A relationship between happiness and life expectancy in breast cancer
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Abstract:
The second most common cancer among women is breast cancer. We have many categories of breast cancer. About 40000 women die for this cause in recent years[1]. We consider the relationship between happiness and life expectancy with death anxiety in patients with breast cancer. In this article we use logistic regression in R. Results show us that by increasing the awareness and understanding of people's beliefs about this disease, they can increase the ways of happiness and life expectancy in these people which reduces the anxiety of death in these patients.

Key words: Cancer, logistic regression, life expectancy.

1. Introduction:
Breast cancer has many type and many stages. Time is so important factor for detection cancer. Radiologists should detect cancer soon as soon. Type of regression can help to radiologist for prediction of cancer[2].

Information about patient like age and history of menopause and age of menopause is important for prediction or detection in first phase[3].

In this case assume that we have two patient with two history. First person has a sister with breast cancer and second person has a mother or sister and mother with breast cancer. Which is more probability for detection? Second person[4].

Many different kind of cancer are the problems that can affect a person's physical and mental health[5]. cancers patients suffering from depression experience a drop in quality of life and have a higher rate of mortality than others. In addition, depression in cancer patients can stimulate the abandonment of therapy stages and lead the patient to severe renal complications and death. Therefore, patients with this disease as well as other cancer diseases need for compatibility due to the stress. In this regard, one of the best supports for people coping with problems is feelings of joy and happiness. Happiness leads to a positive attitude to life, a positive self-concept and enjoyment of physical[6].

2. Related work:
many research published in this scope. Vikas used simple logistic and RBF and rRepTree for detecting breast cancer[9].

A comparative study between neural network and decision tree and genetic algorithm done by wei-pin chang[10]. The result of this study represent that combine of neural network and decision tree is the best solution for cancer detection[10].

Senturk had comparative study about seven data mining algorithm in cancer detecting. Their experimental result shows that support vector machine has high accuracy[11].

3. Materials and methods:
3.1 data sets:
Data sets related to the 50 states of the United States of America. It consists of[1]:
- state.abb
- state.area
- state.center
- state.division
- state.name
- state.region
- state.x77

R currently contains the following “state” data sets. Note that all data are arranged according to alphabetical order of the state names.

Table1:datasets and descriptions

<table>
<thead>
<tr>
<th>Data set</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td>State. abb</td>
<td>character vector of 2-letter abbreviations for the state names.</td>
</tr>
<tr>
<td>State. Area</td>
<td>numeric vector of state areas (in square miles).</td>
</tr>
<tr>
<td>State. center</td>
<td>list with components named x and y giving the approximate geographic center of each state in negative state. Division longitude and latitude.</td>
</tr>
</tbody>
</table>
Alaska and Hawaii are placed just off the West Coast.

<table>
<thead>
<tr>
<th>State.name</th>
<th>factor giving state divisions (New England, Middle Atlantic, South Atlantic, East South Central, West South Central, East North Central, West North Central, Mountain, and Pacific).</th>
</tr>
</thead>
<tbody>
<tr>
<td>State.region</td>
<td>character vector giving the full state names.</td>
</tr>
<tr>
<td>State.x77</td>
<td>factor giving the region (Northeast, South, North Central, West) that each state belongs to.</td>
</tr>
<tr>
<td>Population</td>
<td>matrix with 50 rows and 8 columns giving the following statistics in the respective columns</td>
</tr>
<tr>
<td>Income</td>
<td>population estimate as of July 1, 1975</td>
</tr>
<tr>
<td>Illiteracy</td>
<td>per capita income (1974)</td>
</tr>
<tr>
<td>Life EXP</td>
<td>illiteracy (1970, percent of population)</td>
</tr>
<tr>
<td>Murder</td>
<td>life expectancy in years (1969–71)</td>
</tr>
<tr>
<td>Hs Grad</td>
<td>murder and non-negligent manslaughter rate per 100,000 population (1976)</td>
</tr>
<tr>
<td>Frost</td>
<td>percent high-school graduates (1970)</td>
</tr>
<tr>
<td>Area</td>
<td>mean number of days with minimum temperature below freezing (1931–1960) in capital or large city</td>
</tr>
</tbody>
</table>

3.2. Logistic regression analysis:

There are hundreds of types of regressions. Linear regression: Oldest type of regression, designed 250 years ago; computations (on small data) could easily be carried out by a human being, by design. Can be used for interpolation, but not suitable for predictive analytics. Logistic regression: Used extensively in clinical trials, scoring and fraud detection, when the response is binary. Types of regression showed in below:

\[ y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_p x_p + \epsilon_i \quad i = 1, \ldots, n \]

In that formula y is answer variable and \(x_1, x_2, \ldots, x_p\) are independent variable that \(p\) is the count of independent variables.

The goal is to find two-variable relationship so that new information can be obtained.

After regression we do summary for showing results.

Fig. 1 shows the different types of regression. In linear regression have:

Fig. 2 linear regression

If you have more than one variable, we can use multivariable regression[2]. In this article we use this model:

After draw correlation matrix as like below:

Fig. 3. Summary of data

Fig. 4. Correlation matrix

Now you must calculate the correlation matrix. After draw correlation matrix as like below:
Now we made the linear model and Analysis of Variance Table:

Model 1: \text{Life.Exp} \sim \text{Population} + \text{Income} + \text{Illiteracy} + \text{Murder} + \text{HS.Grad} + \text{Frost} + \text{Area} + \text{Density}

Model 2: \text{Life.Exp} \sim \text{Population} + \text{Income} + \text{Illiteracy} + \text{Murder} + \text{HS.Grad} + \text{Frost} + \text{Density}

<table>
<thead>
<tr>
<th>Res.Df</th>
<th>RSS</th>
<th>Df</th>
<th>Sum of Sq</th>
<th>F</th>
<th>Pr(&gt;F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>41</td>
<td>22.0683</td>
<td>-1</td>
<td>-0.3564</td>
<td>0.6621</td>
</tr>
<tr>
<td>2</td>
<td>42</td>
<td>22.4247</td>
<td>-1</td>
<td>-0.4205</td>
<td>0.4205</td>
</tr>
</tbody>
</table>

3.3. analysis:
We analyse this method in R language and see this results. The model should include all relevant variables. More variables generally produce a better model fit to the data. Therefore by increasing the awareness and understanding of people's beliefs about the disease they can increase the happiness and life expectancy of these people which reduces the anxiety of death in these patients.

Conclusion:
Among all types of cancer, breast cancer is the most common cancer as well as the most common cause of death among women. Breast cancer is a psychological and emotional phenomenon for many women because it is a member of the most sensitive parts of the body and is a sign of the beauty and attractiveness of a woman.

A psychological concept that means how human could have a better life and could be positive is happiness.

by analyzing the effect of hope on mental health and happiness of cancer patients it is concluded that happiness and hope life can lead to increased happiness among patients undergoing dialysis.

Reference


