

An Analysis of Endo Metrial (Uterine) Cancer using Rtd Matrix

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Abstract

Cancer begins when cells in a part of the body start to grow out of control. They are many kind of cancer, but they all start because of out of control growth of abnormal cells. Cancer cell growth is different from normal cell growth. Instead of dying, cancer cells continue to grow and form new abnormal cells growing out of control and invading other tissues are what makes a cell a cancer cell. Endometrial cancer starts in the endometrium, the inner lining of the Uterus (womb). In this paper an attempt is made to find out the peak age of women getting Endometrial cancer by the method unsupervised questionnaire. we collected the data from 100 patients (of Adyar Cancer Institute), Chennai.

The following are identified as the symptoms of endometrial cancer namely unusual vaginal bleeding, unusual vaginal discharge, pain during inter course, pelvic pain, change in bladder habits, change in bowel habits, ascites, weight loss. First section gives the details about endometrial cancer. Section two deals with the concept of RTD matrix. In section three the data being analyzed using RTD matrix. In section four conclusions and suggestions are derived.

Keywords:

Cancer, Endometrial cancer, unusual vaginal bleeding, unusual vaginal discharge, pain during inter course, pelvic pain, change in bladder habits, change in bowl habits, ascites, weight loss
ATD matrix, RTD matrix, CETD matrix.

INTRODUCTION

Cancer begins when cells in a part of the body start to grow out of control. In most cases the cancer cells form a tumor. Some cancer like leukemia, rarely from tumors. Instead these cancer cells in volve the blood and blood forming organs and circulate through other tissues where they grow. The most common type of adenocarcinoma is known as endometroid cancer. Endometroid cancer are made up of cells in glands that look much like the normal uterine lining (endometrium). 54,870 new cases of cancer of the body of the uterus will be diagnosed. 10,170 women will die from cancers of the uterine body the cancer rates could further increase by 50 percent to 15 million new cases in the year 2020 according to the world cancer report, the most comprehensive global examination of the disease to date.

2. The concept of ATD,RTD &CETD Matrix:

2.1. Average Time Dependent (ATD) Matrix:

Raw data is transformed into a raw time dependent data matrix by taking along the rows the details of the age group and along the columns the number of occurrences of different symptoms. We make it into the Average time Dependent Data (ATD) Matrix (a_{ij}) by dividing each entry of the raw data matrix by the number of years. i.e., the time period. This matrix represents a data, which is totally uniform. At the third stage we find the average and Standard Deviation (S.D) of every column in the ATD Matrix.

2.2. Refined Time Dependent (RTD) Matrix:

Using the average μ_j of each j^{th} column and σ_j the S.D of the each j^{th} column we choose a parameters α from the interval $[0,1]$ and form the interval $[\mu_j - \alpha \sigma_j, \mu_j + \alpha \sigma_j]$ and form the Refined time dependent matrix (RTD matrix), Using the formula

$$a_{ij} \leq (\mu_j - \alpha \sigma_j) \text{ then } e_{ij} = -1 \text{ else}$$

$$\text{If } a_{ij} \in (\mu_j - \alpha \sigma_j, \mu_j + \alpha \sigma_j)$$

$$\text{Then } e_{ij} = 0 \text{ else}$$

$$\text{If } a_{ij} \geq (\mu_j + \alpha \sigma_j) \text{ then } e_{ij} = 1.$$

We redefine the ATD matrix into the Redefined time dependent fuzzy matrix for here the entries are = 0 or 1. Now the row sum of this matrix gives the maximum age group.

2.3. Combined Effective Time Dependent Data (CETD) matrix:

We also combine the above RTD matrices by varying the $\alpha \in [0,1]$, so that we get Combined Effective Time Dependent Data (CETD) matrix. The row sum is obtained for CETD matrix and conclusions are derived based on the row sums. All these are represented by graphs and graphs play a vital role in exhibiting the data by the simplest means, which can be even understood by a layman.

3. Description of the problem:

We symptoms of Endometrial cancer are unusual have interviewed 100 women Endometrial cancer patients. The vaginal bleeding, unusual vaginal discharge, pain during intercourse, pelvic pain, change in bladder habits, change in bowel habits, ascites, weight loss. We analyze these problems using fuzzy matrix, we call the RTD matrix is fuzzified by the entries from the set $\{-1,0,1\}$.

In this paper we will discuss symptoms of Endometrial cancer, which are taken as the column of the initial row data matrix the age group in years.12-35, 36-60, 61-80. The estimation of the maximum age group is five stage process. In the first stage we give the matrix representation of the raw data. The 3×8 matrix is not uniform i.e., the number of individual years in each interval may not be the same. So in the second stage, in order to obtain an unbiased uniform effect on each and every data so collected, transform this initial matrix into an Average Time Dependent Data (ATD) matrix. To make the calculations easier and simplex average techniques convert the above average time dependent data matrix in to a matrix with entries $e_{ij} \in \{-1,0,1\}$. We name this matrix as the Refined Time Dependent Data Matrix (RTD Matrix) or as the fuzzy matrix. The value of e_{ij} corresponding to each entry is determined in a special way. At the fourth stage using the fuzzy matrices we obtain the combined effect time dependent data, matrix (CETD Matrix), which gives the cumulative effect of all these entries. In the final stage we obtain the row sums of the CETD matrix are given.

3.1 Estimation of maximum age group of Uterine cancer patients by using 3×8 matrices:

In this section we take eight attributes related to symptoms of Uterine Cancer namely S_1 - Unusual Vaginal bleeding, S_2 - Unusual Vaginal discharge, S_3 - Pain during inter course, S_4 - Pelvic pain, S_5 - Change in bladder habits, S_6 - Change in bowel habits, S_7 - Ascites, S_8 - Weight loss.

Initial raw data matrix of order 3×8

Years	S_1	S_2	S_3	S_4	S_5	S_6	S_7	S_8
12-35	19	20	23	24	26	27	30	15
36-60	51	30	50	44	60	70	47	48
61-80	4	1	1	2	2	7	3	7

The ATD matrix of order 3×8

Years	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈
12-35	0.79	0.83	0.95	1.0	1.08	1.12	1.25	0.62
36-60	2.04	1.2	2	1.76	2.4	2.8	1.88	1.92
61-80	0.2	0.05	0.05	0.1	0.1	0.35	0.15	0.35

The Average and Standard deviation of the above ATD Matrix

Average μ	1.01	0.693	1.0	0.953	1.193	1.423	1.093	0.963
S.D σ	0.93	0.58	0.97	0.830	1.15	1.25	0.87	0.83

The RTD matrix for $\alpha = 0.25$

$$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ -1 & -1 & -1 & -1 & -1 & -1 & -1 & -1 \end{bmatrix}$$

$$\begin{bmatrix} 0 \\ 8 \\ -8 \end{bmatrix}$$

The RTD matrix for $\alpha = 0.45$

$$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ -1 & -1 & -1 & -1 & -1 & -1 & -1 & -1 \end{bmatrix}$$

The row sum matrix

$$\begin{bmatrix} 0 \\ 8 \\ -8 \end{bmatrix}$$

The RTD matrix for $\alpha = 0.65$

$$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ -1 & -1 & -1 & -1 & -1 & -1 & -1 & -1 \end{bmatrix}$$

The CETD matrix

$$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 \\ 4 & 4 & 4 & 4 & 4 & 4 & 4 & 4 \\ -4 & -4 & -4 & -4 & -4 & -4 & -4 & -4 \end{bmatrix}$$

The RTD matrix for $\alpha = 0.75$

$$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ -1 & -1 & -1 & -1 & -1 & -1 & -1 & -1 \end{bmatrix}$$

The row sum matrix

$$\begin{bmatrix} -1 \\ 32 \\ -32 \end{bmatrix}$$

The row sum matrix

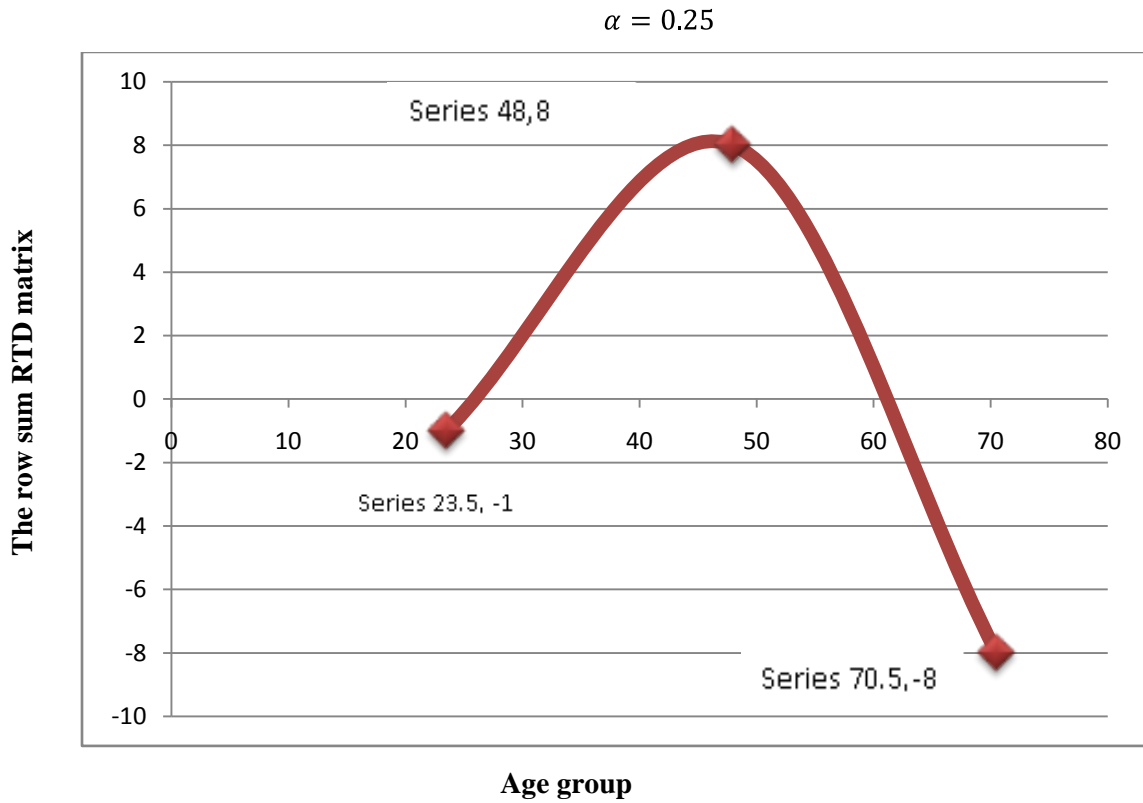
$$\begin{bmatrix} -1 \\ 8 \\ -8 \end{bmatrix}$$

The row sum matrix

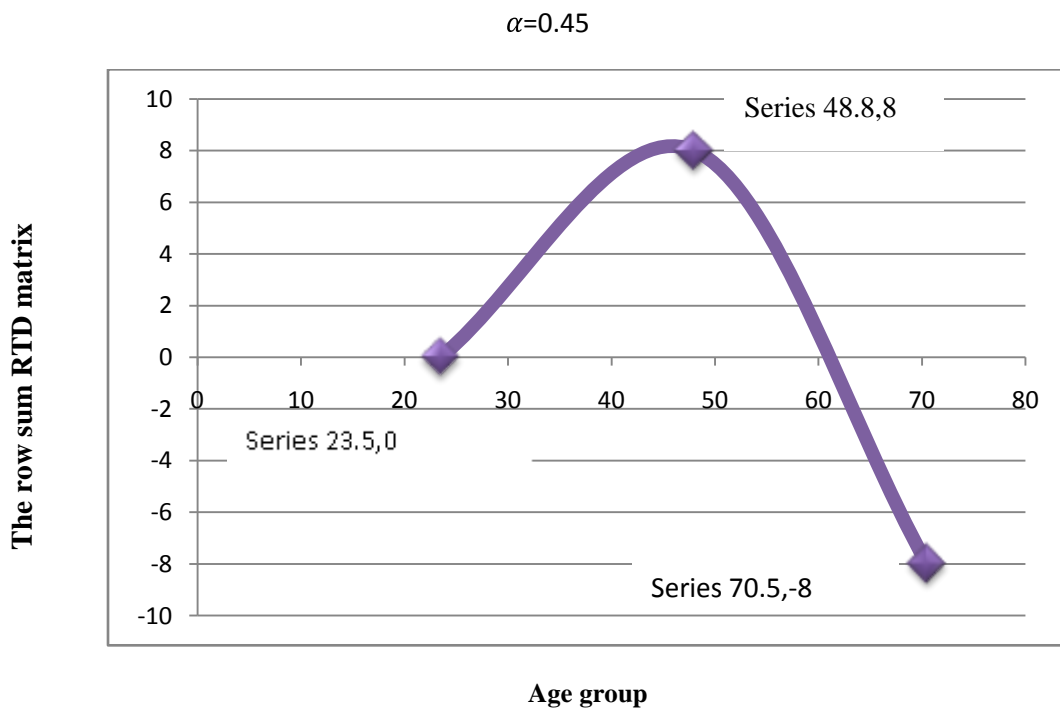
$$\begin{bmatrix} 0 \\ 8 \\ -8 \end{bmatrix}$$

The row sum matrix

Graph 1 : Graph depicting maximum age group of Endometrial (Uterine) Cancer Patients

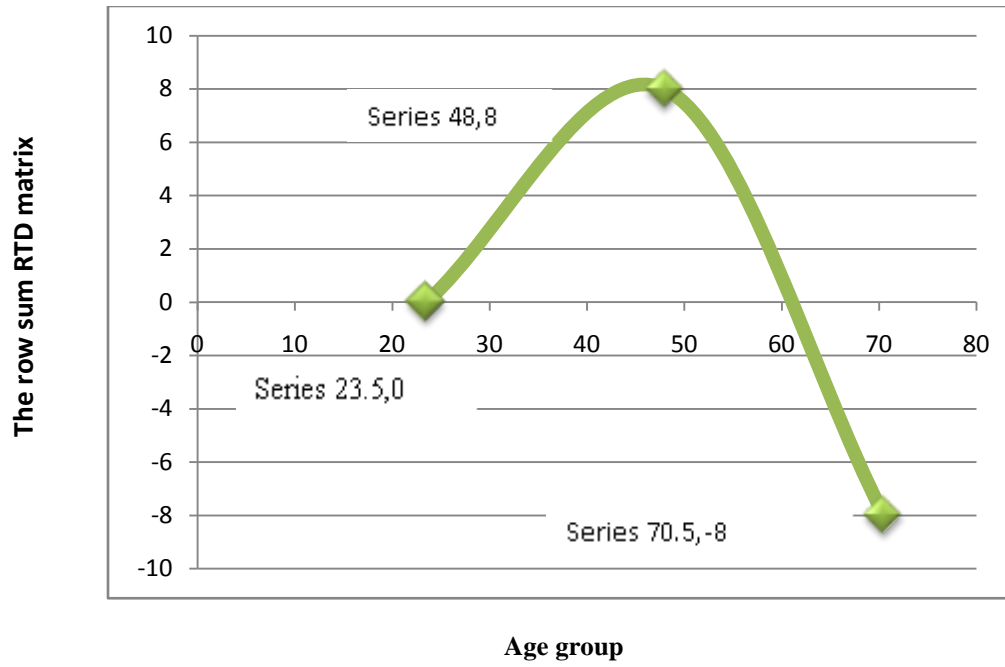


Graph 2 : Graph depicting maximum age group of Endometrial (Uterine) Cancer Patients



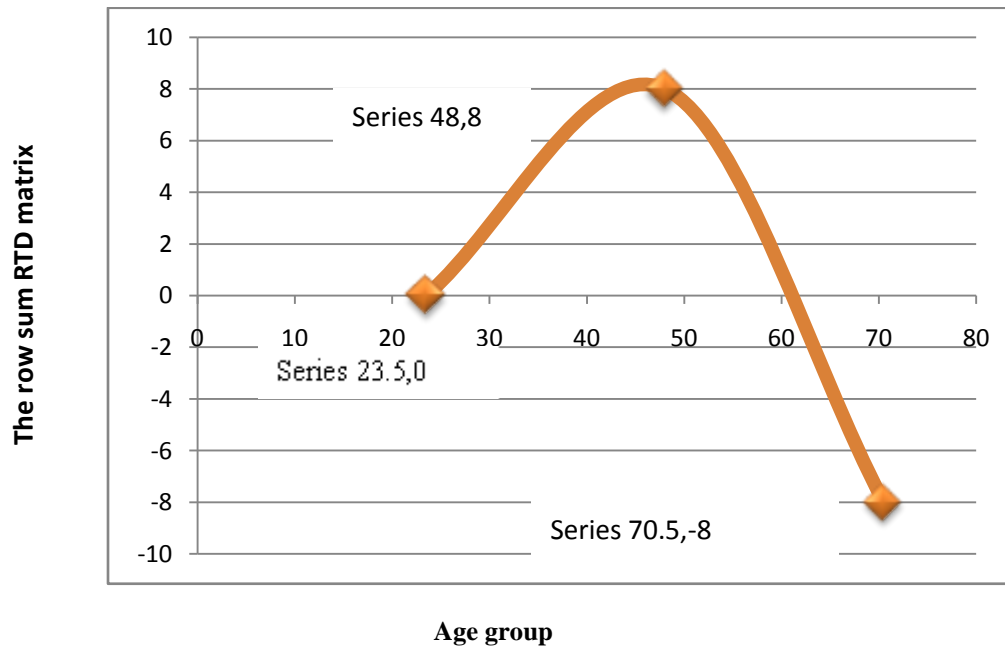
Graph 3 : Graph depicting maximum age group of Endometrial (Uterine) Cancer Patients

$\alpha = 0.65$

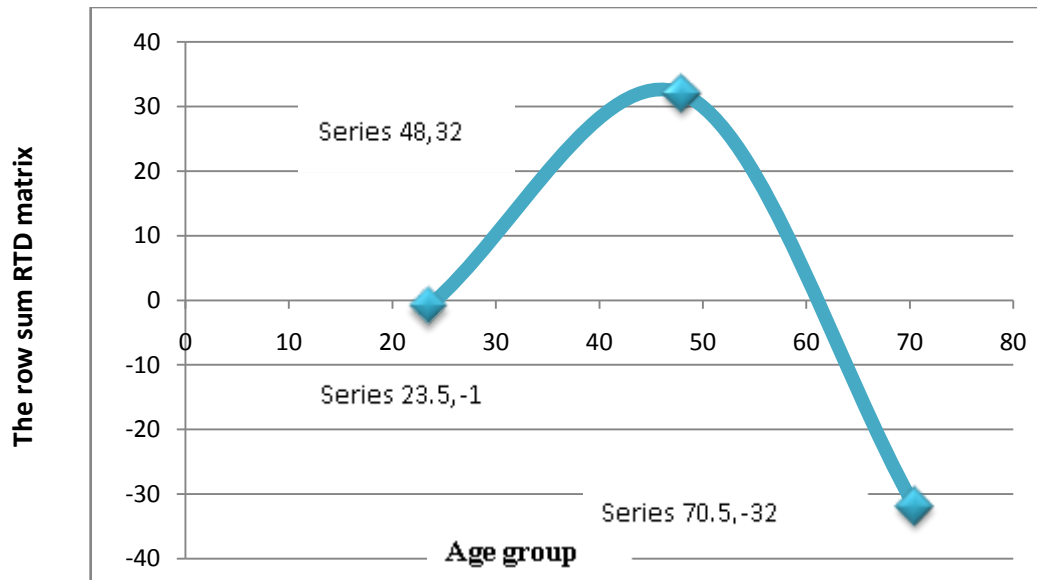


Graph 4 : Graph depicting maximum age group of Endometrial (Uterine) Cancer Patients

$$\alpha = 0.75$$



Graph 5: Graph depicting maximum age group of Endometrial (Uterine) Cancer Patients



From the above graph we observe that Uterine cancer start at the age of 22. The peak age of women having Uterine cancer is 48. The peak period is 36 to 60.

Conclusion

From the above analysis, Uterine Cancer starts at the age of 19. The peak age of women having Uterine Cancer is 49 the peak period for the Uterine Cancer is 40 to 50. Uterine Cancer mostly occur in women over the age of 50, and the risk is especially high for women over age 60. The above analysis with the CETD Matrix result get confirmed.

4. REFERENCES:

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