# Delay in breast cancer care: a study in Thai women.

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## Abstract

**Background** Breast cancer is the second most common cause of cancer death in Thai women. Cancer registry data reveal a high prevalence of late stage disease at diagnosis. Factors resulting in delay in Thailand have not yet been investigated.

**Objectives** To determine the extent of and the factors contributing to delay in breast cancer care.

**Design** Women with breast cancer who were first treated at Songklanagarind Hospital between June 1994-June 1996 were interviewed with retrospective chart audits of care.

**Measures** Dependent variables included patient delay (symptom recognition to first care) and system delay (first care to treatment). Independent variables tested included demographic factors, help-seeking behavior and cancer knowledge. Non-parametric rank sum tests were used for univariate analysis and Cox regression was used for multivariate analysis.

**Results** Ninety-four cases were included in the study. The median patient and system delay were 4 weeks. 26.6% and 24.4% of patients experienced patient and system delay longer than 12 weeks respectively. Only marital status (unmarried compared to married women) was significantly associated with patient delay (Hazard ratio 2.78, 95% CI 1.23-6.25). Contacting a provincial hospital instead of a university hospital as first medical care (HR 2.50, 1.23-5.26), being given a diagnosis rather than being told nothing (HR 2.04, 1.14-3.57) and being given treatment rather than being immediately referred (HR 4.55, 2.22-9.09) were associated with system delay.

**Conclusions** Patient delay and system delay in breast cancer care are important weaknesses of disease control in Thailand. Educational program should target unmarried women who are at higher risk of delay. System delay in hospitals outside the university needs to be improved by a good referral system.

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## Introduction

Delay in diagnosis and treatment of breast cancer leads to progression of disease with late stage and is associated with high mortality.[1-3] Furthermore, smaller tumors are more likely to be treated successfully with limited breast surgery.[4-6] Understanding the nature of delay in each society should lead to earlier diagnosis and treatment, thus improving outcome.

In Thailand, breast cancer is the second most common cancer in women. The data from our Cancer Registry revealed that most patients receive treatment at a late stage (56% at stage III & IV). These figures suggest delay in breast cancer care, which needs to be investigated.

Delay in breast cancer care can be divided into patient delay (time since symptom recognition to initial medical consultation) and system delay (time from first medical consultation to treatment).[7] A number of studies concerning delay in breast cancer care have been reported.[7-14] Factors that have been found to be associated are age, economic status, education, history of chronic disease, symptom perception, cancer knowledge and previous health care experience. However, most of these studies are from developed countries or high incidence areas. It is appropriate to gain insight into the nature of delay and the association of delay with these factors in Thailand. This is true because socio-cultural aspects of care or help-seeking behavior particular to Thailand are unknown and because cancer education is not well developed.

## Thai Health Care System

Health services in Thailand are mainly provided by public hospitals, run by the Ministry of Public Health, university hospitals and the private sector. Public health services include small health centers covering 3,000-5,000 people, 10-60 bed community hospitals covering 20,000-40,000 people and 100-400 bed provincial hospitals covering more than

200,000 people. A patient can visit any of these health services and be referred to larger hospital. The services are free for civil servants and the poor who have registered and received a government health card.

Cancer has just been recognized as an important health problem for Thai people since 1994. University hospital is the main provider of cancer care, especially radiation and chemotherapy. There are less than ten university hospitals in Bangkok, the capital city, and one or two in each region of the country. Songklanagarind hospital, the study site, has 700 beds and is the only university hospital in the southern region of Thailand; serving 14 provinces with a population of 8 million people.

## Materials and methods

### Subject selection

Eligible subjects included patients with histologically-confirmed primary invasive carcinoma of breast who were admitted to Songklanagarind Hospital for initial treatment between June 1994 to June 1996. Cases were excluded if they did not cooperate or data concerning delay were unreliable.

Number of subjects was determined by sample size calculation which is based on testing a null hypothesis of no difference between the incidence rates of 2 (or more) groups.[15] Assuming an independent factor is present with 2 levels with approximately median survival time of 3-5 and 5-8 weeks and approximately 50% of the subjects in each level. At 5% level of significance and with 80% power, 44 to 130 subjects are required.

### Data collection

Data on personal and health care behavior were obtained by interview by a trained ward nurse using a structured questionnaire. Clinicopathological data, for example type of surgery, laboratory results and pathologic results, were abstracted from hospital and

pathological records. Duration of delay was also determined from hospital records and compared with interview data. If a large discrepancy existed, the case was excluded due to possible unreliability of the data.

**Study variables**

The independent variables included sociodemographic background, patient assessment of first symptom and date on which it was recognized, source and date of first care, diagnosis and treatment by first doctor, past health care practice and cancer knowledge. Pathological TNM staging was based on the staging system of the American Joint Committee on Cancer.[16]

The dependent variables were patient delay and system delay. Patient delay was calculated in weeks from the date on which a patient first noticed the symptom to the date of first medical consultation. System delay was the interval from first medical consultation to the date of admission for treatment at the study hospital.

**Statistical analysis**

Non-parametric statistics using Kruskal-Wallis and Wilcoxon rank sum tests were initially used to explore the association between delay and independent variables. Cox regression for survival time data was used in multivariate analysis. Hazard ratios (HR) for each level of a factor have been reciprocated in order to denote the ratio of the natural logarithm of the probability of delay among subjects at that level to that among subjects at the reference level at any given time. Thus a ratio greater than one indicates a greater probability of delay, and a ratio less than one a lower probability of delay, compared with the reference level. The best fitted models were obtained by backward elimination guided by the change in log-likelihood, using a p-value of greater than 0.05 as the criterion for removal.

## Results

There were a total of 101 eligible cases during the study period. Seven cases were excluded because of non-cooperation and unreliability of delay data. These cases were not different from the included cases regarding to stage of disease. Four of these had stage II disease, 2 with stage III and 1 with stage IV. The final number of cases used in the analysis was 94.

Patient delay ranged from 1-207 weeks with a median of 4 weeks. 26.6% of patients experienced patient delay longer than 12 weeks. Breakdown of duration of patient delay by demographic characteristics, symptom-related factors and tumor stage are shown in Table 1. Unmarried women had remarkably long patient delay compared to married women. However, the difference is not significant in univariate analysis. Tumor stage was also not significant if separated into 4 stages but appeared significant when grouped into stage I +II and stage III + IV (p value = 0.038, Wilcoxon rank sum test). In multivariate analysis, only marital status was statistically significant with a hazard ratio of 2.78 (95% CI 1.23-6.25).

The system delay ranged from under a week to 104 weeks with a median of 4 weeks. 24.4% of patients had system delay longer than 12 weeks. Diagnosis and management of first physician were statistically significant in univariate analysis. These two variables and source of first care were assessed separately in Cox regression because they were correlated. All these three variables gave statistically significant hazard ratios (Table 2). Since no other factor was significant, the results in the Table 2 are presented without adjustment.

None of the factors related to past health care utilization was associated with patient or system delay (Table 3).

## Discussion

The present study demonstrates a high proportion of patient and system delay in breast cancer care. Being unmarried is the only significant predictor for patient delay, whereas sources of first care and diagnosis and treatment of first contacting physician were associated with system delay.

In our study, the proportion of study subjects who experienced delay of 3 months or longer is comparable to other studies but the median delay is longer. In the literature, the proportion of delay over 3 months was reported mainly for patient delay. In a large review of this topic in 1974 by Antonousky et al., patient delay of 3 months or longer ranged from 35-50%.[17] The results of a meta-analysis of 12 publications during 1975-1992 found a 3-month delay of 34.2% (range 9-50%)[18] ;and other recent individual studies reported a range of 19-27%.[7,10-12,19] However, our median patient and system delay were two weeks longer than in other studies.[7,8,12,19] These results indicate the existence of delay in diagnosis and treatment of breast cancer in our country. However, the comparison of delay duration with other studies has to be interpreted with caution because different definitions and terms were used.

Sociodemographic background has long been found to be associated with delay in breast cancer care[9,17,20,21] although conflicting results exist.[7,13,22] The fact that unmarried women had a significantly longer patient delay in this study contrasts with other studies.[7,12,13,23] We have no data to argue why these unmarried women had such a long delay. It may be due to shyness concerning consultation and exposure of their breast to another person or it may be due to lack of psychosocial network and support.[18] Since this delay is quite significant and the incidence of breast cancer is expected to rise due to an increasingly westernized life-style, this issue should be considered in attempts to improve breast cancer care. Further study to gain insight into causes the delay which might lead to intervention is necessary.

Our data suggest that the first doctor plays a very important role in determining the duration of system delay. The subjects who had their first consultation at a provincial hospital experienced longer system delay than those who contacted the university hospital. Referred cases without prior treatment had shorter system delay. Thus the development of good referral system may shorten delay. Most patients did not have access to the university hospital for first care; and approximately 20% of cases were given medical treatment by their first doctor. This resulted in a median system delay of 13 weeks. Thus, these doctors need feedback, and perhaps a refresher course to improve case management.

However, the fact that not being informed of the diagnosis by the first doctor was associated with shorter delay is problematic. We have no data whether in fact the doctor did use verbal communication to encourage the patient to go to the referral center quickly or whether not being informed of the diagnosis increased the patient's anxiety and thus led the patient to go to the referral center more quickly or in contrast if being informed of the diagnosis of possible cancer frightened the woman and made her avoid further treatment.

Health beliefs[23-25], health education exposure[26] as well as family factors[27] have been shown to be associated with help-seeking behavior. However the present study could not demonstrate the relationship of these factors to the delay. Although it was shown that unmarried women had higher risk of delay, unfortunately other detailed reason such as shyness of a woman, gender of physician etc, were not explored. Further study aimed to elucidate these relationships should be considered, then public education health efforts can be better directed.

Our study has some limitations including sampling bias. Our hospital is a referral center and patients who suffer from advanced disease may be less likely to seek treatment; this was shown by the very few stage IV disease in our sample. So in fact, the extent of delay might be more severe than observed. This sampling bias could also be responsible for the

non-association of many variables tested. Another limitation is the reliability of the data as a result of recall bias. The patients were asked to recall the time at which they first recognized the lump, the first medical consultation, etc. Reliability should be more questionable in those with longer delay before data collection. The last major limitation was an inability of the study to give in detail the associated reason for the observed association. However, because this is an exploratory study and since there are no other data concerning this problem available in our country, our results will serve as a guide for further investigation.

The study, however, had some strength. Most previous studies used simple statistical tests by dichotomizing the time into two or more intervals. By using this method, significant factors may appear insignificant. In contrast, by using Cox regression for the continuous timing data, even a small difference will be detected.[28] Just a few recent studies have used Cox regression analysis.[8,19] The final strength of this study is that the study explored many potential variables which allowed us to identify factors independently associated with delay.

In summary, patient and system delay in breast cancer care are important weaknesses of breast cancer control in Thailand. Unmarried women are more vulnerable to prolonged patient delay but the reason for this remains unknown. Educational programs should address this expanding high-risk group. System delay in hospitals outside the university needs to be minimized by a good referral system. General practitioners in this country may need a refresher course to improve case management, avoid unnecessary medical treatment and properly refer patients.

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## References


1. Tobar L, Fagerberg CJ, Gad A, Baldetorp L, Holmberg LH, Grontoft O, et al. Reduction in mortality from breast cancer after mass screening in mammography: randomized trial for Breast Cancer Screening Working Group of the Swedish National Board of Health and Welfare. Lancet 1985:1:829-32.
2. Elwood JM. Moorehead WP. Delay in diagnosis and long term survival in breast cancer. BMJ 1980;280:1291-4.
3. Feldman JG, Carter AC, Nicastri AD, Hosat ST. Breast self-examination, relationship to stage of breast cancer at diagnosis. Cancer 1981;47:2745-50.
4. Muller CB. Surgery for breast cancer: less may be as good as more. N Engl J Med 1985;312:712-4.
5. Atkins H, Hayward JL, Klungman DS. Treatment of early breast cancer: a report after ten years of a clinical trial. BMJ 1972;2:423-5.
6. Veronesi U, Saccozzi R, bet Vecchi M. Comparing radical mastectomy with quadrantectomy, axillary dissection and radiotherapy in patients with small cancer of the breast. N Engl J Med 1981;305:6-11.
7. Rossi S, Cinini C, Di Pietro C, Lombardi C, Crucitti A, Bellatom R, Crucitti F. Diagnostic delay in breast cancer: Correlation with disease stage and prognosis. Tumori 1990;76:559-62.
8. Caplan LS, Helzlsouer KJ, Shapiro S, Freedman LS, Coates RJ, Edward BK. System delay in breast cancer in Whites and Blacks. Am J Epidemiol 1995;142:804-12.
9. Leventhal EA, Prohaska T. Age, symptom interpretation, and health behavior. J Am Geratr Soc 1986;34:185-91.
10. MacArthur C, Smith A. Delay in breast cancer and the nature of presenting symptoms. Lancet 1981;1:601-3.

11. Nichols S, Water WE, Fraser JD, Wheeler MJ, Ingham SK. Delays in the presentation of breast symptoms for consultant investigation. Community Med 1981;3:217-25.

12. GIVIO (Interdisciplinary group for cancer evaluation). Reducing diagnostic delay in breast cancer. Possible therapeutic implications. Cancer 1986;58:1756-61.

13. Mor V, Masterson-Allen S, Goldberg R, Guandagnoli E, Wool MS. Pre-diagnostic symptom recognition and help seeking among cancer patients. J Community Health 1990; 15:253-66.

14. Bedell MB, Wood ME, Lezotte DC, Sedlacek SM, Orleans MM. Delay in diagnosis and treatment of breast cancer: implication for education. J Cancer Educ 1995;10:223-8.

15. Lemeshow S, Hosmer Jr DW, Klar J, Lwanga SK. Adequacy of sample size in health studies. Chichester: John Wiley & Sons Ltd; 1990.

16. Rosen PP, Oberman HA. Atlas of tumor pathology. Tumors of the mammary gland. Washington, D.C: Armed Forces Institute of Pathology; 1992;115-7.

17. Antonovsky A, Hartman H. Delay in the detection of cancer: A review of the literature. Hlth Educ Monograph 1974;2:98-128.

18. Facione NC. Delay versus help seeking for breast cancer symptoms: a critical review of the literature on patient and provider delay. Soc Sci Med 1993;36:1821-34.

19. Coates RJ, Bransfield, Wesley M, Hankey B, Eley JW, Greenberg RS, et al. Difference between black and white women with breast consultation. J Natl Cancer Inst 1992;84:938-50.

20. Farley TA, Flennery J. Late stage diagnosis of breast cancer in women of lower socioeconomic status: public health implication. Am J Public Health 1989;79:1508-12.

21. Richardson JL, Langholz B, Berstein L, Burciaga C, Danley K, Ross RK. Stage and delay in breast cancer diagnosis by race, socioeconomic status, age and year. Br J Cancer 1992;65:922-6.

22. Samet JM, Hunt WC, Goodwin JS. Determinants of cancer stage. A population-based study of elderly New Maxicans. Cancer 1990;66: 1302-7.

23. Worden JW, Weisman AD. Psychosocial components of lagtime in cancer diagnosis. J Psychosom Res 1975;19:69-79.

24. Magarey CJ, Todd PB, Blizard PJ. Psychosocial factors influencing delay and breast self-examination in women with symptoms of breast cancer. Soc Sci Med 1977; 11:229-232.

25. Lauver D, Chang A. Testing theoretical explanations of intentions to seek care for a breast cancer symptom. J Appl Soc Psycho 1991; 21: 1440-1458.

26. Kang SH, Bloom SR, Romano PS. Cancer screening among African-American women: their use of tests and social support. Am J Public Health 1994; 84: 101-103.

27. Facione NC, Dodd MJ. Women's narratives of help-seeking for breast cancer. Cancer Pract 1995; 3: 219-225.

28. Cox DR. Regression models and life tables (with discussion). J R Stat Soc 1972;34:187-220.

**Table 1**. Demographic characteristics of the patients and duration of patient delay.

Relationship of demographic and symptom-related factors to patient delay.

| Study variables | Number of cases | Median duration (interquatile range in week) |
|---|---|---|
| Age (years) | | |
| ≤ 40 | 31 | 2 (1-8) |
| 41-50 | 36 | 8 (1-22) |
| >50 | 27 | 2 (1-12) |
| Marital status | | |
| Unmarried | 9 | 29 (2-104) |
| Married | 85 | 3 (1-10) |
| Education level | | |
| ≤Primary school | 66 | 3 (1-12) |
| Secondary-high | 14 | 3 (1-32) |
| > High school | 14 | 4.5 (2-9) |
| Family monthly income (Baht) | | |
| ≤ 5000 | 50 | 2.5 (1-12) |
| 5001-10000 | 17 | 2 (1-7) |
| >10000 | 27 | 8 (2-24) |
| Type of symptom | | |
| Mass | 80 | 4 (1-12) |
| Pain or other | 13 | 2 (1-7) |
| Patient symptom assessment at first recognition | | |
| Benign | 77 | 5 (1-12) |
| Tumor/ cancer | 15 | 2 (1-5) |
| Tumor stage | | |
| Stage I | 6 | 3 (1-6) |
| Stage II | 66 | 2.5 (1-12) |
| Stage III | 15 | 8 (2-27) |
| Stage IV | 4 | 28 (3.5-67.5) |

**Table 2.** Relationship between current health care utilization and system delay.

| Study variables | Number of cases | Median duration (weeks) | Hazard ratio (95% CI) |
|---|---|---|---|
| Source of first medical care | | | |
| Private clinic | 22 | 3.5 (1-12) | 1.85 (0.91-3.85) |
| Community hospital | 22 | 4 (3-8) | 1.69 (0.81-3.45) |
| Provincial hospital | 28 | 4 (2-21) | 2.50 (1.23-5.26) |
| Private hospital | 10 | 4 (2-11) | 1.79 (0.77-4.17) |
| University hospital | 12 | 2 (1-3.5) | 1 |
| Diagnosis of first physician | | | |
| Benign | 23 | 7 (2-19) | 2.04 (1.14-3.57) |
| Tumor/possible cancer | 42 | 4 (1-12) | 1.69 (1.02-2.70) |
| Not informed of diagnosis | 28 | 2 (1-4) | 1 |
| Management of first physician | | | |
| Medicine | 20 | 13 (3-28) | 4.55 (2.22-9.09) |
| Biopsy | 49 | 4 (2-9) | 5.56 (2.04-1.56) |
| Others | 6 | 3 (1-4) | 2.00 (0.76-5.26) |
| No treatment | 6 | 6 (3-7) | 3.70 (1.39-11.11) |
| Refer | 13 | 1 (0-1) | 1 |
| Transportation condition to study hospital | | | |
| Easy | 35 | 3 | 1 |
| Fair | 35 | 4 | 0.99 (0.62-1.58) |
| Difficult | 24 | 7 | 0.67 (0.96-2.86) |

**Table 3.** Relationship of patient and system delay with past health care practices and cancer knowledge.

| Study variables | Number of cases | Patient delay | | System delay | |
|---|---|---|---|---|---|
| | | Median | HR (95% CI) | Median | HR (95% CI) |
| Cancer history in family | | | | | |
| No | 79 | 3 | 1 | 4 | 1 |
| Yes | 14 | 4 | 1.14 (0.63-2.00) | 3 | 1.00(0.55-1.82) |
| History of chronic disease | | | | | |
| No | 68 | 4.5 | 1 | 4 | 1 |
| Yes | 25 | 1 | 0.73 (0.46-1.18) | 4 | 0.84 (0.52-1.33) |
| Usual help-seeking behavior | | | | | |
| Non-professional | 19 | 5 | 1 | 3 | 1 |
| Professional | 75 | 2 | 1.01 (0.61-1.69) | 4 | 1.19 (0.72-2.00) |
| Past experience with hospital admission | | | | | |
| No | 41 | 5 | 1 | 4 | 1 |
| Yes | 45 | 3 | 0.76 (0.49-1.18) | 4 | 1.19 (0.78-1.82) |
| Ever heard of breast disease | | | | | |
| No | 47 | 5 | 1 | 3 | 1 |
| Yes | 45 | 2 | 0.79 (0.51-1.25) | 3 | 1.04 (0.66-1.67) |
| Ever practiced breast self-examination | | | | | |
| No | 50 | 3 | 1 | 4 | |
| Yes | 30 | 3 | 0.78 (0.49-1.23) | 2.5 | 0.79 (0.50-1.27) |
| Think cancer is curable | | | | | |
| No | 13 | 1 | 0.94 (0.51-1.75) | 3 | 1.23 (0.65-2.33) |
| Don't know | 35 | 6 | 1.28 (0.81-2.04) | 3 | 1.04 (0.66-1.61) |
| Yes | 45 | 4 | 1 | 4 | 1 |