Men's Health Journal. 2021; 5(1): e32

OPEN ACCESS

ORIGINAL RESEARCH

Predictors of Testis Cancer Mortality in Iran

Amir Reza Abedi[1], Ehsan Shojaeefar[1], Fereshte Aliakbari[1], Mohammad Ali Ghanbari[1]*, Jalil Hosseini[1]†

1. Men's Health and Reproductive Health Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

Received: June 2021; Accepted: June 2021; Published online: July 2021

Abstract: **Introduction:** Testis cancer is a rare cancer that afflicts young men. although the incidence of testis cancer is increasing, the mortality rate is decreasing. This study examines the mortality of testicular cancer and its relationship with the human development index and its components in Iran during 2005-2015. **Materials and Methods:** Data of patients with testis cancer were collected from the Office of National Cancer Registry in the Ministry of Health and Medical Education (MOH&ME) during 2005-2015. An additional telephone survey was conducted by trained interviewers to collect data, including survival status, demographic characteristics, age of cancer diagnosis and other clinical profiles. Kaplan-Meier survival rates were calculated according to demographic characteristics, economic status, and residential area and socioeconomic status (SES). All the analyses were done using STATA software, version 14 (StataCorp. 2015). **Results:** From 2005 to 2015, 5886 testicular cancer cases were diagnosed among men in all age groups. Most patients (73.9%) were 15–49 years of age at the time of diagnosis, 26.1% were 50 years of age or older. Seminoma was diagnosed among 46.78% of the patients and non-seminoma among 42.28%. Factors which had impact on survival rate were age (P=0.001), tumor histology (P=0.02, hazard ratio=1.23[0.98-1.38]) and TNM stage (P=0.001, hazard ratio=1.2[0.92-1.28]). Patients who got married at the time of diagnosis more likely presented at earlier stages and had better overall testis cancer-specific survival than patients who were single, separated, widowed, or divorced (P=0.002, hazard ratio 1.27[1.09-1.49]). Testis cancer mortality rate was significantly higher in patients who did not graduate from high school and significantly higher in patients who were tenants (P=0.057, hazard ratio =1.132[0.996-1.28]). **Conclusion:** Testis cancer mortality is decreasing in Iran. Age, TNM stage and histology, and marital and economic status were factors influencing mortality rate.

Keywords: Testis cancer; Mortality rate; Prognostic factor

Cite this article as: Abedi M R, Shojaeefar E, Aliakbari F, Ghanbari M A, Hosseini J. Predictors of Testis Cancer Mortality in Iran. Mens Health J. 2021; 5(1): e32.

1. Introduction

Although testis cancer is a rare disease (1) but it is the most common solid malignancy among young men (2). For unknown reasons, the incidence of testis cancer continues to increase and it has been doubled in North America and most European countries during the last 20 years (3, 4). However, the cancer mortality rate continues to decrease which could be due to sophisticated diagnostic imaging modalities, together with improvements in surgical techniques, and development of multidrug chemotherapeutic agents (3). The current five-year survival rate for all stages of testis cancer exceeds 80% and approaches 100% for patients with low stage disease (5). The tumor histology, tumor size, the extent to which cancer has spread, patient's age and socioeconomic status (SES) have been discussed as prognostic factors (6). Knowing the data about the testicular cancer incidence and mortality could be useful for health programming and research activities in the field of testis cancer. However, limited information is available about the incidence and mortality of testis cancer in Iran. This study examines the mortality of testicular cancer and its relationship with the human development index and its components in Iran during 2005-2015.

2. Materials and Methods

This is a retrospective study in which data of patients with testis cancer were collected from the Office of National Cancer Registry in the Ministry of Health and Medical Education

*Corresponding Author: Mohammad Ali Ghanbari; Address: Men's Health and Reproductive Health Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran. Email: irtema@gmail.com, Phone: (+98) 2122712234 / Fax: (+98)2122716383.

†Corresponding Author: Jalil Hosseini; Address: Men's Health and Reproductive Health Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran. Email: dr.jalil.hosseini2019@gmail.com, Phone: (+98) 2122712234 / Fax: (+98)2122716383.

(MOHME) during 2005-2015. An additional telephone survey was conducted by trained interviewers to collect data, including survival status, demographic characteristics, age of cancer diagnosis and other clinical profiles. Patients were questioned using a structured interview schedule about several variables that influence SES such as educational attainment, income, housing, and employment variables. According to the study protocol, three telephone calls within two consecutive weeks were considered as a sufficient attempt to collect data. Using Cox regression model and survival analysis, Kaplan-Meier survival rates were calculated according to demographic characteristics, economic status, residential area, and SES. All the analyses were done using STATA software, version 14 (StataCorp. 2015. Stata Statistical Software: Release 14. College Station, TX: StataCorp LP), and P<0.05 was considered statistically significant.

3. Results

From 2005 to 2015, 5886 testicular cancer cases were diagnosed among men in all age groups. In these 10 years, there was an average of 840 cases diagnosed per year. Most patients (73.9%) were 15–49 years of age at the time of diagnosis, 26.1% were 50 years of age or older. Seminoma was diagnosed among 46.78% of the patients and non-seminoma among 42.28%. Other histological types and unspecified cancers were diagnosed in 10.94% of patients. Testicular cancer mortality declined from 0.78/100,000 to 0.51/100,000 From 2005-2015.

Figure 1 presents the five-year relative survival for testicular cancer in Iran from 2005 to 2015. The total five-year relative survival for testicular cancer was 70.2% during 2005–2015. Factors affecting survival rate were age (P=0.001), tumor histology (P=0.02, hazard ratio=1.23[0.98-1.38]) and TNM stage (P=0.001, hazard ratio=1.2[0.92-1.28]). Increasing age was associated with reduced relative survival. Slightly higher survival was observed in the seminoma group, (93.98%, 95% CI: 80.9 to 100), than in the non-seminoma group (87.94%, 95% CI: 77.3 to 94.2). By TNM summary stage, the five-year relative survival was 97.23% for localized tumor stage I, 94.36% for stage II, 64.77% for stage III, and 54.67% for unknown stage.

Patients who were married at the time of diagnosis more likely presented at earlier stages and had better overall testis cancer-specific survival than patients who were single, separated, widowed, or divorced (P=0.002, hazard ratio 1.27[1.09-1.49])(Figure 2). Married men had both a decreased risk of all-cause mortality (hazard ratio: 0.58; 95% CI: 0.53–0.63) and of testis cancer specific mortality (hazard ratio: 0.60, 95% CI: 0.53–0.69), even after controlling for age at diagnosis, year of diagnosis, disease stage, and tumor type. In this study, family history was not significantly associated with the risk of cancer mortality (P= 0.595, figure 3). In terms of SES, the mortality of testis cancer was significantly higher in patients who did not graduate from high school and patients who are tenants (P=0.026, figure 4). The patients' occupation was not significantly associated with cancer mortality rate (P=0.49).

4. Discussion

In this study, we analyzed the survival rate of testis cancer in Iran from 2005 to 2015. The introduction of cisplatin-based therapies in the late 1970s led to a decrease in the mortality rate of testis cancer, with survival rates reaching 95% (7). It has been stated that the decline of testicular cancer mortality in Eastern European countries started in the 1980s, but at a rate slower than that recorded in Western Europe (8). In this study, overall five-year survival rate increased slightly (10.1%) from 2005–2010 to 2010–2015 (from 65.2% to 75.2%). Similar mortality changes were reported in other Western countries (8). The reason behind that is the better diagnostic tools and the development of new chemotherapeutic agent. Moreover, the shift in attitudes to men's health contributes to early diagnosis and better outcomes.

The highest five-year survival rate was seen in Northern Europe (92.8%), followed by 91.8% for Central Europe, 89.1% for Southern Europe, and 80.1% for Eastern Europe (9). In this study, the five-year survival rate was 70.2% in Iran. The survival for patients with seminoma was always higher than that for non-seminomas in Europe and in all the European regions (9). In our study, a five-year survival was still lower compared to other countries. Differences in five-year relative survival between our study and other Northern European countries was a cause of concern. Possible factors explaining these differences could be: limited access to appropriate therapies, delayed treatment, or lack of evidence-based guidelines.

This study was able to represent the independent effect of age on the prognosis of testicular cancer. In a study by Fossa et al., the adverse impact of increasing age on testicular cancer-specific mortality was noted. Reduced treatment intensity combined with increased therapy-related toxicity is a plausible explanation for increased testicular carcinoma-specific mortality in patients older than 40 years (6). Hoffman et al. showed that low sociodemographic status reduced the likelihood of being offered radiotherapy (10, 11). In their study, men residing in countries with a higher education level were more likely to receive adjuvant radiotherapy for stage I seminoma than men residing in countries with a lower education level. This study showed that patients with low socioeconomic status were more likely to succumb to death. Delayed treatment or limited access to appropriate treatment might explain the difference in the mortality rate in people with different socioeconomic status in this study.

In our study, Marital status was an independent predictor of improved overall survival in men with testis cancer. Abern and colleagues showed that being married (P<0.001) and Caucasian race (P< 0.001) independently predicted improved testis cancer-specific survival, while increased age (P<0.001), increased stage (P<0.001), and non-seminomatous germ cell tumor (P<0.001) histology independently predicted testis cancer-specific death (12). There are two reasons for our findings. First, married men may be urged to seek medical attention sooner once they have symptoms or a physical abnormality is detected. Second, married men are more likely to seek evaluation for male factor infertility; therefore, testis tumor is diagnosed in an early stage.

Sandrucci et al. and Blay et al. explained that patients with rare cancers should be treated at centers from the beginning of their clinical history with a multidisciplinary clinical decision on how to plan treatment which can largely determine patient outcomes (13, 14). The quality of cancer registration and the number of the missed cases in this study make our study less reliable. Despite the limitations of this study, this nationwide analysis highlights changes in testicular cancer incidence, mortality, and survival, indicating an existing gap for survival improvement

5. Conclusion

Testis cancer is a rare cancer that mostly afflicts the young population. Although the incidence of testis cancer is increasing in Iran, the mortality rate is decreasing. Age, TNM stage and histology, and marital and economic status are factors which influence mortality rate. Family history of testis cancer or occupation did not affect the mortality rate.

6. Appendix

6.1. Acknowledgment

None.

6.2. Conflict of interest

No conflict of interest.

6.3. Funding support

None.

6.4. Author's contributions

All the authors have the same contribution.

References

1. Ross R, McCurtis J, Henderson B, Menck H, Mack T, Martin S. Descriptive epidemiology of testicular and prostatic cancer in Los Angeles. British journal of cancer. 1979;39(3):284-92.

2. Richie JP. Detection and treatment of testicular cancer. CA: a cancer journal for clinicians. 1993;43(3):151-75.

3. Curreri SA, Fung C, Beard CJ, editors. Secondary malignant neoplasms in testicular cancer survivors. Urologic Oncology: Seminars and Original Investigations; 2015: Elsevier.

4. Horner M, Ries L, Krapcho M. SEER Cancer Statistics Review, 1975–2006. Bethesda, MD: National Cancer Institute 2009: h ttp. seer cancer gov/csr/1975_2006/, based on November. 2008.

5. Hawksworth DJ, McLeod DG, Brassell SA, editors. Advances made in the treatment of testicular cancer in the US Military: 1946 to the present. Urologic Oncology: Seminars and Original Investigations; 2009: Elsevier.

6. Fosså SD, Cvancarova M, Chen L, Allan AL, Oldenburg J, Peterson DR, et al. Adverse prognostic factors for testicular cancer–specific survival: a population-based study of 27,948 patients. Journal of Clinical Oncology. 2011;29(8):963-70.

7. Park JS, Kim J, Elghiaty A, Ham WS. Recent global trends in testicular cancer incidence and mortality. Medicine. 2018;97(37).

8. Levi F, La Vecchia C, Boyle P, Lucchini F, Negri E. Western and eastern European trends in testicular cancer mortality. The Lancet. 2001;357(9271):1853-4.

9. Trama A, Foschi R, Larrañaga N, Sant M, Fuentes-Raspall R, Serraino D, et al. Survival of male genital cancers (prostate, testis and penis) in Europe 1999–2007: Results from the EUROCARE-5 study. European Journal of Cancer. 2015;51(15):2206-16.

10. Hoffman KE, Chen M-H, Punglia RS, Beard CJ, D'Amico AV. Influence of year of diagnosis, patient age, and sociodemographic status on recommending adjuvant radiation treatment for stage I testicular seminoma. Journal of clinical oncology. 2008;26(24):3937.

11. Woods L, Rachet B, Coleman M. Origins of socio-economic inequalities in cancer survival: a review. Annals of oncology. 2006;17(1):5-19.

12. Abern MR, Dude AM, Coogan CL, editors. Marital status independently predicts testis cancer survival—an analysis of the SEER database. Urologic Oncology: Seminars and Original Investigations; 2012: Elsevier.

13. Sandrucci S, Gatta G. Rare cancers: A network for better care. European Journal of Surgical Oncology. 2019;45(1):1-2.

14. Blay J-Y, Soibinet P, Penel N, Bompas E, Duffaud F, Stoeckle E, et al. Improved survival using specialized multidisciplinary board in sarcoma patients. Annals of Oncology. 2017;28(11):2852-9.

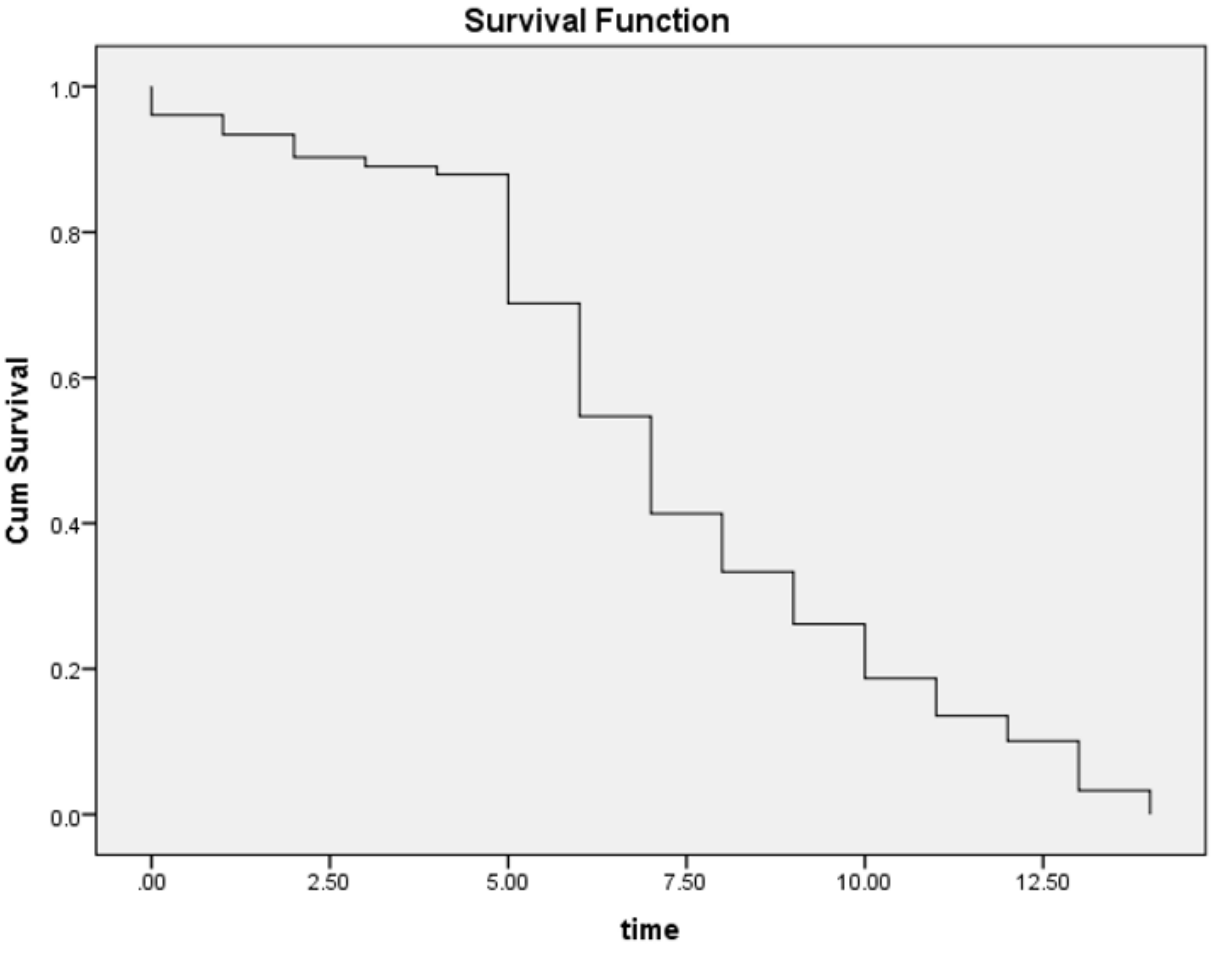

Figure 1: Kaplan-Meier overall survival analysis of testis cancer. Overall 5-year survival rate: 70.2% (CI95% 67.4-73).

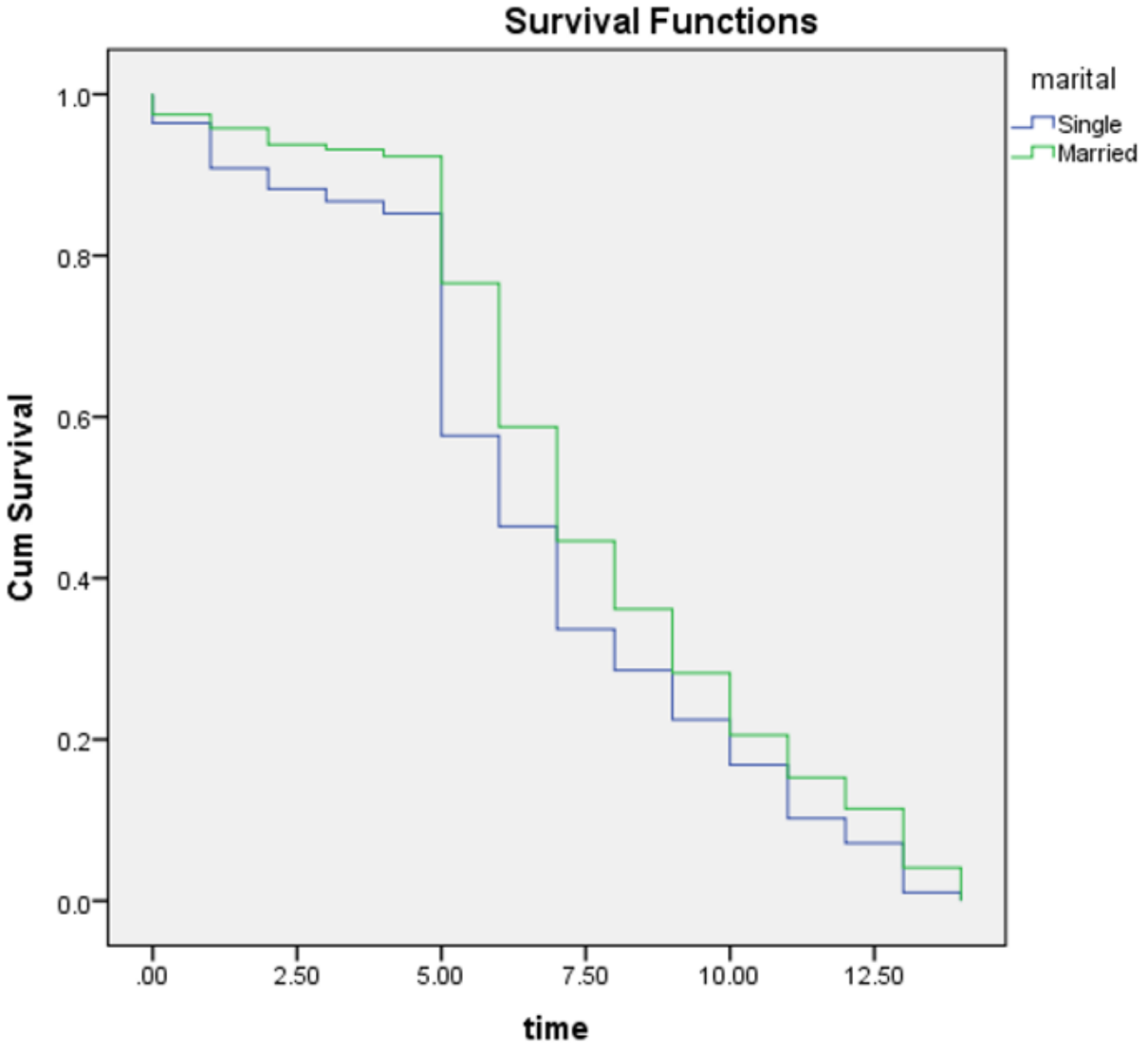

Figure 2: Kaplan-Meier survival analysis of testis cancer according to marital status.

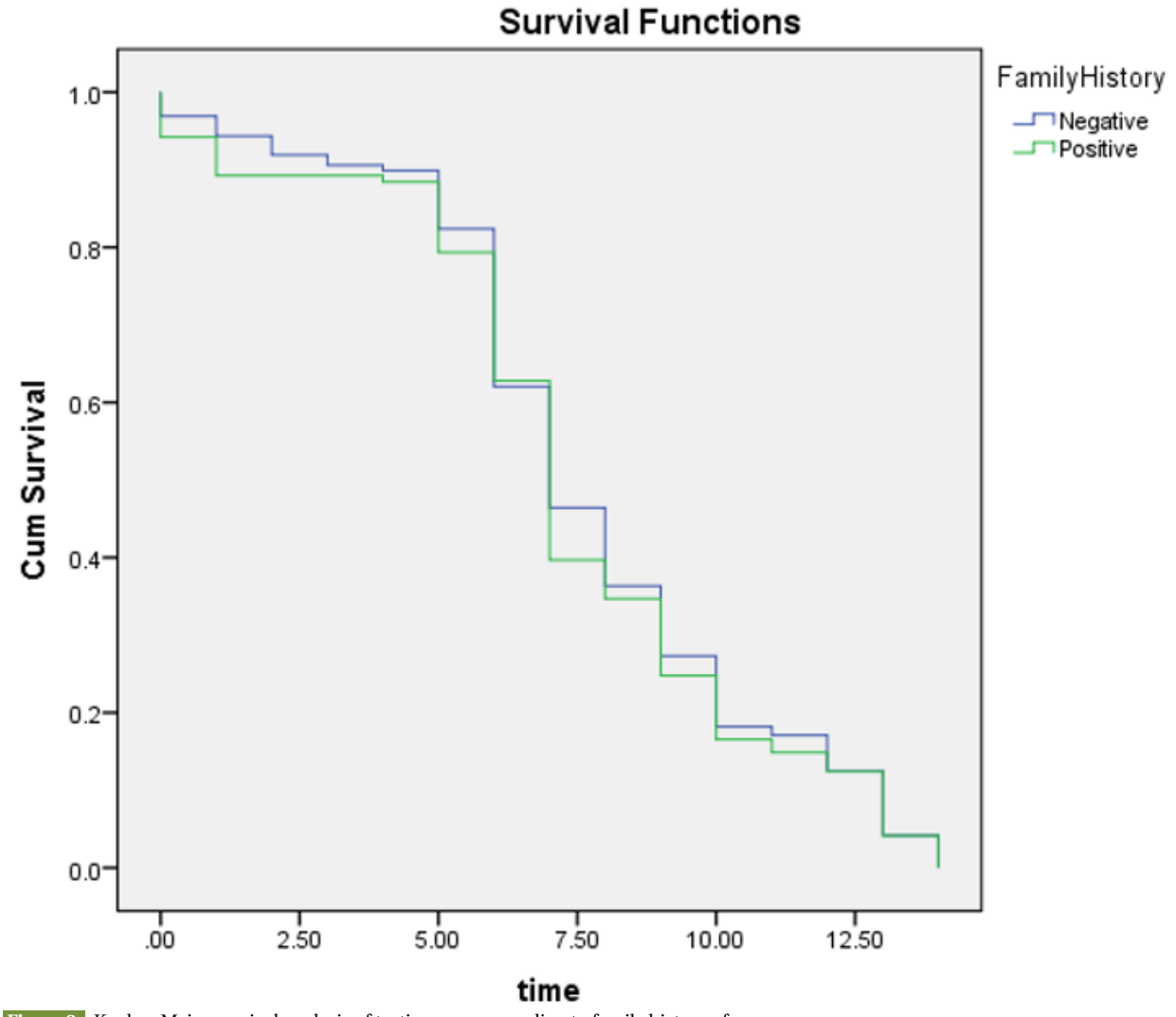

Figure 3: Kaplan-Meier survival analysis of testis cancer according to family history of cancer.

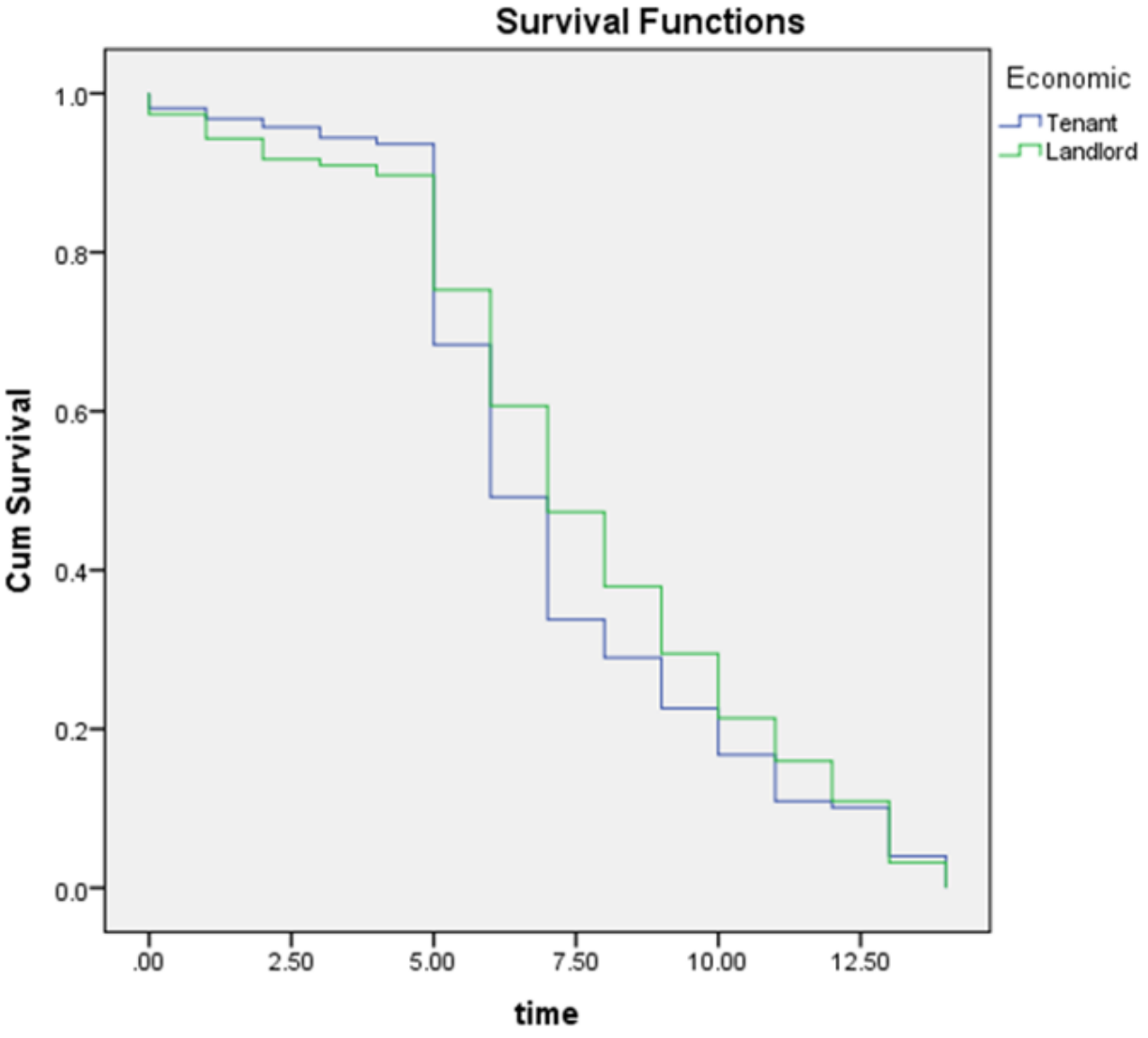

Figure 4: Kaplan-Meier survival analysis of testis cancer according to marital and economic status.