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CHANGE OF DURATION OF HOSPITAL STAY OF THE CANCER PATIENTS OVER A DECADE AT A REGION CANCER CENTRE OF EASTERN INDIA

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Abstract:

In this retrospective study 430 cancer patients were selected randomly with the aim to compare the mean duration of hospital stay of the cancer patients. Out 430 patients 215 patients were selected randomly who were admitted during the period 2008-09 and rest 215 patients were selected randomly who were admitted during the period 2018-19. The patients of the two groups were matched for ages. The mean duration of hospital stay of the patients admitted during 2008-09 and 2018-19 were 12.26 ± 10.88 days and 8.75 ± 7.56 days respectively. t-test showed that the mean duration of stay of the patients admitted during the period 2018-19 was significantly lower than that of the patients admitted during the period

2008-09 ($p=0.0021$). Thus the duration of hospital stay of the cancer patients decreased significantly over the decade. This kind of study with more associated information will help in the management of beds in the cancer treating centres to cope up with crisis of management of beds with limited beds in the indoors and increasing burdens of cancer patients.

Key Words - cancer patients; duration of hospital stay; decennial comparison; optimal management of beds; retrospective study; hospitalization; place of death

Introduction:

With the increasing incidence of cancer the hospitals/institutes treating cancer patients overcrowding occurs when the need for the services outstrips available resources. Unavailability of inpatient beds impairs treatment of cancer patients and is associated with increased waiting times in these hospitals, especially for patients awaiting hospital admission. Unlikely to other hospitals cancer treating hospitals need more beds to treat the patients as a few numbers of patients can be treated through day care only causing delay in treatments and more advancement of the stages of cancers.

The duration of hospital stay (DOHS) following surgery has been suggested as a marker of the quality of care. However, cancer being a disease of patients aged more than 50 years several co-morbid conditions as well as stage of cancer are associated with DOHS. The accepted “ideal” LOS resulting from optimal surgery and enhanced recovery programme is deemed to be 5 days or fewer. Therefore, the proportion of individuals with hospital stays at or below this threshold has been routinely used as a measure of good practice.[1]

However, excessive or prolonged DHOS has also been suggested as an indicator of the effectiveness of care. In overall there is significant interest in monitoring hospital stays and publishing comparative analyses across the different multidisciplinary teams providing care in an effort to improve standards. But reliably identifying institutions with “outlying” practice is difficult for several causes. [2]

Numerous factors may influence postoperative DHOS including the age of the patient, the presence of concomitant disease, the site and stage of the tumour and the method of presentation, type of operation performed, and whether laparoscopic or not.[3–7]

Furthermore, the annual number of patients operated for cancer differs between hospitals. Greater variability in DHOS may be observed among hospitals with lower workloads compared to those with higher workloads simply by chance. Thus, appropriate adjustment for workload must be undertaken to reliably compare providers. [8-10] These studies aimed to make use of these data and apply robust methods to investigate patterns of post-operative

DHOS stay. It seeks to identify factors that significantly influence both optimal and prolonged DHOS and make risk-adjusted comparisons between all providers treating this disease, with the ultimate purpose of feeding these information back to Trusts to enable them to do “root cause analyses” of DHOS.

In developed countries it a common practice to evaluate the DHOS of the cancer patients for optimization of DHOS. On the contrary a few assessments of DHOS may be done in developing countries like India. Till date no research communication has been made on this issue considering lower proportion of hospital beds are available to accommodate with the increasing burden of cancer patients.

Chittaranjan National Cancer Institute (CNCI) is one of the pioneer Regional Cancer Centres to cater the services to the patients of eastern India with limited bed facilities till date. However, a new hospital with 460 beds will be in function shortly.

Thus study aimed at the assessment of DHOS with the optimum utilization of bed facilities to treat the cancer patients in this hospital.

Materials and Methods:

Materials:

Chittaranjan National Cancer Institute (CNCI) is one of the pioneer regional cancer centres (RCC) of India started in 1950 and inaugurated by Madam Curie (Junior). Due to lack of space it has only 200 beds to treat the patients attending the hospital of this institute. On average 8600 patients attend the hospital for their treatments and being the RCC of this region most of the patients are travelling a long distance to reach the hospital. Thus the requirement of beds is a big challenge to treat the patients. This study aimed at comparing the duration of hospital stay of cancer patients in 2008-09 and 2018-19.

With advancement of treatments the length of stay may be improved with optimization of length of stay. Thus the changes of duration of hospital stay of cancer patients under study were compared over a decade.

The information required for this study was collected from the admission register of during the period 2008-09 and 2018-19 of the hospital.

Methods:

As per the aim of the study the information on primary site of cancer, type of treatments offered, date of admission, date of discharge and status of the patients at discharge were collected from the admission register and department of medical records were collected and entered into computer for analysis.

Sampling Techniques:

The patients were selected randomly. The random numbers were used from Kevin Conroy: 5120 Random Numbers (<5k, 2002) [Call the JavaScript pseudo-random number generator.] Website: RandomNumber.org, 2004.

Results:

Statistical Analysis:

Statistical Analysis was performed with help of Epi Info (TM) 7.2.2.2 EPI INFO is a trademark of the Centers for Disease Control and Prevention (CDC).

Descriptive statistical analysis was performed to calculate the means with corresponding standard deviations (s.d.). Test of proportion was used to find the Standard Normal Deviate (Z) to compare the difference proportions. Student's t-test was used to compare the means of two groups. $p < 0.05$ was taken to be statistically significant.

In this study to compare the duration of hospital stay of the cancer patients over a decade a total number of 430 patients were randomly selected from admission register of the patients of the hospital under study.

Out of 430 patients 215 patients were randomly selected from the patients who were admitted during the period 2008-09 and rest 215 patients were randomly selected from the patients who were admitted during the period 2018-19. Thus the patients of the two groups were in the ratio 1:1.

Table-1: Basic information of the patients

Basic Information	Number (n=430)	%	Z-value	p-value
Period of admission				
2008-09	215	50.0%	0.01	0.99 NS
2018-19	215	50.0%		
Age (years)				
<20	14	3.3%	2.02	0.043 S
20 - 39	68	15.8%		
40 - 59	201	46.7%		
60 - 79	143	33.3%		
≥80	4	0.9%		
Gender				
Male	377	43.9%	1.69	0.09 NS
Female	481	56.1%		
Religion				
Hindu	341	79.3%	8.34	<0.0001 S
Muslim	84	19.5%		
Christian	3	0.7%		
Buddhist	2	0.2%		
Department of registration				
Surgical Oncology	492	57.3%	6.02	<0.0001 S
Head & Neck Oncology	134	15.6%		
Radiation Oncology	87	10.1%		
Gynecological Oncology	86	10.0%		
Medical Oncology	59	6.9%		

S-Statistically Significant

NS-Statistically not significant

The mean (\pm s.d.) age of the patients was 51.51 ± 15.27 years with range 12 – 97 years and the median age was 53 years. 46.7% of the patients were with age between 40 – 59 years which was significantly higher than other age groups ($p=0.043$).[11]

Proportion of females (56.1%) of the females was higher than that of males (43.9%) but it was not significant ($p=0.09$).

Hindus (79.5%) were significantly higher than patients with other religions ($p<0.0001$).

Patients from Department of Surgical Oncology (57.3%) was significantly higher than other departments ($p<0.0001$).

Table-2: Information of different parameters

Parameters	Number (n=430)	%	Z-value	p-value
Type of treatment				
Chemotherapy	164	38.1%	2.54	0.011 S
Surgery	126	29.3%		
Resuscitation	66	15.3%		
Radiotherapy	26	6.0%		
Symptomatic	12	2.8%		
Conservative	10	2.3%		
Supportive	7	1.6%		
D/L Biopsy	4	0.9%		
Radiotherapy + Chemotherapy	7	1.6%		
Chemotherapy + Surgery	2	0.5%		
Under Investigation	2	0.5%		
Brachytherapy	1	0.2%		
Laparotomy	1	0.2%		
Pleural Tapping	1	0.2%		
Provox Implant	1	0.2%		
Duration of hospital stay (in days)				
<7	205	47.7%	2.77	0.005 S
7 - 14	126	29.3%		
15 - 21	56	13.0%		
22 - 28	15	3.5%		
>28	28	6.5%		
Status at discharge				
Alive	384	89.3%	11.46	<0.0001 S
Dead	36	8.4%		
Discharged on risk bond (DORB)	10	2.3%		

40.2% of the patients were admitted for chemotherapy followed by surgery (29.7%) for surgery which was significantly higher than other mode of treatments. However, no significant difference was found between chemotherapy and surgery ($Z=1.48$; $p=0.14$).

The mean (\pm s.d.) duration of hospital stay of the patients was 10.51 ± 11.30 days with range 1 – 84 days and the median was 7 days

Most of the patients (47.7%) were discharged within a week after admission which was significantly higher ($p=0.005$).

89.3% of the patients were discharged alive ($p<.0001$). 8.4% of them died during treatments and only 2.3% of them were discharged on risk bond on request of the patients/patients' parties.

Table-3: Comparison of age and duration of hospital stay of the patients

Parameters	Period of admission		t-test	p-value
	2008-09	2018-19		
Age (in years)				
Mean±s.d.	50.81±15.35	52.19±15.20	0.93	0.35 NS
Median	52	54		
Range	13 - 85	12 - 97		
Duration of hospital stay (in days)				
Mean±s.d.	12.26±10.88	8.75±7.56	3.25	0.0012 S
Median	7	7		
Range	1 - 84	1 - 49		

S-Statistically Significant

NS-Statistically not significant

t-test showed that there was no significant difference in mean ages of the patients of the two groups ($p=0.35$). Thus the patients of the two groups were matched for their ages.

However, according to t-test the mean duration of stay of the patients admitted during the period 2018-19 was significantly lower than that of the patients admitted during the period 2008-09 ($p=0.0021$). Thus the duration of hospital stay of the cancer patients decreased significantly over the decade. Introduction of better treatment facilities and with the advanced of antibiotics and other drugs helped to reduce the duration of stay of the cancer patients.

Discussion:

About 70.0% of the patients attending at CNCI are with poor socio-economic background and have to travel long distances to reach CNCI for their treatments. Also more than 60% of the patients are reporting at semi-advanced to advanced stages of their diseases and due to lack of transport for the patients more indoor admissions require for investigations for confirmation of diagnosis and treatments. Thus the treatments which can be provided through day care require admission.

As per this study the mean (\pm s.d.) age of the patients was 51.51 ± 15.27 years with range 12 – 97 years and the median age was 53 years which resembled with the report of the National Cancer Registry Programme in India where the mean age of the patients was 50 years. [11]

It was revealed from the study that the mean (\pm s.d.) duration of hospital stay (DOHS) of the patients was 10.51 ± 11.30 days with range 1 – 84 days and the median was 7 days. Most of the patients (47.7%) were discharged within a week after admission which was significantly higher ($p=0.005$). 89.3% of the patients were discharged alive ($p<.0001$). 8.4% of them died during treatments and only 2.3% of them were discharged on risk bond on request of the patients/patients' parties.

Numico et al. mentioned the mean DOHS of the patients was 12.1 days with median 9.0 days and range 0 – 66 days. 58.0% of the patients were discharged after one week which was higher than that of the patients (42.0%) who were discharged after one week. 60.6% of the patients were discharged alive which was higher than that of the patients who died during treatments at hospital (26.5%) and rest 12.9% of the patients were in hospice or long-term medical care.[12]

Silva et al. reported that during their hospital stay the majority of the patients were treated with only medical supportive measures (such as antibiotics for infection or opiates for pain), 33.3% of them had a diagnostic or therapeutic invasive procedure performed (such as thoracentesis for pleural effusion or biliary drainage for obstruction). However, only 9.8% of the patients received chemotherapy or radiotherapy. Also the median DOHS was 9.0 days, with 58.0% of the admissions having duration >7 days. In 26.5% of the patients in-hospital deaths were observed and another 12.9% was transferred to hospice for palliative care.[13]

In their study Rocque et al. found in their study in 66% of the cases patients were admitted due to symptoms and only in 3% for chemotherapy administration. Pain was the most common chief complaint at admission (28%). Time of hospital stay increased as the number of admissions finalized to chemotherapy administration decreased in a ten-year period. The rate of referral to hospice was 12%. Thus their study indicated that the oncology inpatient services are increasingly used for managing acute cancer-related conditions only.[14]

Alonso-Babarro et al. and Chastek et al. reported that home care was strictly dependent from the familiar and social environment as the potential caregivers were progressively less able to take care of their relatives (mainly due to socio-economic factors) the hospital became the only possible solution for terminal care. For these reasons, focusing health care policy strictly on organizing end-of-life care at home might not decrease hospital referral of cancer patients and might not decrease costs of advanced cancer care.[15-16]

Espinosa et al. mentioned in their study the crucial role of oncologists in the context of inpatient care. Competences and skills should be enhanced accordingly and should be considered part of the specific place of oncology in cancer care. [17].

Popescu et al. suggested for hospitalization of cancer patients should be considered a necessary step in the trajectory of the disease ; rather than considering hospitalization as avoidable or even inappropriate. Thus efforts must be increased for efforts to assure rapid symptom control and prompt stabilization of acute conditions.[18]

The palliative care decision to initiate a palliative goal for the treatment had a distinct impact on the use of hospital services at the end-of-life. Contact with a PC unit further increased the likelihood of end-of-life care at primary care. [19]

In their study Aravani et al. mentioned that the overall median DOHS in 1998 and in 2010 were 10 days with inter-quartile range (IQR) 7–14 days and 8 days with IQR 5–13 days

respectively. Also significant changes in practice over time were observed. Also in the present study the mean DOHS of the patients admitted during the period 2018-19 was significantly lower than that of the patients admitted during the period 2008-09 ($p=0.0021$). Thus the DOHS of the cancer patients decreased significantly over the decade. Introduction of better treatment facilities and with the advanced of antibiotics and other drugs helped to reduce the duration of stay of the cancer patients.[20]

The study by Schneider et al. revealed that on an average the DOHS were 29 days in 2003-2004. The patient groups differed significantly in the average DOHS ($p<0001$) where as the patients with lung cancer underwent inpatient hospital treatment most frequently (3.3 times) and for the longest with mean DOHS of 35 days. This study showed that patients in an advanced stage of lung cancer were a particular important target group for reducing hospitalization at the end of life. Thus these patients must be provided with special attention when structures of palliative care are extended.[21]

40.2% of the patients were admitted for chemotherapy followed by surgery (29.7%) for surgery which was significantly higher than other mode of treatments. However, no significant difference was found between chemotherapy and surgery ($p=0.14$). This scenario differed from the study by Numico et al. in which 56.5%, 7.6%, 33.3% and 2.2% of the patients were admitted for medical supportive measures only, Chemotherapy, invasive procedures and Radiotherapy respectively. [12]

Conclusions:

As per the Medical Council of India (MCI) a functional teaching hospital with 300 beds must have a minimum of 60% indoor bed occupancy and for 500 beds it must be at least 75%. But no study has been done till date for cancer treating hospitals in India.

With increasing number of cancer patients and limited resources of the developing countries around the globe study may be undertaken to optimize the length of stay and to increase the bed occupancy rate to treat the cancer patients in a better way.

With limited bed facilities in hospital management of beds in optimal way scientifically with the help of data science will be very helpful to reduce the duration of hospital stay of the patients. With the increasing burden of cancer patients management of beds will be a big challenge. Thus kind of research work with more parameters may be introduced in cancer treating hospitals.

Conflict of interest:

The authors declare no conflict of interest.

Limitations:

The study was based on only 430 patients attending at a single institution due to financial constraint. Being a government aided hospital mostly patients from poor socio-economic background are attending this kind of cancer treating centres. CNCI is providing services mostly the patients from rural area which on average 67.0% annually. So it is very difficult to treat the patients with day care chemotherapy as they have to travel long distances to reach their residences. The scenario has been reflected in the analysis as most of the patients were treated with chemotherapy through indoor admission. Thus multicentric study will be helpful to have a result with better accuracy.

Introduction of researches with more specifically with other associated information of the patients will be helpful to achieve optimal duration of hospital for best management of available beds.

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