



Applied Mortality Proportional Rates on Testicular Cancer in Erbil and Sulaimani from (2000-2014)

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Abstract

Mortality rate of cancer is important for the sector of the health care, to use a graphical method developed by Gabriel to describe the row and columns of a matrix to tables of age and period. While, it is useful to use age specific rates changes with time by pattern. Trends in age precise rates and changes in the age specific distribution are defined as projections. we apply this model on fertility rates, mortality rates, and population base for a particular type, data was collected from learning science Hospital in Erbil and Sulaimani for testicular cancer (Secondary data) between 2000 and 2014, and again we can use model of proportion growth rate. In addition, it can also be used as the model to determine if the mortality rates for age of a particular type will increase or decrease over a certain period of time. The age-standardised mortality rates from testicular cancer were significantly lower in Erbil and Sulaimani in 2000-04 compared to 2005-09 and 2010-14 related on Figures (9-14). On Erbil and Sulaimani testicular cancer, In 2000-04, the hazard functions rates were 0.08-0.1, whilst in 2005-09 they were 0.1- 0.2 and 2010-14 were 0.12-0.32. While, the Easyfit and SPSS programs used for practical part for this study.

Keywords: Mortality Rates; Proportion; Age Distribution; Data Analysis; Trends; Testicular Cancer.

1-Introduction:

Testicular cancer is a paradox. It is one of the leading causes of death between the ages of 15 and 44, but it is one of the hardest curable cancers. In fact, despite the number of deaths from testicular cancer in young people, it has been suggested as a model for curable cancer. Trends in the mortality description of a disease are usually based on the age matrix and mortality rate determined over a period of time, and are derived from the number of deaths and years of vulnerable individuals. Testicular cancer research discusses testicular cancer facts for men and women. Our medical research book can write your project on every aspect of testicular cancer. For cancer testicular mortality in Kurdistan region this data was collected in regularly hospitals from Erbil and Sulaimani, for five years age groups and five years periods by Erbil hospital science between (2000- 2014) and the average age groups from 15 and 64 years. Tables 1&2 shows testicular cancer mortality in Erbil and Sulaimani learning science hospitals.

Table1: Rates of Mortality from testicular cancer in Erbil, during 2000-2014, ages 15-64.

Age at death	Period of death			Totally 2000-2014
	2000-2004	2005-2009	2010-2014	
15-19	12	17	28	57
20-24	20	19	36	75
25-29	26	24	45	95
30-34	38	29	41	108
35-39	46	47	37	130
40-44	43	52	46	141



45-49	40	41	34	115
50-54	40	52	28	120
55-59	31	33	42	106
60-64	46	39	32	117
Totally	342	353	369	

Table2: Rates of Mortality from testicular cancer in Sulaimani, during 2000-2014, ages 15-64.

Age at death	Period of death			Totally 2000-2014
	2000-2004	2005-2009	2010-2014	
15-19	8	11	20	39
20-24	13	14	28	45
25-29	7	19	33	59
30-34	20	27	35	88
35-39	31	36	39	106
40-44	37	44	44	125
45-49	31	36	28	89
50-54	33	42	33	108
55-59	22	30	36	88
60-64	39	36	38	113
Totally	241	295	334	

Barrett 1973 and Osmond and Gardner 1982a, b, 1983 used the age range and cohort models to describe the trend of such matrices. If $M = k_{ij}$ is an $I * J$ matrix with age as rows and points columns, which is they fit of the model

$$k_{ij} = h_i * b_j * C_{I-i+j} * \exp(e_{ij}) \quad (1)$$

Take log for both of the side we get the following equation;

$$\ln k_{ij} = \ln h_i + \ln b_j + \ln C_{I-i+j} + e_{ij} \quad (2)$$

Where:

h_i is the age value, b_j the period value, C_{I-i+j} the cohort value corresponding to the i th age group and j th period and e_{ij} is an error term. There are three advantages with this model.

1-They adopt the same pattern of age-specific rates for all periods and regiments. Although this makes sense for many cancers, since mortality often correlates closely with age-stable capacity function, it is less suitable. For example, Table 1 shows that the age of the highest rate of testicular cancer has shifted from 55 and over in the first two periods compared to 35 and less in the last three periods.

2- Model 2 is not definable and needs some external constraints to provide unique parameter estimates. In fact, the linear displacement that is suitably applied to the logarithms of each set of values does not affect relevance quality. In particular, the equations determine the optimal solution.

$$\ln h'_i = \ln h_i + \bar{x} + \delta(I - i), \quad i = 1, 2, \dots, I \quad (3)$$

$$\ln b'_j = \ln b_j + v + \delta_j, \quad j = 1, 2, \dots, J \quad (4)$$

$$\ln C'_k = \ln c_l - \bar{x} - v + \delta_l, \quad l = 1, 2, \dots, I + J - 1 \quad (5)$$

3- The model assumes that the period and the coefficients apply equally to all age groups. This is unlikely in some cases. For example, diagnostic improvements have allegedly caused an increase in age groups in deaths from multiple myeloma (Cuzick, Velez, and Doll, 1983). Such a process can produce artifact artifacts.

In this paper we show that the scatter plot presented by Gabriel in 1971 can be used to highlight trends and aging distributions without such definability. The graphical technique



that combines the matrix R with four vectors instead of the three component age, period, and cohort models. Both methods require the estimate of the same number of independent parameters $(2I + 2J - 4)$.

2- Methodology

The scatterplot technique generates two sets of points on the level, which first correspond to all ages shown in R, and the others correspond to the periods. For each point we necessitate an x co-ordinate and y co-ordinate. We use the following notation:

$$H_i = (h_i, d_i) \quad (6)$$

Is the age point corresponding to age group i;

$$\beta_j = (b_j, \lambda_j) \quad (7)$$

Is the period point corresponding to period j. The biplot model is;

$$k_{ij} = h_i b_j + d_i \lambda_j + e_{ij} \quad (8)$$

Where;

The e_{ij} is an error term. Thus each rate is fitted by the scalar product between vectors from the origin to its age point and its period point. The fitting is done by least square minimization. Specifically we seek to minimize.

$$g = \sum_{i,j} e_{ij}^2 = \sum (k_{i,j} - h_i b_j - d_i \lambda_j)^2 \quad (9)$$

Over the values of h_i , b_j , d_i and λ_j .

R is being approximated by a matrix of rank 2. Conditions are needed to determine a particular solution. The non uniqueness arises from the fact that we may introduce

h'_i, d'_i, p'_j and λ'_j where;

$$\begin{pmatrix} h'_i \\ d'_i \end{pmatrix} = \begin{pmatrix} \cos \theta & -\sin \theta \\ \sin \theta & \cos \theta \end{pmatrix} \begin{pmatrix} \delta_1 & 0 \\ 0 & \delta_2 \end{pmatrix} \begin{pmatrix} \cos \sigma & -\sin \sigma \\ \sin \sigma & \cos \sigma \end{pmatrix} \begin{pmatrix} h_i \\ d_i \end{pmatrix} \quad (10)$$

After some multiplication we get the following equation;

$$\begin{pmatrix} h'_i \\ d'_i \end{pmatrix} = \begin{pmatrix} h_i [\delta_1 \cos \theta \cos \sigma - \delta_2 \sin \theta \sin \sigma] - d_i [\delta_1 \cos \theta \sin \sigma - \delta_2 \sin \theta \cos \sigma] \\ h_i [\delta_1 \sin \theta \cos \sigma - \delta_2 \cos \theta \sin \sigma] + d_i [\delta_1 \sin \theta \sin \sigma + \delta_2 \cos \theta \cos \sigma] \end{pmatrix} \quad (11)$$

And

$$\begin{pmatrix} b'_j \\ \lambda'_j \end{pmatrix} = \begin{pmatrix} \cos \theta & -\sin \theta \\ \sin \theta & \cos \theta \end{pmatrix} \begin{pmatrix} 1/\delta_1 & 0 \\ 0 & 1/\delta_2 \end{pmatrix} \begin{pmatrix} \cos \sigma & -\sin \sigma \\ \sin \sigma & \cos \sigma \end{pmatrix} \begin{pmatrix} b_j \\ \lambda_j \end{pmatrix} \quad (12)$$

Again some multiplication on the above formula we get the equation 13;

$$\begin{pmatrix} b'_j \\ \lambda'_j \end{pmatrix} = \begin{pmatrix} b_j [1/\delta_1 \cos \theta \cos \sigma - 1/\delta_2 \sin \theta \sin \sigma] - \lambda_j [1/\delta_1 \cos \theta \sin \sigma - 1/\delta_2 \sin \theta \cos \sigma] \\ \lambda_j [1/\delta_1 \sin \theta \cos \sigma - 1/\delta_2 \cos \theta \sin \sigma] + b_j [1/\delta_1 \sin \theta \sin \sigma + 1/\delta_2 \cos \theta \cos \sigma] \end{pmatrix} \quad (13)$$

In geometrical terms this is acknowledging that the scalar products between the sets of points corresponding to age groups and periods are invariant under the following four transformations:

- 1- σ a rotation of the co-ordinate space through angle σ .
- 2- δ_1 a scale change, δ_1 applied to the new h_i terms with the inverse applied to the new b_j terms.
- 3- δ_2 a similar scale change in the y direction.
- 4- θ a further rotation of the co-ordinate space through angle θ .



Collinearity is maintained by these transformations. None of the internal structures of the vector was changed from the model in contrast to the age period, cohort model non definition. The minimum function of decomposing the single value for R or the same is obtained from the self-solution units $R^T R$ or RR^T (both positive and quasi-positive and symmetric).

In practice for this estimate are available immediately. If they are less than J , RR^T is more convenient and associate versa. In our example, the $R^T R$ is even less than half of this case. Four unusual vectors are obtained as follows:

1- b_j is the j th component of the eigenvector corresponding to the largest eigenvalue of $R^T R$,

2- λ_j is the j th component of the eigenvector corresponding to the next largest eigenvalue of $R^T R$.

$$3- h_i = \sum_j k_{ij} b_j, \quad d_i = \sum_j k_{ij} \lambda_j \quad (14)$$

We determine σ and θ by requiring that h_i 's and b_j 's corresponding to the x-direction and the d_i 's and λ_j 's corresponding to the y-direction. The scale parameters δ_1 and δ_2 are determine by forcing the lengths of vectors in the same direction to be equal. Thus

$$\sum_i h_i^2 = \sum_j b_j^2 \quad \text{and} \quad \sum_i d_i^2 = \sum_j \lambda_j^2 \quad (15)$$

This is a sensitive special solution. Some modifications would be useful if both I and J are very different. (Sibson, 1979) To present this method, other dimensions may be used, but it will be difficult to represent and rarely add significant descriptive power.

For the most part useful property of the scatter plot is its capacity to represent age and period changes simultaneously via projections.

1- We consider rates for a specific age group. The estimates of these are proportional to the projection of the points on the line connecting the origin and age point of the corresponding age group. This property is a direct consequence of the use of the standard product. If the estimates move away from the asset over time, the estimates of interest rates will increase over time.

2- We would look at the age at which the deaths are reported for a given period of time, and find that the age-specific estimates meet the expectations of the age points on the line that connect the origin to the corresponding point. Therefore, the scatter plot light highlights different age distribution structures at different times. If the function exists, it will be determined by the need to accurately estimate large rates. The alternative could be a function of the rates, possibly a logarithm or logit. This would be disadvantageous in that it is less interpretable. Another formula for the dipole model is

$$\ln k_{ij} = \ln(h_i b_j + d_i \lambda_j) + e_{ij} \quad (16)$$

This is less easy to handle, but it offers another way to avoid the dominance of big rates.

There are strong bipolar bonds and the corresponding analytical method has developed a graphical method of asymmetric matrix based on a point-oriented product instead of the standard product (Hill, 1974, Gower, 1977 and Gabriel, 1971).

3. Techniques and patients data

The data start 2000-2014 covers the testicular cancer patients and the data was collected from Rzgary Teaching Hospital in Erbil and Sulaimani city in Iraq. After we are organized the data and also we analyzed by using Spss and the Easyfit 5.6 standard Programming.

3.1 Statistical analyses

This paper considers apply on the secondary data based on laboratory investigations. These data are supplied by Rizgary Teaching Hospital, Erbil and Sulaimani, Iraq for the year 2000 to 2014. The data collected from existing databases in terms of the mortality time of death. The data includes the factors affecting the testicular which are age, hazard time, time inter and exit patient on hospital. The data translated into codes using a particularly designed coding sheet, after that converted to computerized database. The specific statistical advice was



required and EasyFit 5.6 standard program used. First all after the compare between mortality rates from patients in Erbil and Sulaimani from 2000-04 was stability by ages 15-40, but from 2005 to 2009 the hazard rates increased.

The following tables show descriptive statistics in testicular cancer patients from Erbil and Sulaimani hospitals between 2000 and 2014 for the ages 15-64 years.

Table3: Descriptive statistics for the testicular cancer in Erbil from 2000 to 2014, ages 15-64 years.

Years	No.	Minimum	Maximum	Mean	Std. Deviation	Variance
2000-2004	10	12	46	34.20	11.593	134.400
2005-2009	10	17	52	35.30	12.970	168.233
2010-2014	10	28	46	36.90	6.523	42.544

Table4: Descriptive statistics for the testicular cancer in Sulaimani from (2000-14), ages 15-64 years.

Years	No.	Minimum	Maximum	Mean	Std. Deviation	Variance
2000-2004	10	7	39	24.10	11.542	133.211
2005-2009	10	11	44	29.50	11.511	132.500
2010-2014	10	20	44	33.40	6.769	45.822

4- Result and discussion:

Tables 1&2 are used in these sections. Figures (1&2) show a plot of the age and period of death value obtained from model 2 using the identification described by Osmand and Gardner (1982b). The graphs contain age values scatterpolt against at number of the death on the years logarithmic scale. The age value for the figures 1 & 2 are rise to a maximum for the 35-40 age groups, decline to the 50-55 groups and increased again.

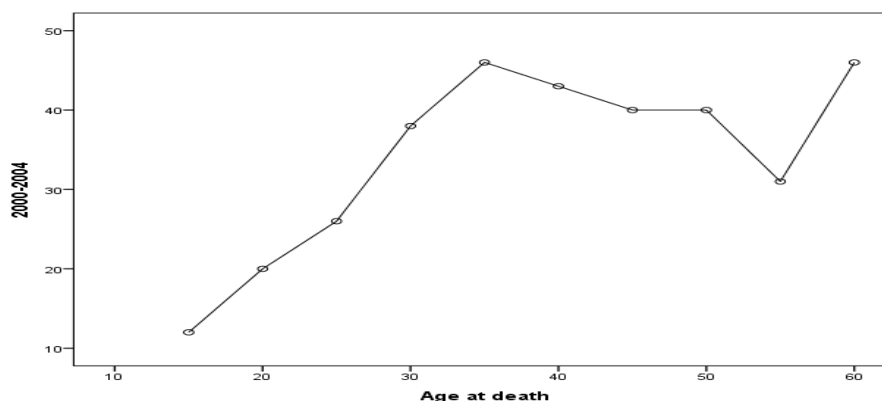


Figure1: Mortality rate from testicular cancer in Erbil during 2000-04 ages 15-64, age and period of death values are plotted.

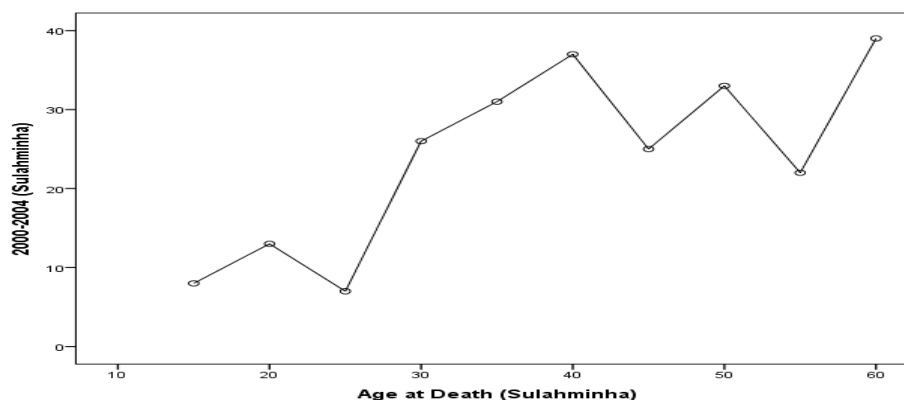


Figure2: Mortality rate from testicular cancer in Sulaimani during 2000-04 ages 15-64, age and period of death values are plotted.



Figures 3&4 demonstrate the biplot for the same data from 2005 to 2009 in Erbil and Sulaimani hospitals, from the ages 15-30 the value of the mortality rates increase sharply and start to raise from 35 to 40 years and then decline ages 40 after fluctuated until 60 years for the data years between 2004 and 2009.

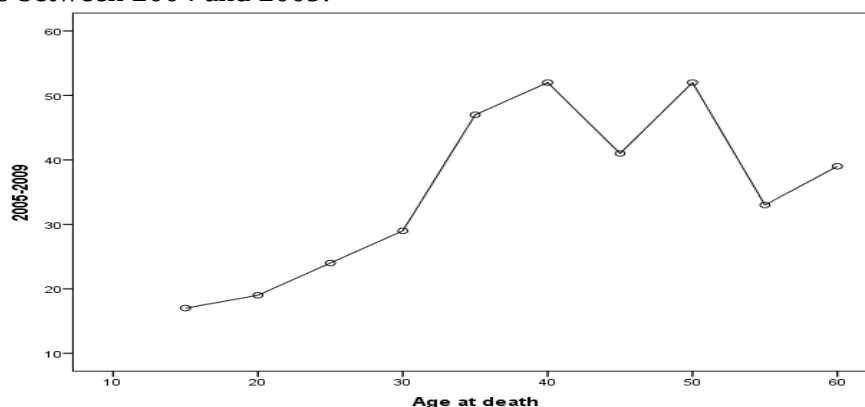


Figure3: Mortality rate from testicular cancer in Erbil during 2005-09 ages 15-64, age and period of death values are plotted.

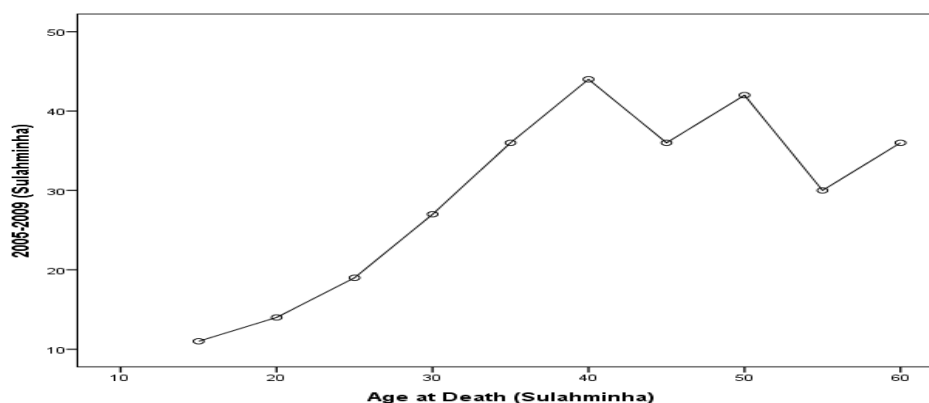


Figure4: Mortality rate from testicular cancer in Sulaimani during 2005-09 ages 15-64, age and period of death values are plotted.

Lastly, from 2010 to 2014 the figure 5 & 6 illustrated that the maximum rate for mortality at age group 25 and 40 for the patient in Erbil which are these period more effected or work with cancer, but in Figure 6 the higher rates for hazard just at 40 and then decline until age 64. Finally, the age groups from 35 to 40 years for the testicular cancer were more death affected in this decease.

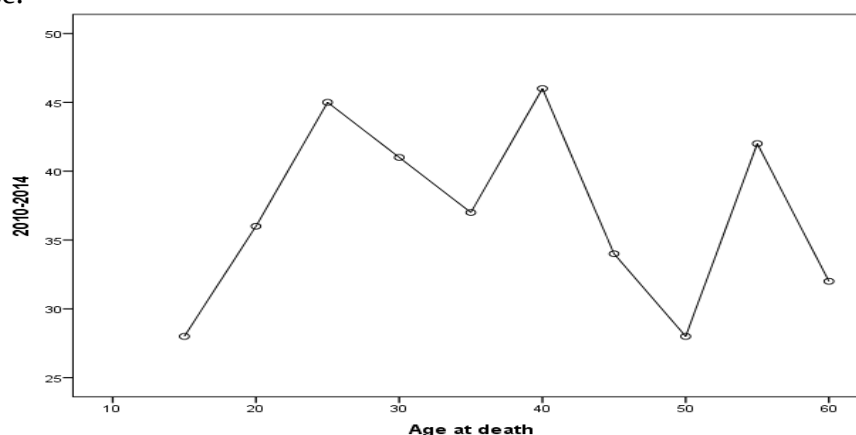


Figure5: Mortality rate from testicular cancer in Erbil during 2010-14 ages 15-64, age and period of death values are plotted.



Figure6: Mortality rate for testicular cancer in Sulaimani during 2010-14 ages 15-64, age and period of death values are plotted.

The following figures 7 & 8 are shown the companied all years testicular cancer from 2000 to 2014 on Erbil and Sulaimani hospitals of Kurdistan Region of Iraq and ages 15-64 years.

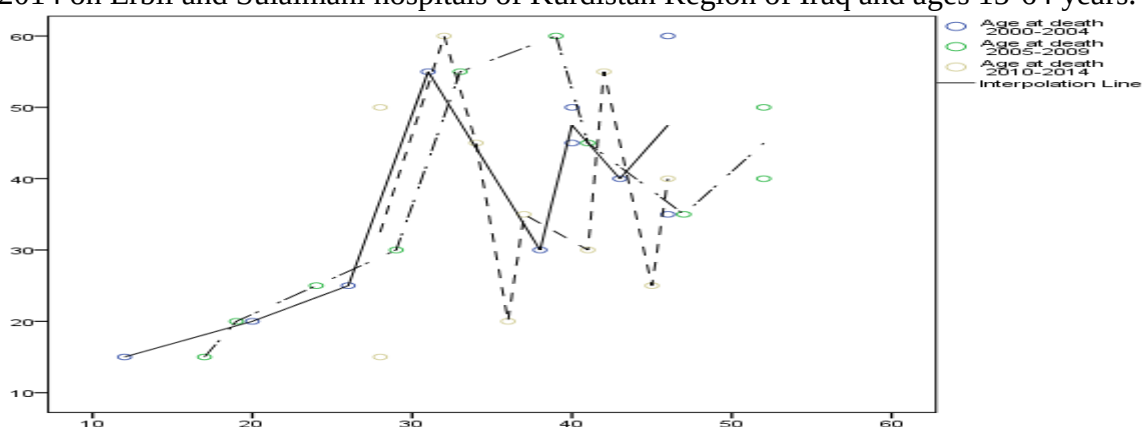


Figure7: Mortality rate for testicular cancer in Erbil during 2000-14 ages 15-64, age and period of death values are plotted.

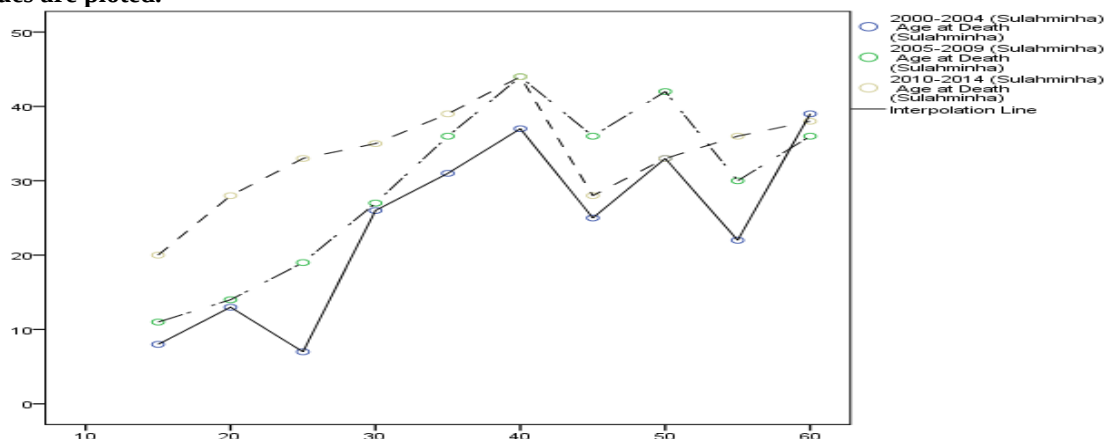


Figure8: Mortality rate for testicular cancer in Sulaimani during 2000-14 ages 15-64, age and period of death values are plotted.

To determine the hazard function for the testicular patients in the Rizgary teaching Hospital Erbil and teaching hospital Sulaimani. This is performed by finding the hazard functions curve for the selected time of death, beginning with first case depend on tables 1&2 observation, the P- value of Kolmogrov simirnov for the normal distribution data patients at Erbil and Sulaimani testicular cancer from 2000 to 2004 are equal to (0.226 and 0.132), which is grater than (0.05),. On the other hand, the data from 2005-2009 the P-value of Kolmogrove simirnov for the same distribution of both city are equal to (0.116 and 0.214), again is greater than (0.05). Finally, the P- value of kolmogrov simirnov for the data testicular cancer in Erbil and Sulaimani patients between 2010 and 2014 are



(0.135 and 0.176), again greater than the level value (0.05), which are statistical significant. while the value of the mean, variance and standard division are shown in tables 3&4. Know we are going to the second case which is the hazard rate function which are illustrate figures 9, 10, 11, 12, 13 and 14 from 2000-2014 in Erbil and Sulaimani teaching hospital for the testicular cancer patients, ages 15-64 years.

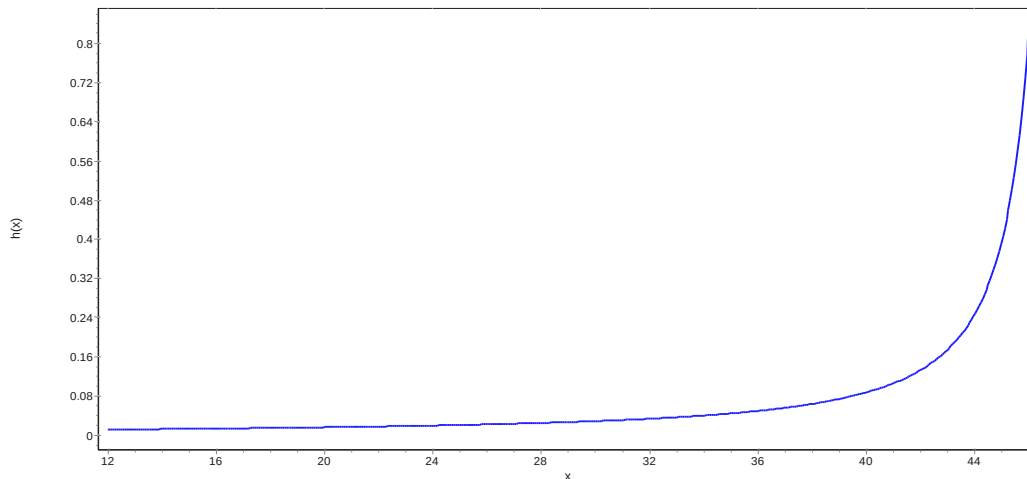


Figure9: The hazard functions for the testicular cancer in Erbil City from 2000-04, ages 15-64.

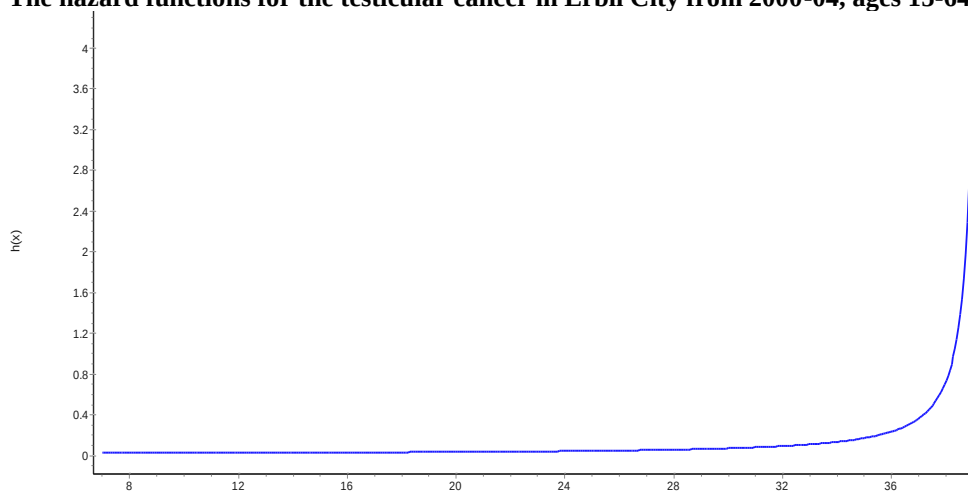


Figure10: The hazard functions for the testicular cancer in Sulaimani City from 2000-04, ages 15-64.

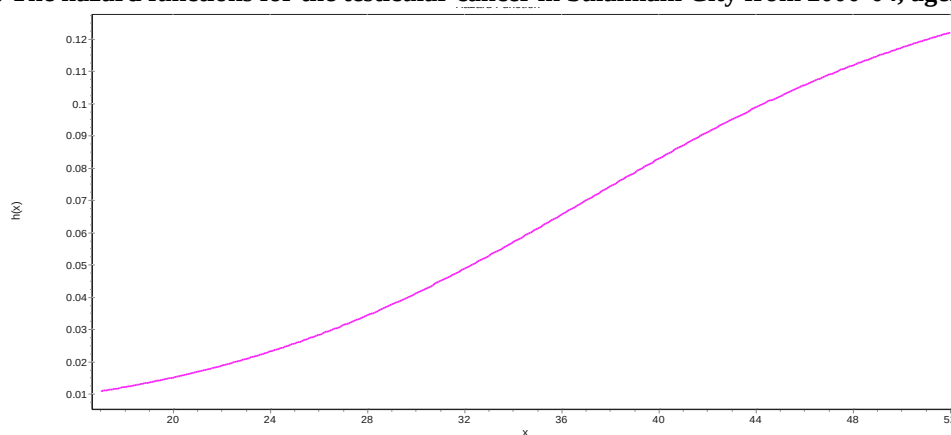


Figure11: The hazard functions for the testicular cancer in Erbil City from 2005-09, ages 15-64.

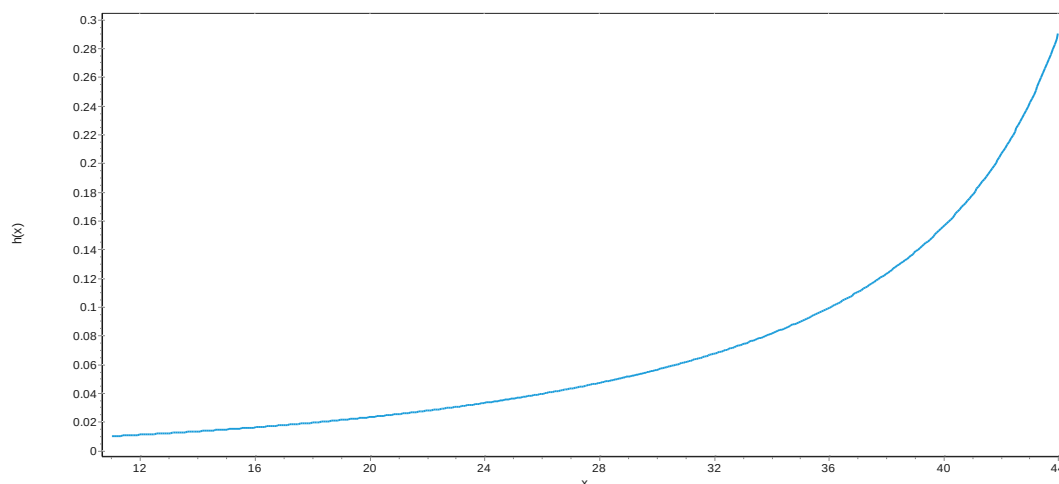


Figure12: The hazard functions for the testicular cancer in Sulaimani City from 2005-09, ages 15-64.

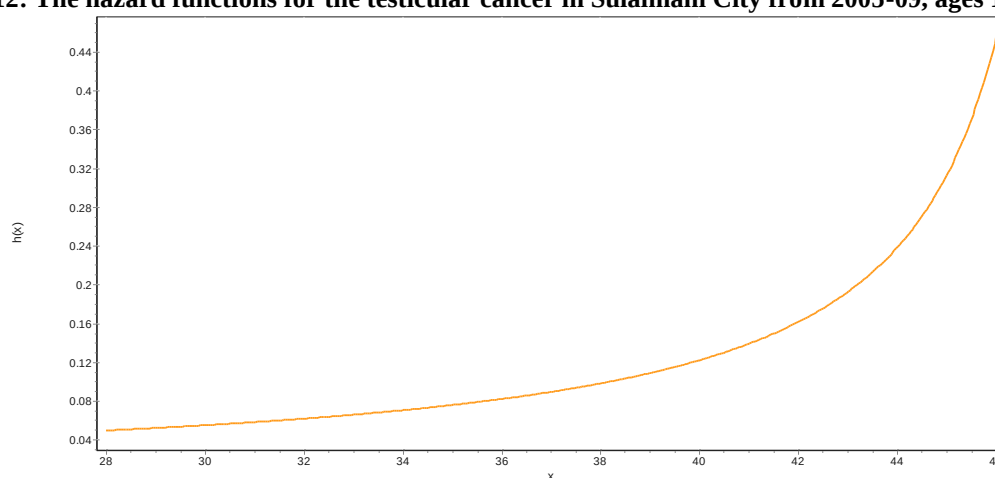


Figure13: The hazard functions for the testicular cancer in Erbil City from 2010-14, ages 15-64.

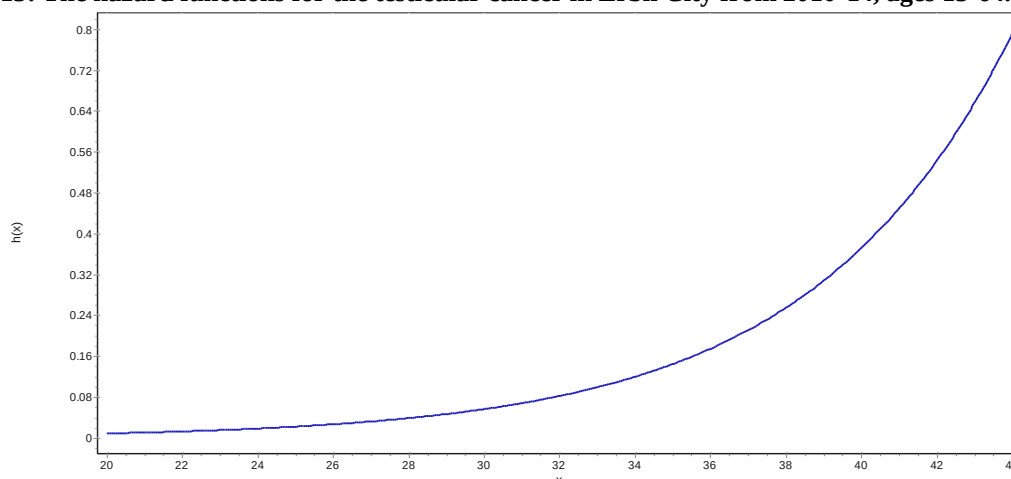


Figure14: The hazard functions for the testicular cancer in Sulaimani City from 2010-14, ages 15-64.

References:

- Andersson TML, Dickman PW, Eloranta S et al. Estimating the loss in expectation of life due to cancer using flexible parametric survival models *Stat Med* 2013, No. 32 Vol.30; PP.5286-5300.
- Bosl GJ, Voelzang NJ, Goldman A et al.: Impact of delay in diagnosis on clinical stage of testicular cancer (1981). *Lancet* No.2 pp. 970-9721.
- Coleman MP, Estève J, Damiecki P, Arslan A, Renard H (1993) *Trends in Cancer Incidence and Mortality (IARC Scientific Publications No. 121)*. International Agency for Research on Cancer: Lyon
- Cuzick, J., Velez, R. and Doll, R. (1983) International variations and temporal trends in mortality from multiple myeloma. *Int. J. Cancer*, No.32 pp. 13-19.

- Dahl O: Testicular carcinoma: A curable malignancy (1985). *Acta Radiol Oncol. No. 24 pp. 3-15.*
- Einhorn L: Testicular cancer as model for a curable neoplasm (1981). *Cancer Res No. 41. pp. 3275- 3281.*
- Fossa SD, Aass N, Harvei S. et al. Increased mortality rates in young and middle-aged patients with malignant germ cell tumours *Br J Cancer* 2004; No. 90. pp. 607-612.
- Hill, M. O. (1974) Correspondence analysis: a neglected multivariate method. *App. Statist., No. 23 pp. 340-354.*
- Osmond, C., Gardner, M. J. and Acheson, E. D. (1982a) Analysis of trends in cancer mortality in UK during 1951-80 separating change associated with period of birth and period of death. *Brit. Med. J., 284, 1005-1008.*
- Osmond, C., Gardner, M. J., Acheson, E. D., Adelstein, A. M. (1983) Trends in cancer mortality; analysis by period of birth and death. London: H.M.S.O. O.P.C.S. Series DH1 No. 11
- Sibson, R. (1979) Studies in the robustness of multidimensional scaling: perturbational analysis of classical scaling. *J. R. Statist. Soc. B, No. 41, pp. 217-229.*
- Møller H, Knudsen LB, Lynge E (1994) Risk of testicular cancer after vasectomy: cohort study of over 73 000 men. *Br Med J . No.309. pp. 295-299*
- Oliver RTD: Testicular germ cell tumors-A model for a new approach to treatment of adult solid tumors (1985). *Postgrad Med J. No. 61 pp. 123-131.*
- Richiardi L, Bellocchio and etc (2004) Testicular cancer incidence in eight northern European countries: secular and recent trends. *Cancer Epidemiol Biomarkers Prev. No. 13. pp. 2157-2166.*
- Surveillance, Epidemiology, and End Results (SEER) Program. SEER*Stat Database: Surveillance Systems Branch, 2014. www.seer.cancer.gov (5 July 2014, date last accessed), November 2013 submission.

پوخته

پژیهی مردنی شیرپه نجه گرنگه بۆ سیکتهری چاودیری تهندرستی، تاکه ریگه ییکی هیلکاری به کار بهینیت دهری کهوت له لایهن (گیبیرهل) تا به شیوه یه کی نهستوونی و به نهی قالبیک بۆ دووزینه وه خشتهی مهتریکس بو تهمن و ماوه. لهو کاتهی، که نهوه بهسووده تا تهمن دیاریکراو گۆرانی پژیه به کار بهینیت لهگه ل کات له لایهن شیواز. ئاراسته له تهمن پژیه و گۆرانی تهواو له دابهشکردنی دیاریکراوی تهمن پیناسه دهکرت ههروهک پیتیشینی خستنه سهرده. ئیمه ئهم مۆدیله جیهه دهکین له پژیهی بهیتی، پژیهی مردن، و دانیشتهوان دا دهمهزینن بۆ جۆریکی دیاریکراو. داتا کۆکراوه له نهخوشخانهی زانستی فیرکه ری له ههولیر و سلیمانی بۆ شیرپه نجهی تیستیکه لهر (داتای کۆکراوه له به شی ئامار) له ئیوان سالاکانی (۲۰۰۰ و ۲۰۱۴)، و دووباره ئیمه دهتوانین مۆدیلی پژیهی گه شه کردنی پژیه به کار بهینن. سه ره رای نه وهش، دهتوانیت به کار بهینرت ههروهک مۆدیله که تا دیاری بکات نه گهر پژیهی مردن بۆ تهمنی جۆریکی دیاریکراو یان زیاد دهکات یان کهم دهیتته وه به سه ره ماوه ییکی دیاریکراوه. ته مه نی (ستانداردیه سه د) پژیهی و پژیهی مردن له بو شیرپه نجهی (تیستیکه لهر) زورگرنگی تاییه ته مه ندی خوی هه یه، له شاری ههولیر و سلیمانی له سالاکانی (۲۰۰۰-۰۴) پژیهی مردن له بو شیرپه نجهی (تیستیکه لهر) که متر به به راورد لهگه ل سالاکانی (۲۰۰۵-۰۹) وه ره ها (۲۰۱۰-۱۴) که به بی نه و کرافانی که له خواروه ئامازه بی کردوه له ژماره (۱۴-۰۹). وه ره ها بو زیاتر روونکردنه وه به شیوازی مایماتیکس له سه ره شیرپه نجهی (تیستیکه لهر)، له هه ردوو شاره که بو سالاکانی (۲۰۰۰-۰۴)، یه کسانه به (۲۰۰۸-۰۱)، به لام له (۲۰۰۵-۰۹) پژیهی مردن یه کسان بوو (۲۰۰۱-۰۲) و له هه مان کات دا له کوتای سالاکان (۲۰۱۰-۱۴) یه کسان بوو (۲۰۱۲-۰۳). که نه مه ش و ده کاینات پژیهی مردن له بو شیرپه نجهی (تیستیکه لهر) به ره سه روا ده روا. و له کوتایی دا، برنامه [یسیفیت] و به رنامه ی ئیس پی ئیس ئیس به کارم هیناوه بۆ به شی کرداری بۆ نه مه توزینه وه.

ملخص

معدل الوفيات السرطان اهم القطاع في مجال الصحة، لقد اوصف اغابريل صف وأعمدة مصفوفة لجداول العمر والفترة الزمنية و القات. وكذلك من المفيد يمكن استخدامه في مجال الجداول الاحصائية وطريقة رسومات. يمكننا تعرف الاتجاهات في المعدلات الدقيقة والتغيرات في عمر التوزيع المحدد على أنها المتوقعة. وقد استخدامات البيانات في المستشفيات اربيل التعليم العالي والسلیماني لسرطان الخصية (البيانات الثانوية) خلال الفترة ما بين 2000 و 2014، وايضا يمكننا استخدام هذا النموذج لمعدلات الخصوبة ومعدلات الوفيات والسكان لنوع معين من البيانات معدل النمو. بالإضافة إلى ذلك، يمكن استخدامه كنموذج لتحديد ما إذا كانت معدلات الوفيات لفترة معينة من الزمن يزداد او ينقص. في حين كانت معدلات الوفيات المعيارية للعمر من سرطان الخصية أقل بشكل ملحوظ في اربيل والسلیماني في الفترة 2004-2000 مقارنة بالفترة 2009-2005 والفترة 2010-2014 كما هو واضح في الاشكال (9-14). يمكن ان نلاحظ خلال الفترة ما بين (2004-2000) كانت معدل الوفيات لسرطان الخصية في محافظات اربيل والسلیماني كانت (0.08 و 0.1) على التوالي بينما في فترة (2009-2005) يساوي (0.1 و 0.2) وفي الفترة الاخيرة ما بين (2010-2014) كانت معدل الوفيات يساوي (0.12 و 0.32) وهذا يعني ان نسبة معدل الوفيات يزداد خلال الفترة الزمنية وبالاخص في الفئات العمري (25-40). وقد تمت استخدام في هذا الدراسة البرامج Easy Fit وكذلك برنامج SPSS المستخدمة لجزء عملي لهذه الدراسة. ومن المفهوم أن هذه النتيجة معنوية احصائيا النظر في نموذج ذات الصلة مع وظيفة الكثافة تعتمد على نسبة معدل الوفيات التي تظهر الميزات.