

## RESEARCH COMMUNICATION

# Survival Rates of Breast Cancer: A Hospital-Based Study from Northeast of Thailand

Amornsak Poom<sup>1</sup>, Supot Kamsa-ard<sup>2</sup>, Supanee Promthet<sup>1\*</sup>

### Abstract

A retrospective cohort study was carried out with 340 female breast cancer at a teaching university in northeast of Thailand recruited and followed-up until the end of 2006. Survival probabilities were estimated using the Kaplan-Meier method. 161 cases were alive after five years and 58 patients were lost to follow-up. The overall observed survival rates at 1, 3 and 5 years were 83.3%, 59.9% and 42.9%, respectively. When analysis was conducted for stage combined into 2 groups, early (stage I, II and unknown) and late (stage III and IV), the 5-year survival rate for early stage (60%; 95% CI: 0.51-0.67), was higher than for late stage (27%; 95% CI: 0.19-0.34) with high statistical significance ( $p < 0.001$ ). The hazard ratio of patients with stage IV was 11.6 times greater than for stage I ( $p = 0.03$ ). The findings indicate that the different stages of breast cancer markedly effect the overall survival rate.

**Keywords:** Breast cancer - survival rates - stage at diagnosis - Thailand

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### Introduction

Breast cancer is one of the most common cancer among Thai women (Khuhaprema et al., 2006). National Cancer Institute of Thailand (NCI) reported the newly diagnosed was continuously increasing from 16.3 to 20.5 (per 100,000) during 1992-2000 (Deerasmee et al., 1999; Sriplung et al., 2003; Khuhaprema et al., 2006). Most of them were diagnosed with larger tumors and late stage. There were 56% of breast cancer patient with advanced stage (Thongsuksai et al., 2000). Most of studies have shown that variations in overall survival depend on the difference stage of breast cancer, stage has been shown a strong predicting factor for breast cancer, with the survival declining as stage increases and it appears that the survival in Thai women breast cancer is poor (Taylor & Coates, 1997; Ugnat et al., 2004).

The objective of this study was to evaluate the survival rate between different stages of breast cancer in northeast of Thailand.

### Materials and Methods

The retrospective cohort study was carried out. 340 records of female breast cancer, Thai residential, from a teaching hospital were reviewed. All cases were diagnosed of primary site of breast cancer during 1 January 2000 to 31 December 2001. 90% were histological confirmed for diagnosis. Information available were age at diagnosis, staging, histology, date of last seen, status of at last seen.

Patients were follow-up until 31<sup>st</sup> December 2006 to find out their last status (alive, death and loss to follow-up) confirming by linkage with the death certificates from the Civil Registration, Thailand. For patients who were lost to follow-up after their discharge from the hospital, the date of discharge was recorded as the date of last contact.

The cancer staging was coded using the American Joint Committee on Cancer (AJCC) TNM classification system for disease stage at diagnosis (Greene et al., 2002). The TNM system takes into account information on tumor size and tumor extension (T), regional lymph node involvement (N) and the evidence of distant metastasis (M). The grouped TNM stage in this data included the pathologic stage group.

The data were analyzed using the STATA version 10 (2007). Survival estimated was determined by Kaplan-Meier method and differences in survival were compared by the log-rank test. Cox's proportional hazard models were investigated the prognostic factors which corresponding hazard ratio and the associated 95% confidence intervals were obtained.

### Results

Overall 340 cases, 161 (47.3%) cases were still alive and 179 (52.7%) were dead from breast cancer. The vital status on 31<sup>st</sup> December 2006 (complete follow-up) was available for 282 (82.9%) cases and 58 (17.1%) patients were lost in the follow-up period at the closing date. The median follow-up period was 3.4 years. The mean age at

<sup>1</sup>Department of Epidemiology, Faculty of Public Health, <sup>2</sup>Cancer Unit, Faculty of Medicine, Khon Kaen University, Thailand \*For correspondence: [supanee@kku.ac.th](mailto:supanee@kku.ac.th)

diagnosis was 48.3 years (SD=11.1; ranging from 18 to 79 years), a total 199 (58.5%) cases were aged less than 50 years. Most patients presented themselves at the hospital at advanced stage; stage III 33.2% and stage IV=13.6% (Table 1).

Performing the Kaplan-Meier analysis showed the median survival time was 4.07 years, and the overall observed survival probability for female breast cancer patients at 1, 3 and 5 years were 83.3%, 59.9% and 42.9%, respectively (Figure 1). The best prognosis survival was observed for stage 1 with a five-year survival of 86%, while the lowest 5-year survival for stage 4 (21%) as shown in Figure 2.

When analysis was done for stage combined into 2 groups; early stage (stage I, II and unknown) and late stage (stage III and IV), it showed that the 5-year survival rate for early stage (60%; 95%CI: 0.51-0.67) was higher than the late stage (27%; 95%CI: 0.19-0.34) with statistical

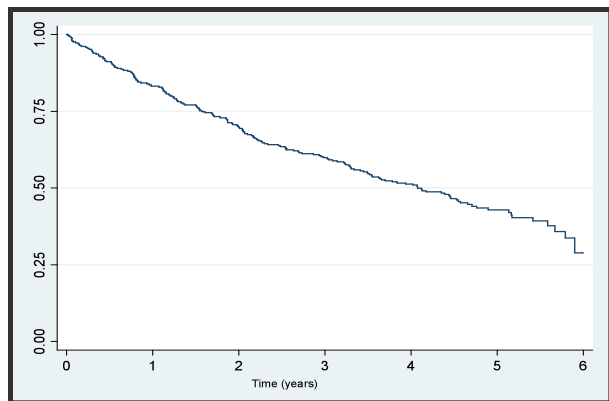
**Table 1. Characteristics of Breast Cancer Patients (Total 340 subjects)**

Variables	Number	Percentage
Age at diagnosis (years)		
<40	72	21.2
40-49	127	37.3
50-59	87	25.6
≥60	54	15.9
Histology		
Ductal carcinoma	242	71.2
Lobular carcinoma	5	1.5
Other	93	27.3
Treatment		
Surgery	33	9.7
Radiotherapy	52	15.3
Chemotherapy	13	3.8
Surgery and radiotherapy	15	4.4
Surgery and chemotherapy	120	35.3
Radiotherapy and chemotherapy	107	31.5
Stage at diagnosis		
Stage 1	12	3.5
Stage 2	83	24.4
Stage 3	113	33.2
Stage 4	46	13.6
Unknown	86	25.3

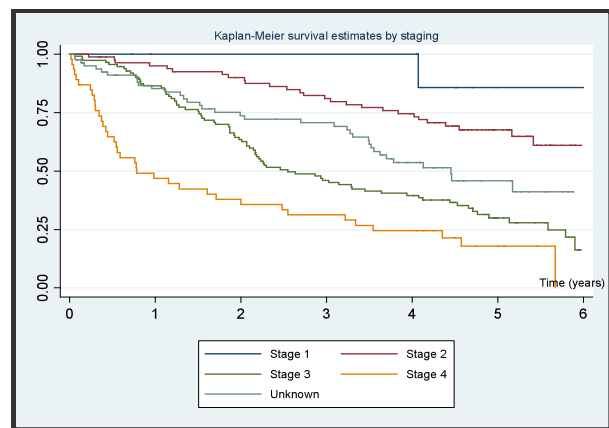
**Table 2. Crude and Adjusted Hazard Ratios of Factor Effecting Mortality of Breast Cancer Patients**

Variables	HR <sub>crude</sub>	HR <sub>adjusted</sub>	95% CI	P-value*
Age at diagnosis (years)				
<40	1	1		
40-49	0.79	0.65	0.42-0.99	0.05
50-59	1.41	1.19	0.77-1.84	0.43
≥60	1.30	1.08	0.66-1.76	0.76
Distant metastasis				
No	1	1		
Yes	3.19	1.93	0.77-4.86	0.16
Stage at diagnosis				
Stage 1	1	1		
Stage 2	3.43	3.35	0.45-24.75	0.23
Stage 3	10.00	9.27	1.28-66.88	0.03
Stage 4	19.06	11.60	1.34-100.46	0.03
Unknown	6.69	6.81	0.93-49.79	0.05

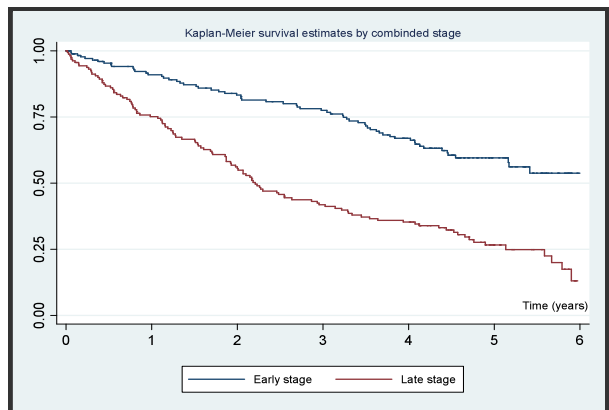
\*Adjusted p-value



**Figure 1. Kaplan-Meier Estimated of Overall Survival of Breast Cancer Patients**



**Figure 2. Comparison of Survival Based on Stage at Diagnosis of Breast Cancer Patients**



**Figure 3. Comparison of Survival Based on Combined Stages at Diagnosis of Breast Cancer Patients**

differences ( $p < 0.001$ ) (Figure 3). For the univariate analysis, breast cancer patients who were diagnosed with late stage were 2.66 times to die more than those patients with early stage (Hazard ratio=2.62; 95% CI: 1.93-3.57;  $p < 0.001$ ).

In Table 2, the Cox's proportional hazard ratio was analyzed for age at diagnosis, distant metastasis and staging of disease. Age at diagnosis and distant metastasis failing to achieve significant independent effected to prognostic factors on survival. A significant increase in relative hazard was observed for stage III and stage IV (for stage III; hazard ratio of 10 compared to stage I in univariate analysis and 9.27 in multivariate study). The

hazard ratio of patients with stage IV was 11.6 times more than stage I (HR=11.6; 95%CI: 1.34-100.46; p=0.03).

## Discussion

The hospital-based cancer registry data showed that trend of newly diagnosed breast cancer was continuously increasing from 231 to 297 cases each year, during 2001 to 2006 and the percentage of late stage (stage III and IV) is still high (Tumor registry Cancer unit of Srinagarind Hospital, 2006).

The five-year survival from breast cancer is usually measured as the proportion of people diagnosed with breast cancer, who are still alive until five years after diagnosis. The findings from this hospital-based study indicated that the 5-year survival (42.9%) was lower than the finding from the population-based study of breast cancer in this area which found 45.4% (Sriamporn et al., 1995). This could be explained that cases at the hospital-based are more severe than those from the population-based registry. The survival rates of breast cancer in developed countries it is much higher than our finding. The SEER 5-year survival rate in United States (1996-2000) was 89% and study in 6 European countries (1990 to 1992) the five-year relative survival was 79% (Sant et al., 2004). In the United States based on 1983-1990, the five-year survival of breast cancer was 81.6% for white women and 65.8% for black women (Ries et al., 1997). Comparing with in developing countries, 5-years survival are similar or lower than in some countries i.e. in Iranian population 62% (Vahdaninia et al., 2004), and 59.6% for Saudi women in the 1994-1996 (Ravichandran et al., 2005), 68.8% in Bahrain during 1980 to 1990 (Fakhro et al., 1999) and others (Hao et al., 2002; Son, 2006). However, the international difference in breast cancer survival rate exist and these different are not easy to interpret. Longer survival in one country versus another may be due to the availability of better treatment, to similar treatments being more effective because diagnosis is made at an earlier stage at disease (Sant et al., 2004).

The five-year survival for patients with ages 40-49 years of 52% were higher than younger women (aged < 40 years) and those with aged than 50 years and older. It seems that women aged 40-49 at diagnosis had the best prognosis than all age group. The survival advantage in this study for women aged 40 to 49 years is similar finding to other studies (Adami et al., 1986; Taylor & Coates, 1997; Sant et al., 2004). Notably, the study from New South Wales women during 1972 to 1991, the prognostic survival was better for those aged 40-49 years for 86% (Taylor & Coates, 1997). The poorer survival observed in this study for women aged 60 years and above of 32% than in other age groups was similar to the findings of Rutqvist & Wallgren (1983). It may be that the observed difference in survival with age merely reflects the fact that older women have a greater underlying risk of death, irrespective of breast cancer diagnosis. However, the effect of age at diagnosis on the survival of breast cancer is still controversial, although some studies have shown a poorer prognosis for younger women (Brenner et al., 2003; Maggard et al., 2003).

From this study, the survival rate by stage at diagnosis of breast cancer was lower to other studies in the same period. For stage 1, the five-year survival was 86% in comparison to 97% (Lim et al., 2001) and 95.3% (Son, 2006). For breast cancer stage II, III, IV was 68%, 37% and 21%, respectively. The survival rates for Lim et al. (2001) were 83%, 56% and 17% and for Son (2006) of 86%, 65% and 29.3%, respectively. In a report published by the American Cancer Society (2007), the 5-year survival rate among US White was 99% for localized disease, 85% for regional and 28% for distant metastases patients. It seems that survival rates in developing countries are generally lower than in economically developed countries such as Europe and North America (American Cancer Society, 2008). Up to five years the survival rates for stage 1 appeared to have a better than other stage. Breast cancer stage 1, the survival time between 1<sup>st</sup> - 3<sup>rd</sup> years was unchanged, that differently survival time from stage 2, stage 3, and stage 4 were decreased since 1st year. The survival time at 1st year of stage 4 was rapidly decreasing more than 50%. The extremely rapidly decrease in breast cancer survival time reflects the increase in staging. The results of this study imply that there was a trend of decreasing five-year survival time with increasing stage for breast cancer. Particularly, when compared the early stage and late stage group, the 5-years survival observed for early stage (60%) was higher than late stage (27%) with the statistical significant difference (p<0.001).

The significant prognostic factors were stage, age at diagnosis and distant metastasis on multivariate analysis. The independent prognostic factor was stage, while age at diagnosis and distant metastasis did not show significant. We suspected that the power of the study was low and thus it was not possible to detect the significant results between survival, age at diagnosis and breast cancer stages. Regarding mortality rate, there are a larger proportion of death for stages III (43.6%) and stage IV (44.1%) than in other lower stage. Notably, late stage of breast cancer showed extremely risk of mortality was 2.62 times than those at early stage. Survival analysis has shown clearly that women with earlier-stage breast cancer have better survival rates. This finding indicated that the breast cancer mortality may associate with the increasing staging. It seems likely that the survival differences are due to difference the both early and late stage of disease at presentation (Sankaranarayanan et al., 1996).

How to encourage patients to come to the hospital at earlier stage is very important. Encouraging women to aware of breast cancer screening is urgent public health education programme as suggestion in the study of Satitvipawee et al., (2009); Jareinpituk et al., (2009).

In conclusion, the findings of this study for female breast cancer in Thailand suggest that the overall survival rates were mainly due to differences in stage at diagnosis of breast cancer. Health education programme for the awareness of breast cancer screening is needed for Thai women in general. The government should also provide the facility for breast cancer screening to cover all Thai women especially high risk age group. The early detection by breast cancer screening might contribute to the improvement of survival rate.

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