RESEARCH ARTICLE

Association of Educational Levels with Survival in Indian Patients with Cancer of the Uterine Cervix

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Abstract

The main objective of this paper was to assess the influence of educational level on the survival of uterine cervix cancer patients in our population. A total of 224 patients were registered in our registry, of which 178 had information on stage and different educational levels. The overall median survival (MS) was 23 months, with values of 18.5, 20.7 and 41.3 months for the illiterate, literate and qualified groups, respectively. In the illiterate patients, stage I was seen in 2.6% and stage IV in 11.8%, while in other 2 groups stage I was seen in 10% to 17% of patients at the time of diagnosis. The survival probability at around 50 months was around 42%, 30% and 26% (approximately) for qualified, literates and illiterates respectively [Log Rank (Mantel-Cox) showed p=0.023]. Emphasis on imparting education to females can be a part of comprehensive cancer control programme for improving the overall survival in patients with carcinoma of the uterine cervix in our population.

Keywords: Cancer cervix - educational levels - survival - Kamrup, India

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Introduction

Uterine cervix cancer is one of the leading causes of cancer deaths amongst women in the world (Ferlay et al., 2014). Effective screening programme has been ongoing worldwide, but still the burden of cervical cancers remains high, especially in low income countries where it is the leading cause of cancer in females. In India it has been reported to have the highest disease frequency with 134, 000 new cases and 73,000 deaths (Arbyn et al., 2011). The five year survival in patients with uterine cervix cancer in low-middle income countries is low, especially diagnosed in advanced stages (Razak et al., 2013).

The differences of survival in patients with carcinoma of the uterine cervix with socio-economic health inequalities is known and it has also been suggested that measuring education levels based on census can serve as important surveillance tools for monitoring temporal trends in uterine cervical cancer-related health inequalities (Milner and Watts, 1987; Schrijvers et al., 1994; Singh et al., 2004) .The female literacy levels in India according to the population census of 2011 is 65.46% and in the state of Assam it is lower than the national average and it stands at 63.0% (Census of India, 2011). Educational level can be an important demographic parameter for surveillance of uterine cervix cancer survival in our population, as the educational levels are abysmally low amongst females in certain regions of the country. In this analysis we had tried to see the influence of educational level and stage at diagnosis in the survival of patients with uterine cervix cancer in our population.

Materials and Methods

This study was commenced after obtaining approval from the institutional ethics committee. For undertaking population based cancer survival studies in low and middle income countries like India, sometimes home visits have to be made to ascertain the vital status of cancer patients (Allemani et al., 2014). On designing the present study we entertained the possibility of home visits and therefore limited the study within the geographic limits of Kamrup District due to resource constraints. The Kamrup district is spread over an area of 2740 km2 and according to the 2011 population census it had 1, 517, 542 inhabitants of which male and female population was 778, 461 and 739, 081 respectively The data of patients with carcinoma uterine cervix from the district of Kamrup in India was obtained from the cancer registry of a regional cancer centre in North Eastern India. The cases that were registered during the period from January 2010 to December 2012 were considered for the present analysis. Total of 224 patients of carcinoma uterine cervix was registered at our registry. Of which in 178 patients the information on stage and different educational levels was present. So, the final data set for the present analysis was of 178 patients. The data

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set consisted of information on educational levels which was classified and coded according to the National Cancer Registry Programme (NCRP) of India.

Educational levels

Broadly the classifications according to NCRP are; not applicable (for children below 5 years), illiterates (patients who are unable to read or write), literates (patients who are able to read and write their names), school or high school levels (primary, middle, secondary and technical education), technical education, and college and above. We had clustered the different educational levels into three groups for the present analysis; Illiterates (unable to read or write), literates (able to write or read their names and primary school education), and qualified (high school/ technical level education and college and above).

Stage of cancer at diagnosis

The information on staging was according to the International Federation of Gynecology and Obstretics (FIGO) staging system. For the present study, stage of disease means stage of disease at the time of diagnosis.

Follow-up methods

The survival was estimated from the date of first diagnosis (DOFD). The follow-up methodology was an active one. The follow-up for survival was until the end of May 2014. The information for survival was first matched with the mortality records of the institute, and if not found on mortality records, the clinical records on the case sheets were sought for the follow-up status. Finally, if the follow-up information on case sheets was not updated until the end of follow-up period, than telephonic calls were made to ascertain the vital status of the patients. For the present study we managed to complete the follow-up by seeking case records, mortality records, and telephonic calls only. In cases where no follow-up information on vital status (dead or alive) was obtained these cases were labeled as censored.

Statistical analysis

Kaplan-Meir estimate was used to predict the survival probabilities of the patients and survival was estimated as median survival function. The test was conducted at 95% confidence interval and $p<0.05$ was considered as statistically significant. Statistical Package for Social Sciences version 19.0 of IBM Inc. was used for the analysis. The results of stage at diagnosis with levels of education are presented as percentages.

Results

In the present analysis, age of patients ranged from 28 to 91 years. The different educational levels of the patients in this analysis were illiterate 42.7% (76/178), literates 12.9% (23/178), and qualified 44.3% (79/178). Out of 178 patients, the information on death was obtained in 88 patients and rest of the patients was alive or censored at variable length of time from the DOFD. The follow-up information was censored in 33 patients and 57 patients were alive till the close of follow-up period.

Table 1. The Table Shows Stage of Patient's vis-à-vis their Different Levels of Education

Educational qualification	Stage I #(%)	Stage II #(%)	Stage III #(%)	Stage IV #(%)
Qualified	8 (10.1%)	49 (62.0%)	20 (25.3%)	2 (2.5%)
Literates	4 (17.3%)	4 (17.3%)	9 (39.1%)	_
Illiterates	2 (2.6%)	40 (52.6%)	25 (32.8%)	9 (11.8%)

*#: number of patients

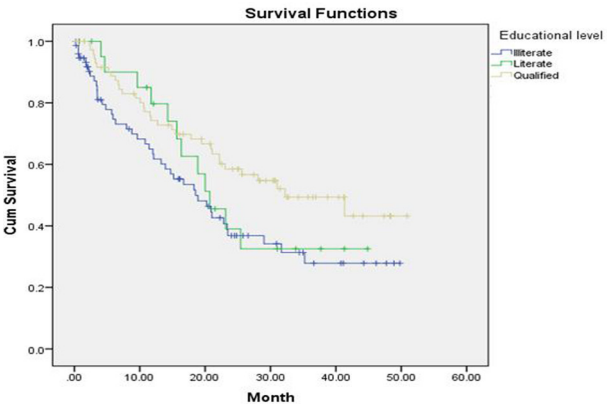

Figure 1. The Kaplan-Meir Curve Showing the Survival Probability of the Three Groups with Different Educational Levels Educational Levels

In the qualified and literate group of patient's stage I was seen in 10.1% (8/79) and 17% (4/23) respectively, and amongst the illiterate patient's stage I was seen in 2.6% (2/76) patients. In the illiterates stage IV was seen in 11.8% of patients (Table 1). The overall median survival (MS) across all educational groups was 23 months. The MS was 18.5 months, 20.7 months and 41.3 months in the illiterate, literate and qualified patients respectively. The survival probability at around 50 months was around 42%, 30% and 26% (approximately) for qualified, literates and illiterates respectively [Log Rank (Mantel-Cox) showed $p=0.023$] as shown in Figure 1.

Discussion

The age adjusted incidence rates for uterine cervical cancers in India range from 5.6 per 100,000 to as high as 24.3 per 100,000 population and in the urban area of our registry area it is 14 per 100,000 population National Cancer Registry Programme, 2013). Our analysis may not represent in entirety the population scenario of the whole district of Kamrup, however, the composition of our study cohort reflects the socio-demographic characteristics of patients from the district of Kamrup. There are various known clinico-pathological parameters at the patient level, like stage at diagnosis, tumour histology, grades, and treatment received including biomarkers (Gadducci et al., 2013) for predicting the survival of patients with uterine cervix cancers, and more recently introduction of ontogenetic tumour staging for treatment and improving patient survival (Hockel et al., 2014). However, in the population, demographic parameter like socio-economic inequalities is well established to see the differences of survival between different groups within a population of a region or country. Also, it has been shown that educational levels are predictive of receiving treatment (Kane et al.,

2003). Interruption of treatment leads to poorer survival outcomes in uterine cervix cancer (Krusun et al., 2014). It may have an influence for better survival estimates in cancer patients with improvement of educational levels and non interruption of treatment. However, a recent meta-analysis has shown that education was not predictive of survival in case of clinical trials (Herndorn et al., 2008). In this analysis, the median survival of patients was 23 months and no attempt was made to highlight the differential survival based upon the stages and treatment instituted in this group of patients. On estimating the MS with different educational status, it showed improvement from 18.5 months to 41.3 months in illiterates to qualified group respectively. Furthermore, there was better survival at the 50 months follow-up period depending on the higher educational qualifications of patients with carcinoma of the uterine cervix of our population. However, the stage at diagnosis of patients with different educational levels did not change significantly in comparison, except in illiterate patients where there was a significant lower proportion of cases with stage I disease (2%) and higher proportion of cases with stage IV disease (11%). In illiterate patients combined stage III and stage IV disease was seen in 44.6% of patients. 43%-62% of patients in all the educational groups were diagnosed with stage II at the time of diagnosis. Education of patients helps in the early detection of cancer patients (Schwartz et al., 2003; Oliveira et al., 2010), but such an association with cancers of the uterine cervix is not well established for our population. Additionally, improvement of knowledge in midwives related to preventive practices for uterine cancer cervical control program is known (Antic et al., 2014). Our stage correlation has shown that early staged cancers of the uterine cervix are more likely to be detected in educated patients irrespective of their levels of educational qualification. Low level of knowledge in females poses a challenge in prevention strategies for uterine cervix cancer (Bayrami et al., 2014). There might be associated socio-demographic contributing factors like compliance and adherence to treatment protocol, personal hygiene and self care, nutritional status etc in the improvement of median and overall survival in patients with higher educational qualifications in our population, which warrants further investigation.

The limitation of this study is the small sample size. The ratio of survival probabilities in the present study varied over period of time for the three educational groups and so, the use of proportional regression analysis for estimating the hazard ratio for each educational group in the study could not be done. Hussain et al. (2008) has shown improvement in survival for patients with cervical cancers with higher educational levels.

In conclusion, emphasis on imparting education to females can be part of comprehensive cancer control programme for improving the overall survival in patients with carcinoma of the uterine cervix in our population.

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