Annals of Medicine and Surgery 81 (2022) 104560

Contents lists available at ScienceDirect

Annals of Medicine and Surgery

journal homepage: www.elsevier.com/locate/amsu

Cohort Study

Short term recurrence and survival rate of breast cancer patients post surgical treatment; north borneo experience

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ARTICLE INFO

Keywords:
Breast cancer
Recurrence
Borneo

ABSTRACT

Introduction: Breast cancer is the most common cancer among women and one of the major causes of mortality and morbidity worldwide. The aim of this study is to determine two-year cumulative recurrence rates and survival rates and their influential factors among women with breast cancer after surgical treatment.

Methods: The breast cancer registry with focus on patient's outcome after treatment was retrospectively review for relevant data. The study was started on 2019. All breast cancer patients who underwent surgical procedure between 2016 and 2019 were identified and recruited in this study and was follow up for two year. We performed Kaplan Meier method to determine 2-year recurrence rates and survival rates and compared unadjusted survival statistics using Log-rank test between baseline variables and outcomes.

Result: From 2016 to 2019, a total of 482 breast cancer patients underwent surgical procedure. The overall observed 2-year recurrence rate among breast cancer patients after surgical treatment was 11.8% (95% CI:8.5,16.4) while for the survival rate was 94.8% (95% CI:91.8,96.7). Log rank test showed that lymph node involvement ($p < 0.001$) and high lymph node ratio ($p < 0.001$) were associated with higher cumulative recurrence rates. Meanwhile, stage 4 breast cancer ($p = 0.001$), higher grade tumour ($p = 0.011$), larger tumour size (>5 cm) ($P = 0.005$) and type of tumour ($p = 0.018$) were demonstrated to have lower survival rates.

Conclusion: Recurrence rate were significant predictor among patient with lymph node involvement and higher lymph node ratio, while stages of tumour, tumour grade, size of tumour and type of tumour were all highly significant predictor for survival rate. Therefore, the aim for early diagnosis and management of breast cancer is crucial in improving the treatment outcome.

1. Introduction

Breast cancer is the most well-known risk in women and is responsible for approximately 25% of all malignant tumours worldwide [1]. Recently, a well-done analysis of the Global Cancer Burden Study announced a further increase in the growth rate of breast cancer with a total of 2.3 million cases in 2020 [2]. Despite advances in basic therapy, metastatic breast cancer is still treated with a palliative purpose [3]. In 2016, Malaysia National Cancer Registry recorded 4,621 cases of female breast cancer, representing 16.5% of all cancer cases recorded in that year. The overall age-standardised rate was 34.4 per 100,000 population and each Malaysian woman has a 1 in 2 chance to develop breast cancer in her lifetime [4]. Cancer incidence in Malaysia is expected to increase due to increasing life expectancy, better socio-economic status and changing lifestyles. The initiative to combat the global breast cancer includes comprehensive control programmes that include prevention, early detection, diagnosis and treatment, as well as rehabilitation and palliative care [5]. The rationale for prevention and early detection lies in promoting awareness of breast cancer such as eliminating or minimising risk factors associated with cancer risk factors and thus to reduce mortality. The survival rate is an important measure of cancer severity and an essential mean for monitoring and evaluating the effectiveness of cancer control [6].

The surgical management of breast cancer in our centre in Kota

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https://doi.org/10.1016/j.amsu.2022.104560
Received 21 April 2022; Received in revised form 28 August 2022; Accepted 28 August 2022
Available online 2 September 2022

Kinabalu, Sabah has been established for many years and the population-based cancer registry had been recorded but the recurrence and survival rate post-surgery are scarcely reported. There are limited population-based breast cancer recurrence and survival rate studies in Malaysia being published apart study by [7] Meanwhile, no research has been conducted and published on the recurrence and survival outcomes post-surgery among the breast cancer patient in our centre. Therefore, the purpose of this research is to determine the overall two year recurrence and survival rate among patient with breast cancer after surgical treatment.

2. Materials and methods

This was a retrospective cohort study, where data were obtained from the breast cancer registry at Breast Clinic in the tertiary hospital in Kota Kinabalu, Sabah. The studies sample recruited among women who diagnosed with breast cancer and underwent breast mastectomy surgery, breast conserving surgery, mastectomy with reconstruction surgery, mastectomy with axillary clearance and mastectomy with wide local excision surgery between 1 January 2016 to 31 December 2019. No sampling technique applied as all the patients underwent breast cancer surgery within the study period who fulfil the inclusion criteria were included. We excluded participant that defaulted treatment, incomplete medical report and refused surgical treatment. A data collection form (DCF) was designed to record the patients' demographic characteristics, the prognostic factors, recurrence and survival rate. Sample size required in this study was calculated to develop multivariable model using Cox Regression Proportional Hazard Model to determine the prognostic factor for Recurrence and Survival rate among post-surgical breast cancer patient. The required sample size was determined based on "rule of thumb" formula that is at least 10 events per predictor parameter (Peduzzietal.1996). A data were recorded first in Microsoft Excel Spread sheet before conducting further statistical analysis using STATA/SE12.0 (Stata Corp, College Station, TX, USA, nd). To determine the recurrence rate and 2-year overall survival rate among breast cancer patients, Kaplan-Meier method was used. This method also called 'Time to Event' Analysis as the goal is to estimate the time for an individual or a group of individuals to experience an event of interest (recurrence rate and survival rate). The estimated survival probabilities are computed using a product limit formula which was based on information from samples given survival time and failure status information. For better illustration of the proportion of individuals that are still alive (surviving) at first, second and third year post surgery procedure, a Kaplan-Meier Curve was plotted. Subsequently, log rank test was applied to test the equality of survival curves for each patient characteristics on recurrence and survival rates. This study was registered under National Malaysian Research Registry (NMRR) and approved by the Malaysia Research Ethic committee (MREC).

3. Results

3.1. Participants demographic characteristics and clinical states

A total of 482 women with breast cancer after surgical treatment were included in the study. The mean age of the patients at the time of diagnosis was 52.1 ± 11.7 years (range 23–88 years) The summary of the frequency and percentage of the main demographic characteristics and clinical states of the study samples are presented in Table 1.

Two Years Overall Cumulative of the Recurrence Rate and Survival Rate after Surgical Treatment.

The recurrence rate and overall survival rate in 2 years period among breast cancer patients in our centre after surgical treatment was analysed using Kaplan-Meier Analysis method. The overall observed 2 years recurrence rate among breast cancer patients after surgical treatment in Kota Kinabalu, Sabah was 11.2% (Fig. 1)while for the survival rate was 94.8% (Fig. 2). Recurrence and survival rate (Table 2). The cumulative

Table 1
Demographic and clinical characteristics of patients.

Variable	Mean (SD)	(n = 482)
		n (%)
Age (Years)	52.1 (11.7)	
<30		9 (1.9)
30–40		74 (15.4)
41–50		143 (29.7)
>50		256 (53.1)
BMI (kg/m^2)	26.4 (5.2)	
<18.5		13 (2.7)
18.5–24.9		198 (41.1)
25–29.9		165 (34.2)
≥30		106 (21.9)
Race		
Kadazan/Dusun		160 (33.2)
Chinese		91(18.9)
Bajau		57(11.8)
Brunei		27(5.6)
Melayu		21(4.4)
Bugis		16(3.3)
Murut		14(2.9)
Bisaya		10(2.1)
Suluk		12(2.5)
Other ethnics		74(15.4)
Age at Menarche (Years)	13.2 (1.5)	
Age Menopause (Years)*	49.8 (4.7)	
Stage(s) of breast cancer		
1st		37(7.7)
2nd		191 (39.6)
3rd		115 (23.9)
4th		139 (28.8)
Size of Tumour (cm)		
<2		80(16.6)
>2-5		269 (55.8)
>5		133 (27.6)
Type of Tumour		
Invasive Ductal Carcinoma		461 (95.6)
Invasive Lobular Carcinoma		9(1.8)
Others		12(2.5)
Grade of Tumour		
1		96(19.9)
2		229 (47.5)
3		157 (32.6)
Vascular Invasion		
Yes		240 (49.8)
No		242 (50.2)
Estrogen Receptor status		
Positive		350 (72.6)
Negative		132 (27.4)
Progesterone Receptor status		
Positive		289(60)
Negative		193(40)

(continued on next page)

Table 1 (*continued*)

Variable	Mean (SD)	(n = 482)
		n (%)
HER2 status		
Positive		236(49)
Negative		246(51)
Treatment		
Surgery ± Radiotherapy		62(13)
Surgery ± Chemotherapy ± radiotherapy ± hormonal therapy ± targeted therapy		205 (42.5)
Surgery w/wo radiotherapy w/wo Hormonal therapy ± targeted therapy		215 (44.6)
Lymph node involvement		
Yes		216 (44.8)
No		266 (55.2)
Lymphatic Invasion		
Yes		247 (51.2)
No		235 (48.8)
Number of Lymph Node affected		
1 to 3		99(46.1)
4 to 9		81(37.7)
≥10		35(16.3)
Lymph Node Ratio		
<0.20		340 (70.5)
0.20–0.65		93(19.3)
>0.65		49(10.2)

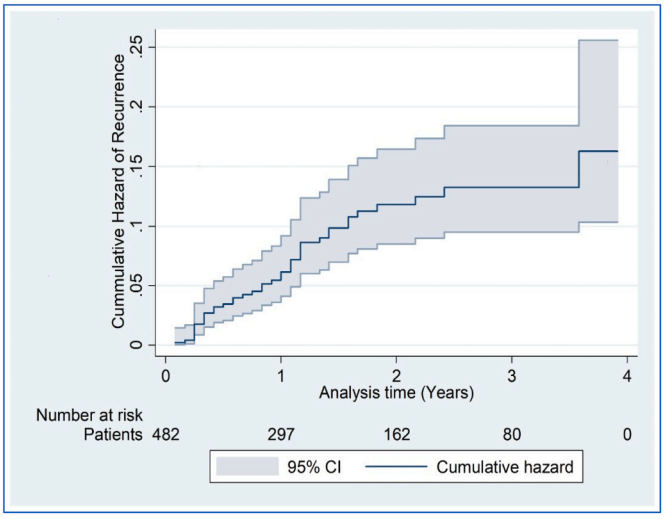

Fig. 1. Overall observed 2 years cumulative recurrence rate among patient with breast cancer after surgical treatment.

two-year recurrence rate and survival rate by the Kaplan-Meier method are presented in Tables 3 and 4.

The two-year cumulative recurrence rate by age was among patients aged 30–40 years (16.3%), Age was not a significant predictor of recurrence (p = 0.336).Patients with BMI <18.5 reported to have highest recurrence rate (33.3%) but those with normal BMI. BMI is insignificant predictor of recurrence (p = 0.632).The stages of tumour showed higher recurrence in stage 4 (18.8%). However statistically it was not significant (p = 0.393). The recurrence rate was lower for grade 1–2 as compared to grade 3 but it was not significant (9.8% vs. 13.9%, p = 0.352). Similarly, patient with larger size of tumour, >5 cm experience higher recurrence rate (12.7%) However, it was also not a significant predictor of recurrence (p = 0.627). The type of tumour was not a

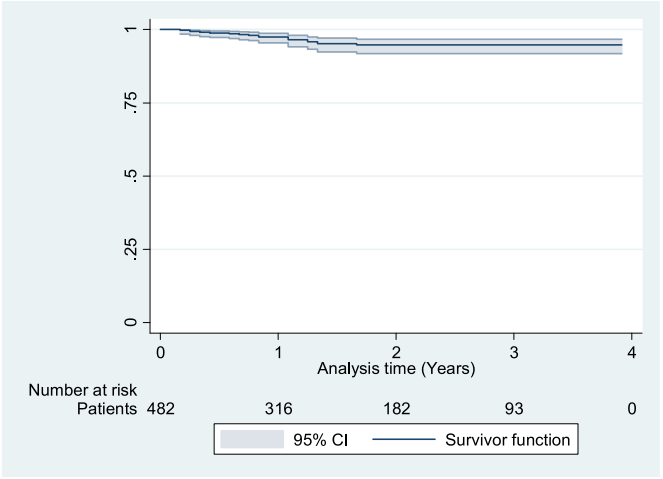

Fig. 2. Overall Observed two years Cumulative Survival Rate among patient with Breast Cancer after Surgical Treatment.

Table 2
Recurrence and survival rate of patients.

Breast Cancer Patients	All Patients (n = 482)
Recurrence	
2 year Recurrence Rate (95% CI)	11.8% (8.5,16.4)
Survival	
2 year Survival rate (95% CI)	94.8% (91.8,96.7)

significant predictor of recurrence (p = 0.139). However, patients with Invasive Ductal Carcinoma (IDC) showed a higher recurrence rate (11.7%) than those with Invasive Lobular Carcinoma (ILC) The status of estrogen, progesterone and HERS receptor. Statistically, these variables were insignificant (p > 0.05) nevertheless, Patient with positive estrogen receptor and progesterone receptor show higher recurrence rate (11.5%, 13.9%), instead, those with positive HER2 Receptor show lower recurrence rate. The involvement of lymph node was highly related to recurrence rate (p = 0.008). Patient with one lymph node or more show 17.6% recurrence rate as for those without lymph node involvement, the recurrence rate was only 6.0%. Correspondingly, patients with higher lymph node ratio showed higher risk to experience recurrence of breast cancer. Those with lymph node ratio >0.65 have 26.9% recurrent rate as compared to lymph node ratio <0.20 and lymph node ratio 0.20–0.65 (15.6% and 23.3%). Therefore, Lymph node ratio is a significant predictor of recurrence for breast cancer (p < 0.001).

Meanwhile, for the two-year cumulative survival rate of post-surgical among breast cancer patients by age, data showed that it was not significant (p = 0.531). The highest rate of death was among patients aged 30–40 years. Patient with normal BMI (18.5–24.9) have highest survival rate (96.7%), BMI is an insignificant predictor of survival (p = 0.337). The stages of tumour were an incredibly significant predictor for survival rate (p = 0.001). Lower survival among patients in stage 4 (88.8%).The tumour grade was also a significant predictor for survival, where the survival rate was higher for patients with tumour grade 1–2 (96.8%) and lower survival for patients with grade 3 (90.8%). Likewise, patients with larger size of tumour, >5 cm have much lower survival rate (89.8%) as compared to those with tumour size <5 cm (97.1%) and tumour size was also a significant predictor of survival (p = 0.005). Besides, the type of tumour was also a significant predictor of survival (p = 0.018) where the patients with Invasive Ductal Carcinoma (IDC) showed a higher survival rate (95.4%). Furthermore, the status of estrogen receptor, progesterone receptor and HERS receptor showed an insignificant predictor for survival (p > 0.05). The involvement of lymph node was not a significant predictor to survival rate (p = 0.980). There

Table 3
Kaplan Meir Analysis on Recurrence Rate of Post-Surgical Breast Cancer patients (n = 482).

Characteristics	Cases (n,%)	Recurrence (n,%)	Cummulative 2 year Recurrence rate (%)	95% CI	*p* value
Age					
<30	9 (1.9)	1 (11.1)	0	0	0.336
30–40	74 (15.4)	9 (12.2)	17.5	8.9, 34.3	
41–50	143 (29.7)	15 (10.5)	13.9	8.1,23.9	
>50	256 (53.1)	16 (6.3)	9.5	5.6,16.1	
BMI					
<18.5	13 (2.7)	1 (7.7)	33.3	4.7,236.6	0.6315
18.5–24.9	198 (41.1)	14 (7.1)	10.1	5.9,17.3	
25–29.9	165 (34.2)	14 (8.5)	12.7	7.4,21.9	
≥30	106 (21.9)	12 (11.3)	13.1	6.6,25.9	
Stage					
1 to 3	343 (71.2)	26 (7.6)	10.57	6.9,16.2	0.3931
4	139 (28.8)	15 (10.8)	14.8	8.8,24.8	
Grade					
1 to 2	325 (67.4)	25 (7.7)	10.3	6.7,15.9	0.3515
3	157 (32.6)	16 (10.2)	14.9	8.9,24.8	
Size Tumour					
<5 cm	349 (72.4)	27 (7.7)	11	7.3,16.6	0.6273
>5 cm	133 (27.6)	14 (10.5)	13.5	7.7,23.5	
Type of Tumour					
Invasive Ductal Carcinoma	461 (95.6)	41 (8.9)	12.6	8.9,17.3	0.1391
Invasive Lobular Carcinoma and Others	21 (4.4)	0 (0)	0	0	
Estrogen Receptor					
Negative	132 (27.4)	10 (7.6)	12.1	6.2,23.3	0.8570
Positive	350 (72.6)	31 (8.9)	11.8	8.0,17.3	
Progestron Receptor					
Negative	193 (40)	19(9.8)	14.9	9.2,24.0	0.314
Positive	289 (60)	22(7.6)	9.9	6.3,15.7	
HER2 Receptor					
Negative	246 (51)	17 (6.9)	10.4	6.3,17.1	0.2235
Positive	236 (49)	24(10.2)	13.2	8.5,20.6	
Number of Lymph Node Involved					
0	267 (55.4)	15 (5.6)	6.2	3.5,10.9	0.0087
≥1	215 (44.6)	26 (12.1)	19.1	12.8,28.6	
Lymph Node ratio					
<0.20	340 (70.5)	17 (5)	5.7	3.4,9.7	<0.001
0.20–0.65	93 (19.3)	14 (15.1)	26.2	15,45.6	
>0.65	49 (10.2)	10 (20.4)	30.4	15.9,57.9	

Table 4
Kaplan meir analysis on survival rate of post-surgical among breast cancer patients (n = 482).

Characteristics	Cases (n,%)	Death (n,%)	Cummulative 2 year Survival rate (%)	95% CI	*p* value
Age					
<30	9 (1.9)	0(0)	0(0)	0	0.531
30–40	74 (15.4)	5(6.8)	91	79.5,96.2	
41–50	143 (29.7)	5(3.5)	94.4	86.9,97.7	
>50	256 (53.1)	8(3.1)	96.1	92.2,98.1	
BMI					
<18.5	13 (2.7)	1 (7.7)	91.7	53.9,98.8	0.337
18.5–24.9	198 (41.1)	5(2.5)	96.7	92.3,98.7	
25–29.9	165 (34.2)	9(5.5)	91.7	84.4,95.7	
≥30	106 (21.9)	3(2.8)	95.9	87.9,98.7	
Stage					
1 to 3	343 (71.2)	6(1.8)	97.6	94.5,98.9	0.001
4	139 (28.8)	12 (8.6)	88.8	80.9,93.5	
Grade					
1 to 2	325 (67.4)	7 (2.2)	96.8	93.2,98.5	0.011
3	157 (32.6)	11 (7)	90.8	83.9,94.9	
Size Tumour					
<5	349 (72.4)	7(2)	97.1	93.9,98.7	0.005
>5	133 (27.6)	11 (8.3)	89.8	82.2,94.2	
Type of Tumour					
Invasive Ductal Carcinoma	461 (95.6)	15 (3.3)	95.4	92.4,97.2	0.018
Invasive Lobular Carcinoma and Others	21 (4.4)	3 (14.3)	83.6	57.3,94.4	
Estrogen Receptor					
Negative	132 (27.4)	6(4.6)	93.5	85.7,97.1	0.507
Positive	350 (72.6)	12 (3.4)	95.2	91.7,97.3	
Progestron Receptor					
Negative	193 (40)	10 (5.2)	92.7	86.7,96.1	0.154
Positive	289 (60)	8(2.8)	96.2	92.4,98.1	
HER2 Receptor					
Negative	246 (51)	9(3.7)	94.7	89.9,97.2	0.966
Positive	236 (49)	9(3.8)	94.8	90.2,97.3	
Number of Lymph Node Involved					
0	267 (55.4)	10 (3.8)	94.8	90.5,97.2	0.980
≥1	215 (44.6)	8(3.7)	94.8	89.7,97.4	
Lymph Node ratio					
<0.20	340 (70.5)	10 (2.9)	95.9	92.5,97.8	0.203
0.20–0.65	93 (19.3)	4(4.3)	93.9	84.3,97.7	
>0.65	49 (10.2)	4(8.2)	88.9	72.6,95.8	

was no different percentage in survival rate for both with or without lymph node involvement (94.8%). Furthermore, patients with higher lymph node ratio showed lowest survival rate. Those with lymph node ratio >0.65 have 88.9% survival rate as compared to lymph node ratio <0.20 and lymph node ratio 0.20–0.65 (95.9% and 93.9%), yet it was

not a significant predictor for survival ($p > 0.203$).

4. Discussion

This current study showed that the overall observed 2-year recurrence rate among breast cancer patients after surgical treatment was 11.2% while for the survival rate was 94.8% [8]. selected 503 female patients with invasive breast cancer and estimated the risk factors for local and recurrence rate and overall survival by univariate and multivariate analysis showed quite similar finding with our study, which is around 9.1% recurrence rate occurred within 2- year from surgery and the overall survival at 10 years was 10.0% for patients with early recurrence and 87.5% for patients with late recurrence. In different study [9], revealed that three-year and five-year survival rates were 87.6% and 78.4%, respectively with 10% recurrence rate. In general, there is no significant different of our study findings compared to other reported study in Malaysia in term of recurrence rate and overall survival of patients after surgery. The recurrence rate of breast cancer in Asia ranging from 10% to 20% after breast-conserving surgery [8] but much lower in western country, 2%, at 5 years and 5.9% at 10 years ([10]. Meanwhile the five-year survival rate, ranges from more than 80% in developed countries to about 60% in middle-income countries and <40% in low-income countries [11]. Study in the developed country by [12]; where they did data analysis among the 257,362 women diagnosed with breast cancer during 2000–2007 that registered in 13 population based cancer registries in Australia, Canada, Denmark, Norway, Sweden and the UK by using Flexible parametric hazard models to estimate net survival and the excess hazard of dying from breast cancer up to 3 years after diagnosis, they found that standardised 3-year net survival was 87–89% in the UK and Denmark, and 91–94% in the other four countries. Our current study showed that the survival rate (94.8%) is higher than 10 years ago in developed country, could be due to improvement and advancement in healthcare system including more trained healthcare personnel and technology to manage breast cancer in our local setting.

Since the introduction of breast-conserving surgery as a standard treatment for early-stage breast cancer, many studies have tried to identify the risk factors for local recurrence. Nevertheless, a wide range of results and conclusions were reported because of differences in the design of those studies. Our study found that the involvement of lymph node was highly related to recurrence rate ($p = 0.008$). Patient with one lymph node or more show 17.6% recurrence rate as for those without lymph node involvement, the recurrence rate was only 6.0%. Correspondingly, patients with higher lymph node ratio showed higher risk to experience recurrence of breast cancer. Those with lymph node ratio >0.65 have 26.9% recurrent rate as compared to lymph node ratio <0.20 and lymph node ratio 0.20–0.65 (15.6% and 23.3%). This suggested that the Lymph node ratio is a significant predictor of recurrence for breast cancer ($p < 0.001$). However [8], stated that their multivariate analysis showed that the premenopausal status (RR = 2.37), presence of LVI (RR = 2.91), multifocality (RR = 2.96), and absence of estrogen receptors (RR = 3.23) proved to be independent risk factors for local recurrence which is very different from our findings.

Many studies have documented that the survival of breast cancer patients depends on factors such as genetics, age at diagnosis, stage of the cancer, access to care, weight, physical activity status, alcohol consumption, disease comorbidities, social, economic, environmental factors, and ethnicity and screening guidelines have also evolved based on the research findings correlating breast cancer screening and survival times [13–15]. Consistent with other studies our study showed differences in overall survival rates among breast cancer patients including the stages of tumour were an incredibly significant predictor for survival rate ($p = 0.001$). Lower survival among patients in stage 4 (88.8%) as compared to those in stage 1–3 (97.6%). The tumour grade was also a significant predictor for survival, where the survival rate was higher for patients with tumour grade 1–2 (96.8%) and lower survival for patients with grade 3 (90.8%). Likewise, patients with larger size of tumour >5 cm have much lower survival rate (89.8%) as compared to those with tumour size <5 cm (97.1%) and tumour size was also a significant predictor of survival ($p = 0.005$). Besides, the type of tumour was also a significant predictor of survival ($p = 0.018$) where the patients with Invasive Ductal Carcinoma (IDC) showed a higher survival rate (95.4%) than those with Invasive Lobular Carcinoma (ILC) and other morphology types (83.6%) [16]. reported that there was statistically significant association between three-year survival and histological type of tumour (0.014), laterality (0.02), metastases (0.000) and type of treatment (0.001) by the univariate analysis log rank test.

Furthermore. the status of estrogen receptor, progesterone receptor and HERS receptor showed an insignificant predictor for survival ($p > 0.05$). Though, patient with positive estrogen receptor and progesterone receptor show lower survival rate (93.5%, 92.7%) as compared to those with negative estrogen receptor and progesterone receptor (95.2%, 96.2%), however, those with positive HER2 receptor have similar survival rate to those with negative HER2 receptor (94.7% vs 94.8%).

The strength of the study is that it was the first to assess the recurrence rate and survival rate of breast cancer after surgical treatment in Kota Kinabalu, Sabah.

The limitations of this study were the short study period. The study was done in 2019. We were able to conduct the study for two years because the availability and completeness of data was only from January 2016. The sample does not represent the whole of Sabah, but it captures a good proportion of breast cancer patients referred from West Coast hospitals in Sabah. The study was retrospective in design where data was collected through patients' records and registry data. We were unable to determine the factors that caused patients to present or be diagnosed at advanced stages. The generalizability of the study findings should be interpreted with caution. Future research should focus on the factors that lead to patients being diagnosed at advanced stages, as these stages were a significant predictor of poor prognosis.

5. Conclusion

The two-year recurrence rate and survival rate of women with breast cancer in Kota Kinabalu, Sabah was comparable to that in some developing countries. Recurrence rate were significant predictor among patient with lymph node involvement and higher lymph node ratio. While stages of tumour, tumour grade, size of tumour and type of tumour were an incredibly significant predictor for survival rate. Within Malaysia, the population based cancer registry has its limitation, particularly when the outcome and recurrence rate is scarcely reported. More study on the factors of late diagnosis or delay treatment among these breast cancer patients should be conducted to ascertain the surgical outcome of breast cancer patients as this would allow us to gauge the progress of the surgical services in this tertiary hospital, referring centre for the whole hospital in Sabah. Apart from that Education program to improve breast health awareness, breast self-examination, and clinical breast exam are relatively inexpensive and can be incorporated into existing primary health infrastructures and implementation of screening programs are vital for early detection of breast cancer. More emphasis also needs to be placed on cancer prevention strategies and the development of population-based registration systems for the effective planning and monitoring of cancer control programs.

Provenance and peer review

Not commissioned, externally peer-reviewed and this work is fully compliant with the STROCSS 2021 criteria by Mathew G and Agha R et al. [17], for the STROCSS Group.

Source of funding

This work had no source of funding.

Ethical approval

The Medical Research and Ethics Committee (MREC), Ministry of Health Malaysia (MOH) has provided ethical approval for this study.

Ethical approval: NMRR-20-27-52650 (IIR)

Two-year retrospective review on breast cancer surgery patient in Queen Elizabeth II Hospital.

Consent

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation(institutional and national)and with the Helsinki Declaration of 2013 and its later amendments. Informed concent was obtained from the patients family for being included in this case report prior to submission. Written informed consent was obtained from the patient for publication of this case report and accompanying images.A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

Raynee Kumilau has conduct the study and write the article, Firdaus Hayati, Siti Zubaidah Sharif, Jerry ES Liew and Nik Amin Sahid supervised, reviewed and edited the manuscript.

Registration of research studies

1. Name of the registry: TWO-YEAR RETROSPECTIVES REVIEW ON BREAST CANCER SURGERY IN QUEEN ELIZABETH HOSPITAL 2.2. Unique Identifying number or registration ID: ETHICS APPROVAL: NMRR-20-27-52650 (IIR)The Medical Research and Ethics Committee (MREC), Ministry of Health Malaysia (MOH) has provided ethical approval for this study. 3. Hyperlink to your specific registration (must be publicly accessible and will be checked): https://nmrr.gov.my/

Guarantor

Raynee Kumilau will be the guarantor and accepts full responsibility for the work and/or the conduct of the study, had access to the data, and controlled the decision to publish at this given time of submission.

Declaration of competing interest

All authors declare that they have no conflict of interest.

Acknowledgements

Thanks to Director general, Ministry of Health Malaysia for the approval to publish this research.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.amsu.2022.104560.

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