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The Affecting Factors to Grade of Breast Cancer in Dr. Soetomo Hospital of Surabaya

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ABSTRACT

Prognosis of cancer depends on variables, other factors, the stage of cancer, the biological warfare and general conditions when the cancer is diagnosed. Social status, economic status, and demographic issues choose in determining the stage of cancer when the patient first comes to the hospital. The purpose of this study to examine the role, nutritional status, and family history with breast cancer patients in Dr. Soetomo hospital. The study conducted in this study was a non-reactive or non-intrusive method. The sample in the analysis using simple random sampling with sample size of 95 patients. Does not contain the effect of variables associated with grade of breast cancer with p-value 0.795. While for variable of nutritional status and family history with cancer to breast cancer level with p-value 0.033 and 0.005. The p-value in the fitting information table was 0.003 model which contains not only the intercept that was not displayed. The value of Nagelkerke 0.157 or 15.7% means that variable cost, nutritional status and family history with cancer can be used only by 15.7%. From the existing variables was 2 significant variables, namely nutritional status with p-value 0.033 and family history with cancer with p-value 0.005. While time did not significantly influence breast cancer rate with p-value 0.795.

Keywords: Grade of breast cancer, Age, Nutritional status, Family history

INTRODUCTION

According to the World Cancer Organization and World Health Organization (WHO), an estimated increase in cancer incidence in the world 300% percent by 2030 and the majority occur in developing countries including Indonesia. Nationally, the prevalence of cancer in the population aged in Indonesia in 2013 is 1.4% or an estimated 347,792 people. Yogyakarta province has the highest prevalence for cancer of 4.1%. Based on the estimated number of cancer patients, Central Java is the province with the most cancer patients estimated, which is about 68,638 people followed by East Java with the estimated cancer of 61,230 people. The highest cancer that occurs in women in Indonesia is breast cancer and cervical cancer. While in men is lung cancer and colorectal cancer(1).

According to GLOBOCAN (IARC) data in 2012 it is known that breast cancer is a cancer with the highest percentage of new cases (after controlling age) of 43.3% and the percentage of deaths (after age control) due to breast cancer by 12.9%. This figure makes breast cancer the biggest cause of death of all cancer diseases suffered by women in the world. Breast cancer in Indonesia in 2013 has a prevalence of 0.5%(1).

The prevalence of breast cancer in Indonesia itself is reported to be quite high. According to Pathological Based Registration data, breast cancer is the most common type of cancer with a relative frequency of 18.6% with an estimated incidence of 12 cases from every 100,000 women in Indonesia(2). The data is supported by data released Hospital Information System (SIRS) which showed that up to 2010 recorded as many as 12,014 cases of breast cancer in Indonesia. This figure makes breast cancer as the first order in hospitalized patients in all hospitals in Indonesia or 16.85% of cases.

The prognosis of breast cancer depends on the number of variables, including the risk factors, the stage of cancer, the biological cancer and the general state of the patient when the cancer is diagnosed. Social status, economic status, and devographic problems play a role in determining the stage of cancer when patients first come to the hospital(3). Some of the things that are believed to be breast cancer risk factors include age, genetics, and inherited diseases, use of post-menopausal replacement estrogens, oral contraceptives, carcinogenic exposures, and other risk factors such as occupation in relation to exposure to industrial materials, alcohol consumption

habits, body fat levels, and smoking habits. Any factors that reduce breast cancer risk are pregnancy, childbirth, and breastfeeding[4].

Breast cancer can be cured if detected at an early stage and at a low grade. Meaning the tumor has not spread, the tumor size is less than or equal to 2 cm, and the growth rate of tumor size is slow. Healing can occur because of two conditions, namely at the right time and in the right place. Therefore, breast cancer detection needs to be done early so that breast cancer is more easily treated and cured. The purpose of this study was to analyze the effect of age, nutritional status, and family history with cancer to grade of breast cancer patients at Dr. Soetomo Hospital.

METHODS

The research conducted in this study was a non-reactive or unobtrusive method. This study was used to refer to data collected by not directly involved to obtain information from the research subjects. This study used secondary data obtained from medical record data[5]. The population in this study were all breast cancer patients who received treatment in the form of chemotherapy and chemotherapy and radiotherapy with the criteria of starting treatment from 1st January until 31th December 2012, listed in the report book of breast cancer patient list in 2012, and has complete medical record file and follow-up patient reports of breast cancer. The sample in this research was taken by simple random sampling with the formula of calculation of sample size of Stanley Lemeshow. So the sample size in this research was 95 medical record data. Data collection of variables using secondary data from the patient's medical records of Dr. Soetomo Hospital in 2012. The analysis in this study used ordinal logistic regression.

RESULTS

Table 1. Correlation of dependent variable with independent variable

Independent Variables	Dependent Variable						Total	
	Grade 1		Grade 2		Grade 3			
	n	%	n	%	n	%	n	%
Age								
≥ 42	13	13.68	26	27.37	38	40	77	81.05
<42	3	3.16	6	6.32	9	9.47	18	18.95
Total	16	16.84	32	33.69	47	49.47	95	100
Nutritional Status								
Normal	11	11.58	12	12.63	15	15.79	38	40
Not normal	5	5.26	20	21.05	32	33.69	57	60
Total	16	16.84	32	33.68	47	49.48	95	100
Family History With Cancer								
Yes								
No	1	1.05	6	6.32	19	20	26	27.37
	15	15.79	26	27.37	28	29.47	69	72.63
Total	16	16.84	32	33.69	47	49.47	95	100

The number of breast cancer patients sampled is 95 people where the dependent variable is the breast cancer patient grade and the independent variables are age, nutritional status and family history with cancer.

Table 2. Test of Model Fitting Information

Model	-2 Log Like Likelihood	X^2	p-value
Intercept Only	52.273		
Final	38.369	13.904	0.003

Hypothesis:
H0: a model containing only the independent variable is suitable to use
H1: models containing only independent variables are not suitable for use

Based on fitting information model, it is known that p value = 0.003 (p value <0.05) H0 decision is rejected so that model containing only independent variable is not suitable for use.

Test model fitting information yield -2 Log Likelihood which explains that without entering the intercept only value 52.273. but by entering an independent variable to the model (Final) there is a decline in value to 38.369. this value change is a chi-square value of 13.904 and significant at 5% real level (p-value 0.003).

Table 3. Goodness of Fit Test

	X^2	p-value
Pearson	8.139	0.701
Deviance	9.714	0.556

Hypothesis:
H0: the data corresponds to the logistic regression model prediction
H1: data does not match the logistic regression model prediction

For Goodness of Fit, the value of chi square for Pearson is 8.139 with p value 0.701 and deviance of 9.714 with p-value 0.556. Deviance shows the size of how many variations the model can not explain. The higher the deviance value the less accurate the model. While the value of p value on the person that is equal to 0.701> 0.05 ($\alpha = 0.05$) so that Ho is accepted which means the data generated from the observer/research in accordance with the prediction of ordinal logistic regression model used and means the model used is fit.

Table 4. Pseudo R-Square

Cox and Snell	0.136
Nagelkerke	0.157
McFadden	0.072

In the table Pseudo R Square obtained Nagelkerke value of 0.157 or by 15.7%. Which means that the variable age, nutritional status and family history with cancer able to explain the variation of only 15.7%.

Table 5. Parameter Estimates

		Estimate	Std. Error	Wald	p-value
Threshold	Grade of Ca Mammae 1	-3.290	0.730	20.320	0.000
	Grade of Ca Mammae 2	-1.482	0.666	4.950	0.026
Location	Age 1	-0.136	0.524	0.067	0.795
	Age 2	0	.	.	.
	Nutritional status 1	-0.884	0.416	4.524	0.033
	Nutritional status 2	0	.	.	.
	Family history with cancer 1	-1.440	0.508	8.022	0.005
	Family history with cancer 2	0	.	.	.

Parameter Table Estimated Wald values and their significance values. The age variable was 0.067 with p-value 0.795 (> 0.05), nutritional status was 4,524 with p-value 0.033 (<0.05), and the family history of cancer with 8.022 with p-value 0.005 (<0.05).

Parameter estimates to see the effect of each regression coefficient is significant or not and said significant if p-value ≤ α. in the table above is known that the nutritional status and family history with cancer affect the breast cancer grade condition. While age does not affect the condition of breast cancer grade.

Table 6. Test of Parallel Lines

Model	-2 Log Likelihood	X^2	p-value
Null Hypothesis	38.369		
General	36.854	1.515	0.679

The Test of Parallel Lines table is used to test the assumption that each category has a saman parameter or relationship between independent variables with logit is the same for all logit equations. Because of the significance value of 0.679 (> 0.05), then accept H_0 that the resulting model has the same parameters so that the selection of the corresponding link function.

From the parameter estimates obtained that the significant variables are nutritional status and family history with cancer so that the ordinal regression model that is formed on the classification function are:
Grade 1
Logit (Y_1) = -3.290 – 0.884 (nutritional status) – 1.440 (family history with cancer)
Grade 2
Logit (Y_2) = -1.482 – 0.884 (nutritional status) – 1.440 (family history with cancer)

Constant variable can be seen in estimate column and Threshold line with value respectively equal to -3.290 and -1.482 while predictor variable value can be seen in estimate column and in Location line with value respectively equal to -0.884 and -1.440. The coefficient value of the predictor variable of the two classification functions above has the same value but for the constants have different values. The value of these constants is a cut point which will be the differentiator of both classification functions and used for classification.

DISCUSSION

Ordinal logistic regression analysis was used to obtain an appropriate model based on predictor variables on breast cancer grade condition. In the contingency table the results were obtained: The largest number of patients classified by age and breast cancer grade was patients over the age of 42 years and had grade 3 breast cancer with 77 patients. While the smallest number of patients classified by age and breast cancer grade is patients less than 42 years old and suffering from breast cancer with a grade 1 condition of 3 patients.

The largest number of patients classified based on nutritional status and breast cancer grade condition were patients whose nutritional status was abnormal and had breast cancer with grade 3 condition that was 32 patients. While the smallest number of patients classified based on age and breast cancer grade conditions were patients whose nutritional status was abnormal and had breast cancer with a grade 1 condition of 5 patients.

The largest number of patients classified according to family history with cancer and breast cancer grade condition were patients with no family history of cancer and breast cancer with grade 3 condition, 28 patients. While the smallest number of patients classified by family history with cancer and breast cancer grade condition were patients with a family history of cancer and breast cancer with a grade 1 condition of 1 patient.

Breast cancer is one of the most deadly cancers. Based on parameter estimates table, age variable has no effect on breast cancer grade with p-value value. 0.795 (> 0.05). This is in line with the research conducted by Ali *et.al* (2016) which states that analysis between age with degree of differentiation (grading) showed no significant relationship with value p = 0.189. However, research conducted by Albrektsen *et.al* (2010) states that the number of young patients who suffered from breast cancer fewer than the number of patients aged over 40 years.

Based on parameter estimates table, the variable of nutritional status with respect to breast cancer grade with p-value value 0.033 (<0.05). This is in line with research conducted by Arif *et.al* (2018) states that there is a body mass index relationship with grading in breast cancer, where there is a tendency that overwight Body Max Index (BMI) is at greater risk of high grade in breast cancer.

While for family history with cancer, based on table parameter estimates indicate that the variable have an effect on to breast cancer grade with p-value value 0.005 (<0.05). According to Anders *et al*, 2010 states that having a family history with cancer increases the likelihood that the cancer is caused by inherited genetic mutations. Cancer caused by genetic mutations occurs in cancer patients under 40 years old. According Largent *et.al* (2005) that cancers caused by genetic mutations tend to have grade 3.

CONCLUSION

The number of samples used in this study were 95 people consisting of 77 samples aged ≥42 and 18 samples aged <42 years. Of the 95 samples, 57 of them had abnormal nutritional status and from the sample 69 people had no family history of cancer. Of the three independent variables used in this study, 2 variables that significantly influence the nutritional status with p-value 0.033 and family history with cancer with p-value 0.005. whereas for age does not affect the significance of grade breast cancer with p-value 0.795.

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