above table explains the relation between duration of illness and types of breast cancer, invasive ductal carcinoma 23(50%) is more common **table (7).**

Table 8. Distribution of BC types by family history.

Family history	Type of breast cancer				Total
	Invasive ductal carcinoma	Invasive lobular carcinoma	invasive micro papillary carcinoma	Medullary carcinoma	
Yes	10(26.3%)	9(23.7%)	4(10.5%)	15(39.5%)	38
No	31(50%)	12(19.4%)	8(12.9%)	11(2%)	62
Total	41	21	12	26	100

(Chi square=8.5562) P=0.0432

This table shows the relations between family history and breast cancer **table (8)**.

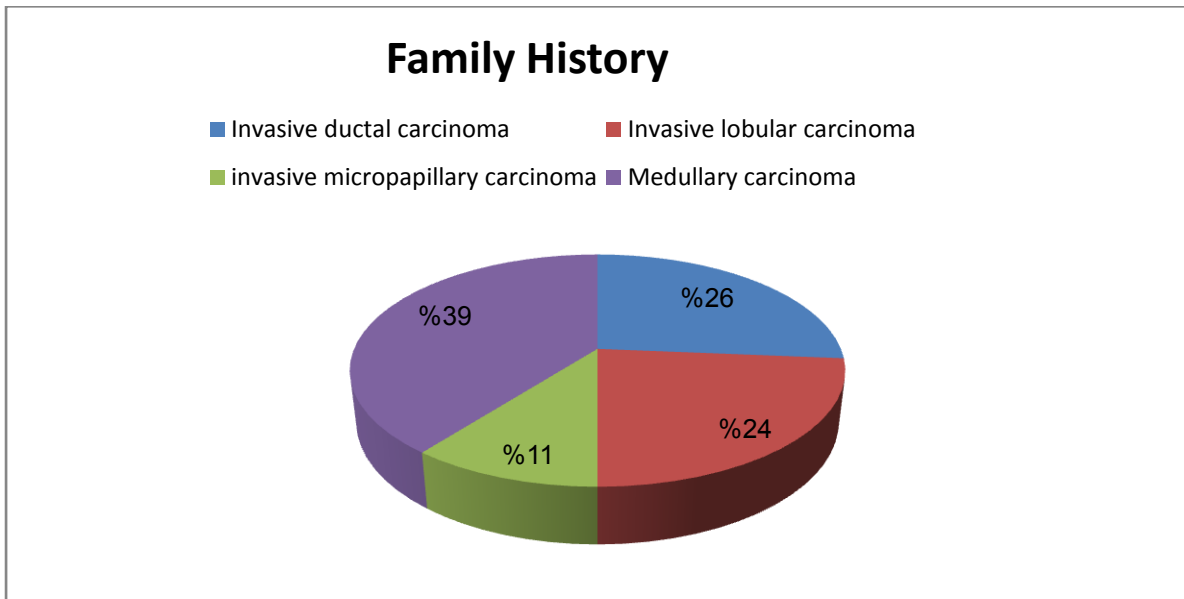


Figure 8. Description of BC types with family history.

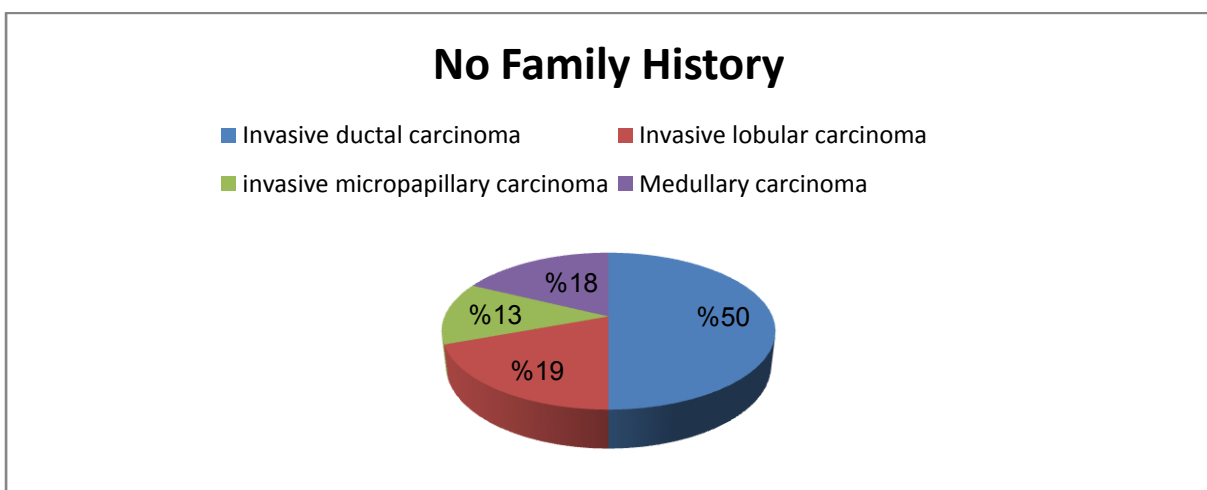


Figure 9. Description of BC types with no family history.

Table 9. Distribution of BC types with marital status.

Marital status	Type of breast cancer				Total
	Invasive ductal carcinoma	Invasive lobular carcinoma	invasive micro papillary carcinoma	Medullary carcinoma	
Single	21(38.9%)	10(18.5%)	7(13.0%)	16(29.6%)	54
Married	2(14.3%)	4(28.6%)	0(0%)	8(57.1%)	14
Divorce	18(56.3%)	7(21.9%)	5(15.6%)	2(6.3%)	32
Total	41	21	12	26	100

(Chi square= 17.4189) P=0.0016

The above table describing the relation between marital status and types of breast cancer, higher incidence rate of Invasive ductal carcinoma found in single patient than other marital status **table (9)**.

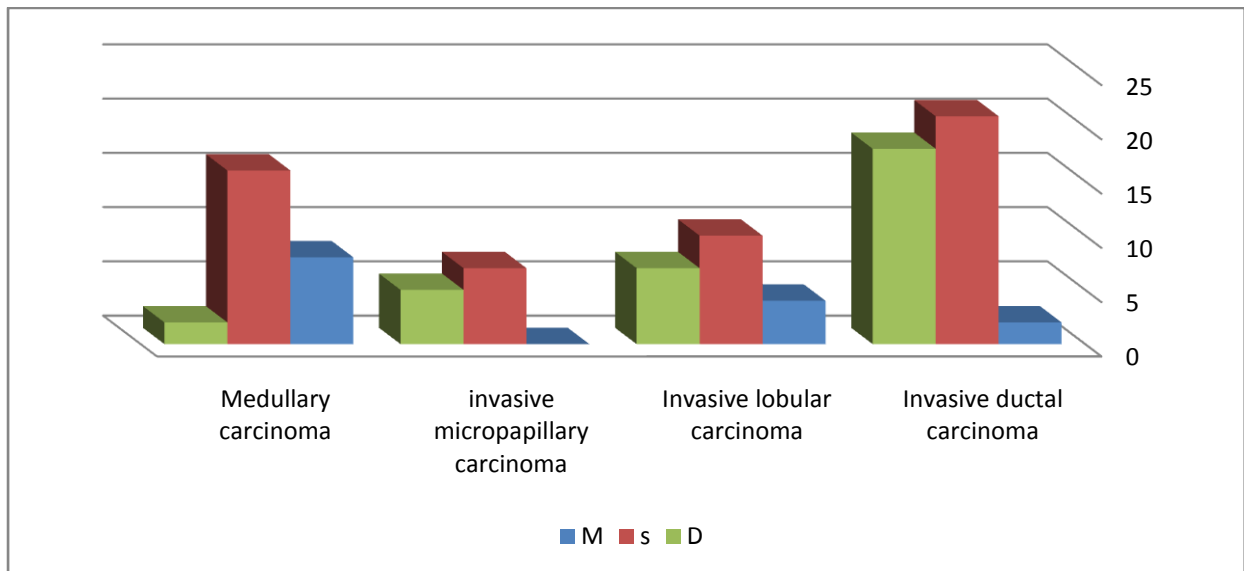


Figure 10. Description of BC types with marital status.

Table 11. Distribution of BC types by socio-economic status.

socio-economic	Type of breast				Total
	Invasive ductal carcinoma	Invasive lobular carcinoma	invasive micro papillary carcinoma	Medullary carcinoma	
House wife	17(41.5%)	6(14.6%)	6(14.5%)	12(29.3%)	41
Employee	11(42.3%)	6(23.1%)	2(7.7%)	7(26.9%)	26
Student	1(33.3%)	1(33.3%)	0(0%)	1(33.3%)	3
Others	12(40%)	8(26.7%)	4(13.3%)	6(20%)	30
Total	41	21	12	26	100

(Chi square= 21.2483) P=0.5661

This table is explain the relation between socio-economic status and types of breast cancer and Invasive ductal carcinoma as a type of breast cancer is prevails in house wives than others **table (12)**

Table 12. Distribution of BC types with dense of breast tissue.

Dense of breast tissue	Type of breast cancer				
	Invasive ductal carcinoma	Invasive lobular carcinoma	invasive micro papillary carcinoma	Medullary carcinoma	Total
Fatty	24(51.1%)	9(19.1%)	1(2.1%)	13(27.7%)	47
Fibrous	4(28.6%)	1(7.1%)	3(21.4%)	6(42.9%)	14
Granular	13(33.3%)	11(28.2%)	8(20.5%)	7(17.9%)	39
Total	41	21	12	26	100

(Chi square=10.7716) P=0.0293

The above table describing the relationship between dense of breast tissue and breast cancer types, higher incidence rate is found in fatty and granular than fibrous breast tissue table (12)

Table 13. Distribution of BC types with body weight.

Weight	Type of breast cancer				
	Invasive ductal carcinoma	Invasive lobular carcinoma	invasive micro papillary carcinoma	Medullary carcinoma	Total
Normal	4(26.7%)	3(20%)	2(13.3%)	6(40%)	15
Obese	33(45.8%)	11(15.3%)	8(11.1%)	20(27.8%)	72
Underweight	4(30.8%)	7(53.9%)	2(15.4%)	0(0%)	13
Total	41	21	12	26	100

(Chi square =7.4878) P=0.1122

Table (13) is shows the relationship between body weight and breast cancer types, invasive ductal carcinoma and other types of breast cancer is more common in obese patients.

Table 14. Distribution of BC types with family planning.

family planning	Type of breast cancer				
	Invasive ductal carcinoma	Invasive lobular carcinoma	invasive micro papillary carcinoma	Medullary carcinoma	Total
Contraceptive	17(46.0%)	4(10.8%)	2(5.4%)	14(37.8%)	37
Natural control	3(42.9%)	2(28.8%)	2(28.8%)	0(0%)	7
No family planning	21(37.5%)	15(26.8%)	8(14.0%)	12(21.4%)	56
Total	41	21	12	26	100

(Chi square=6.1559) P=0.1878

The above table is explains the relation between family planning and breast cancer table (14)

Table 15. Distribution of BC types with previous exposure to radiation.

Previous radiation	Type of breast cancer				
	Invasive ductal carcinoma	Invasive lobular carcinoma	invasive micro papillary carcinoma	Medullary carcinoma	Total
Yes	10(37.0%)	7(26.0%)	1(3.7%)	9(33.3%)	27
No	31(42.5%)	14(19.2%)	11(15.1%)	17(23.3%)	73
Total	41	21	12	26	100
(Chi square= 5.7649) P=0.2174					

Table (15) is describing the relation between previous exposures to radiation and breast cancer, high incidence rates of each type of breast cancer is found in no previous exposure to radiation patients.

Table 16. Distributions of BC types with metastasis.

Metastasis	Type of breast cancer				
	Invasive ductal carcinoma	Invasive lobular carcinoma	invasive micro papillary carcinoma	Medullary carcinoma	Total
Yes	35(52.2%)	17(25.3%)	11(16.4%)	4(6.0%)	67
No	6(18.2%)	4(12.1%)	1(3.0%)	22(66.7%)	33
Total	41	21	12	26	100
(Chi square=42.4781) P=0.0000					

Table (16) is shows the relation between metastasis and types of breast cancer, Invasive ductal carcinoma 35(52.2%) is found more common in metastasis.

DISCUSSION

In regard to association between body weight and BC types this study found there is no significant relation between body weight and each type of BC in this study ($P=0.1122$). This result is supported by other result which found that gaining weight after menopause can increase a woman's risk factor.⁽⁸³⁾ Gaining (10) kg after menopause increased the risk of developing breast cancer by (18%). Lack of exercise has been linked to breast cancer.⁽⁸⁴⁾ Physical activity after breast cancer diagnosis has shown some associations with reducing BC recurrence and mortality independent of weight loss.⁽⁸⁵⁾ Other study in USA^(45, 67) found that weight change and obesity are risk factors for BC in women.

In association between breast feeding and BC types, this study found that at less than (1) year of breast feeding 26(37.7%) patients were found to have invasive ductal carcinoma as type of breast cancer, at one year breast feeding 12(46.2%) patients have invasive ductal carcinoma at more than one year there is 3 patients were found to have invasive ductal carcinoma, there is significant relationship between breast feeding and each type of breast cancer was determined in this study ($P= 0.0430$).

Similar finding were found^(34, 35) in their study which involving (13,907) breast cancer cases there study found that the duration of breast feeding was associated with the risk of breast cancer.

According to the relation between the dense of the breast tissue and BCtypes this study found in fatty breast tissue 24(51.1%), patient were found to have invasive ductal carcinoma 9(19.1%) invasive lobular carcinoma, 1(2.1%) invasive micropapillary carcinoma 13(27.7%) medullary carcinoma. In fibrous breast tissue 4 (28.6%) invasive ductal carcinoma were found, 1(7.1%) invasive lobular carcinoma, 3(21.4%), invasive micropapillary carcinoma, and 6(17.9%) medullary carcinoma, in granular breast tissue 13 (33.3%) invasive ductal carcinoma, 11(28.2%) invasive lobular carcinoma, 8(20.5%) micropapillary carcinoma and 7(17.9%) medullary carcinoma. There is significant relation between dense of breast tissue and BCwas investigated ($P=0.0293$).^(98, 99) They found the type of breast tissues is considered as essential part in risk factor of breast cancer.

In regard to the relation between metastasis and BCtypes this study found in metastasis patient 35(52.2%) patients were found to have invasive ductal carcinoma 17(25.3%) have invasive lobular carcinoma 11(16.4%) have invasive micropapillary carcinoma and 4(6.0%) patients have medullary carcinoma. Invasive ductal carcinoma is more common. In no metastasis patient 6(18.2%) patients were found to have invasive ductal carcinoma, 4(12.1%) patients have invasive lobular carcinoma, 1(3.0%) patients have invasive micropapillary carcinoma and 22(66.7%) patients have medullary carcinoma there is strong significant relationship between metastasis breast cancer and any type of breast cancer in this study ($P=0.0000$).

Other study such as^(67, 77) which found that there was association between the grade of cancers and the types.

RECOMMENDATIONS

1. To avoid, whenever possible, the risk factors which may accelerate the development of BCs such as smoking, use of contraceptive drugs, exposure to irradiation, etc.
2. To nip in the bud any development of BC, primary and secondary school girls are to be trained for self-investigation of any breast tumors.
3. The advent of both stationary centers and mobile units for the early diagnosis of breast cancer in all states of the Sudan.

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Corresponding author: Osman Abdallah E. Elnoubi, Najran University College of Applied Medical Science, Microbiology Department, KSA.

Email: osmanelnoubi@gmail.com