The importance of a database in the management of healthcare services

A importância de uma base de dados na gestão de serviços de saúde

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ABSTRACT

Objective: To present the epidemiological profile of cancer patients belonging to a database of a Hospital Cancer Registry and to report on the importance of this database in managing healthcare services at an Oncology and Hematology Center. **Methods:** A retrospective survey conducted with 1617 records of patients diagnosed with cancer at the institution between 2004 and 2009. The types of cancer analyzed were of the colon and rectum, breast, prostate and lung. The variables used in the study were age, gender, stage of disease upon diagnosis and treatment. Researchers used an application called SisHCR for data collection, and Excel® for data analysis. To ensure data safety and reliability, passwords were required for accessing files, spreadsheets were backed up on a weekly basis, and patients' CPF numbers were used to avoid data duplication. **Results:** Of the 1617 records analyzed, 36.42% belonged to the topographic group of the breast, and approximately 40% of patients with colorectal cancer were 70 years of age or older. Stage II was prevalent, representing 44% of the sample, and the treatment most used was surgery (57% of cases). **Conclusion:** The study suggested that the Hospital Cancer Registry database is an instrument capable of generating important information about cancer, and that through this information, epidemiological studies can be carried out and the processes of management and care can be improved.

Keywords: Neoplasms; Database; Health management

RESUMO

Objetivo: Apresentar o perfil epidemiológico de pacientes com câncer pertencentes à base de dados do Registro Hospitalar de Câncer e relatar a importância dessa base para a gestão de serviço de saúde de um Centro de Oncologia e Hematologia. **Métodos:** Estudo retrospectivo, realizado com levantamento de 1.617 prontuários, entre os anos de 2004 a 2009. Os cânceres analisados foram de cólon e reto, mama, próstata e pulmão. As variáveis utilizadas no estudo foram idade, gênero, estadiamento da doença ao diagnóstico e tipo de tratamento. Para a coleta de dados, utilizou-se o *software* SisRHC e, na análise, utilizou-se o *software* Excel®. Para a segurança e confiabilidade dos dados, foram utilizadas senhas de acessos aos arquivos, *backups* semanais das planilhas, além do CPF do paciente, a fim de evitar duplicidade. **Resultados:** Do total de 1.617 prontuários analisados, 36,42% pertenciam ao grupo topográfico de mama e aproximadamente 40% dos pacientes com câncer de cólon e reto tinham 70 anos ou mais. O estadiamento II foi prevalente, representando 44% da amostra, e o tratamento mais empregado foi a cirurgia (57% dos casos). **Conclusão:** O presente estudo sugeriu que a base de dados do Registro Hospitalar de Câncer tem papel relevante por ser capaz de gerar um conjunto de importantes informações relacionadas ao câncer e que, por meio dessas informações, é possível realizar estudos epidemiológicos que permitam gerar ações de melhoria gerencial e assistencial a essa população.

Descritores: Neoplasias; Base de dados; Gestão em saúde

INTRODUCTION

According to the World Cancer Report 2008, from the International Agency for Research on Cancer (IARC) / World Health Organization (WHO), the global impact of neoplasms more than doubled in 30 years. It was estimated that over the last years about 12 million new cases of cancer and 7 million deaths would occur [(1)].

In Brazil, estimates for the years 2010 and 2011 near 489270 new cancer cases, the most frequent of which in

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the prostate and lung for males, and in the breast and uterine cervix for females[1].

Thus, investment in and development of measures to improve cancer control by means of early detection, surveillance of risk factors and research have become fundamental. Based on reliable records and data, it is possible to carry out analyses that are the foundation for decision-making as to management and care[2,3].

In order to establish and implement specific measures, the existence of Hospital Cancer Registries (HCR, acronym in Portuguese) and Population-Based Cancer Registries (PBCR) is essential, as they are responsible for reporting updated quality information on cancer and represent the population. These registries are considered by the National Institute of Cancer (INCA) as "powerful tools for the epidemiological surveillance of cancer in the country"[4].

To accompany and analyze information on cancer, in the state of São Paulo there is the *Fundação Oncocentro de São Paulo* (FOSP), a public institution connected to the State Health Secretariat, which assists the preparation and implementation of healthcare policies in the field of Oncology in the State, and serves as an instrument so that oncology hospitals can prepare their own protocols and improve their care practices[5].

The primary objectives of FOSP are to record new cases of cancer and the follow-up of patients, in order to accompany the progression of the disease and carry out epidemiological studies in this area[6].

For this, FOSP utilizes a software called Hospital Cancer Registry System (SisHCR), which is made available to the 75 High-Complexity Oncology Centers and 5 volunteer hospitals, which forward their information to this organization[5,6].

The hospitals that collaborate with FOSP have a sector denominated HCR, which is responsible for transmitting information on cancer to FOSP and to the organization of which they are a part [7].

By means of the HCR data, it is possible to identify the care offered to the oncology patient and therefore, to improve care given to this population. In addition, these data can be used as sources of information for administrative planning, clinical research, and to provide an efficient control of the follow-up of patients treated, allowing the analysis of their survival.

Another contribution is that the HCR enables exchanging information with other hospital registries, as well as the organization of collaborative studies that may more widely characterize a type of cancer in a given population.

In light of this, the HCR becomes an important instrument for epidemiological studies, besides being a resource that allows analysis of the efficiency and efficacy of diagnostic and therapeutic procedures in cancer, along with the evaluation of outcomes such as survival and relapses.

OBJECTIVE

The objectives of this study were to present the epidemiological profile of patients with cancer belonging to the HCR database of an Oncology and Hematology Center, and to report the importance of such a database for the management of healthcare services in this type of organization.

METHODS

Type of study

Level I retrospective descriptive exploratory study, with quantitative data analysis. Quantitative, descriptive and exploratory research is that in which detailed descriptions of existing variables are collected, and data are used to justify and evaluate practical conditions of care[8,9].

Setting

The study was developed at the Oncology and Hematology Center of a large general hospital located in the City of São Paulo.

Population and sample

The population was made up of patients with cancer of the colon and rectum, breast, prostate and lung. The period analyzed was between the years 2004 and 2009.

Patients presented at the institution with the following status: (1) without diagnosis and without treatment; (2) with diagnosis and without treatment; (3) with diagnosis and with treatment.

The variables analyzed were: gender, age, stage of the disease upon diagnosis and type of treatment.

Instrument for data collection

For data collection, the researchers used the SisHCR software, and for data analysis, Excel®.

For safety and reliability of the databank, passwords were created to access the files in order to guarantee the use of the data only by authorized researchers. Weekly backups were made of the spreadsheets, and the files were stored in a restricted access network.

To determine the spread degree of the tumors, the researchers utilized the TNM system. This system,

developed by the American Joint Committee on Cancer (AJCC) and the International Union Against Cancer (UICC), determines staging of solid tumors by measuring the size of the tumor (T), verifying if the disease affected any lymph node (N) and if there is distant metastasis (M)[10].

Implementation of data collection

Data collection was carried out between February 1st, 2012 and March 24th, 2011, after approval of the project by the Research Ethics Committee (CEP) of the *Hospital Israelita Albert Einstein* (HIAE), under number 1497. As this was a non-interventional retrospective project conducted in patient files and with mandatory confidentiality, we requested from CEP authorization to not use the Informed Consent Form (ICF).

The authors committed to using the information obtained exclusively in this research project, and to maintaining strictly confidential the identification of subjects, as per Resolution 96/1996.

Analysis and presentation of the results

The data were presented in absolute numbers and percentages, in the form of tables and graphs.

In constructing the HCR database, we used the patient's CPF number [Individual Taxpayer Register] and the medical chart number, thus avoiding duplicity in data.

RESULTS

Incidence

We analyzed a sample of 1617 patient medical files. Of this total, 191 (11.81%) belonged to the lung group, 327 (20.22%) to the colon and rectum group, 510 (31.53%) were of the prostate group, and 589 (36.42%) were of the breast group, as presented on table 1.

Breast cancer had the highest incidence, represented almost 40% of the total sample. The second most frequently observed disease was prostate cancer, with 32%.

Table 1. Distribution of the number of patients, according to topography, between the years 2004 and 2009

Topography	Patients n (%)	Mean of patients/year	Standard deviation
Breast	589 (36)	98	42
Prostate	510 (32)	85	34
Colon and rectum	327 (20)	55	24
Lung	191 (12)	32	12
Total	1617 (100)	-	-

Gender

In the female gender, breast cancer stands out as the most frequent disease, and for the male gender, prostate cancer had the highest incidence, as demonstrated on table 2.

Table 2. Distribution of male and female genders within the four topographies

Topography	Gender		Total (%)
	Female n (%)	Male n (%)	
Breast	582 (98.81)	7 (1.19)	100
Prostate	-	510 (100)	100
Colon and rectum	152 (46.48)	175 (53.52)	100
Lung	75 (39.27)	116 (60.73)	100

For both colon and rectum cancer and for lung cancer, the greatest incidence was shown in males, with 53.52% and 60.73%, respectively.

Age group

Table 3 shows the number of patients distributed by age groups. A high incidence of colon and rectal cancer is noted for ages 70 years or older, with 130 patients, which represents almost 40% of the 327 patients with this disease.

Table 3. Number of patients with cancer of the breast, prostate, colon and rectum, and lung, by age group

Age group (years)	Breast	Prostate	Colon and rectum	Lung	Total (%)
0-9	0	0	0	0	0 (0)
10-19	0	0	1	0	1 (0.1)
20-29	1	0	2	1	4 (0.2)
30-39	54	0	8	4	66 (4.1)
40-49	168	20	37	12	237 (14.7)
50-59	165	160	65	34	424 (26.2)
60-69	103	220	84	65	472 (29.2)
70+	98	110	130	75	413 (25.5)
Total	589	510	327	191	1617 (100)

Staging

According to figure 1, stage II showed the highest incidence, with a total of 44% of the sample. Stage II had 24.7%, III had 15%, IV had 10%, *in situ* had 5.8%, and Y represented 0.5% of the cases analyzed.

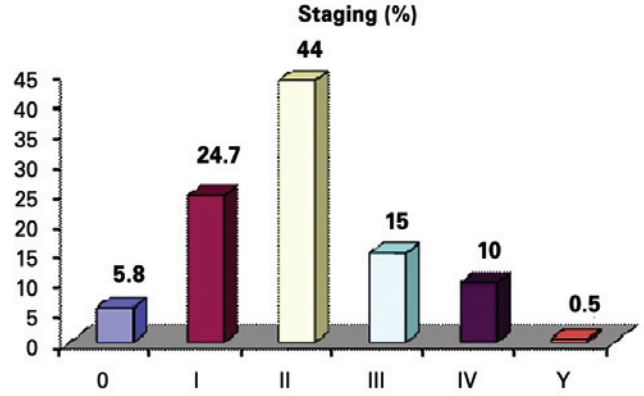


Figure 1. Staging of the four types of tumor analyzed in the sample, according to clinical stage. Stage 0: *in situ;* stage Y: tumors not classified according to TNM

The survival curve shown in figure 2 demonstrates the importance of the relation between the early recognition of the disease and its outcome. It shows that the longer the time until diagnosis, the shorter the survival time the patient might have [11].

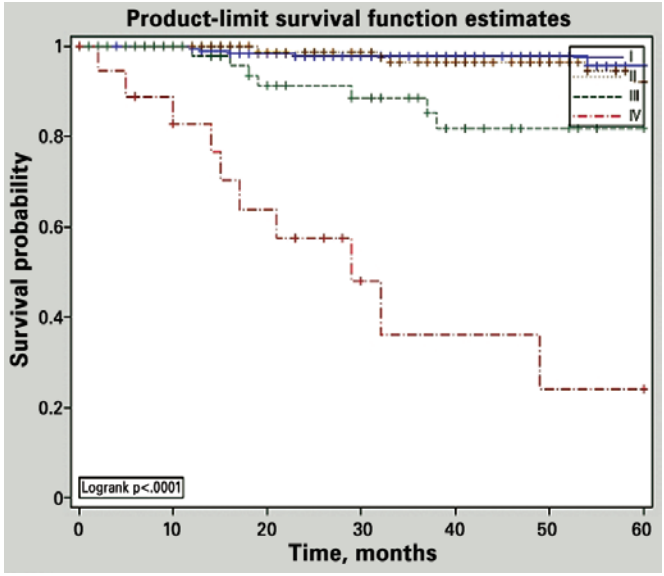
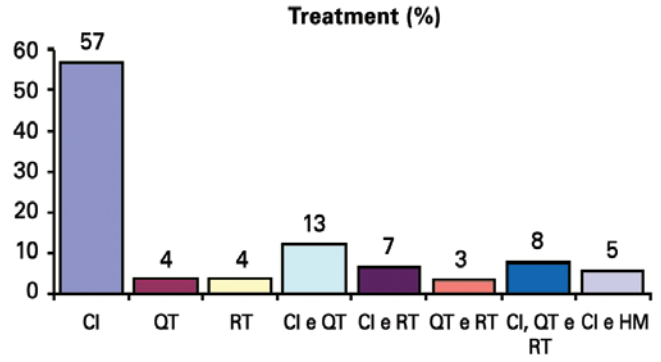


Figure 2. Kaplan Survival Curve – Breast 2009. Survival (%) of cases of breast tumors according to clinical staging and time in months

Treatments

According to figure 3, among the most commonly used treatments, surgery is the first choice of treatment in 57% of cases, followed by 13% that received the combination of surgery and chemotherapy. The third most commonly used treatment was the combination of surgery, chemotherapy and radiation therapy.



CI: surgery; QT: chemotherapy; RT: radiation therapy; HM: hormone therapy.

Figure 3. Types of treatment used in fighting cancer of the breast, prostate, colon and rectum, and lung

DISCUSSION

In healthcare, the use of a system to support decision-making regarding management and care may be greatly helpful, as it allows analysis of data by cross-referencing information, relating health problems with their determining factors and identifying the risks for disease involvement [12].

Such indicators will serve as elements for implementation of measures in prevention, improving the quality of life of patients [11].

As already observed in other health-related studies, the use of information systems has become fundamental to accompany and offer answers to the new and complex demands resulting from organizational transformations.

A study carried out in the city of Ribeirao Preto (SP) aimed to develop a system to support decision-making as to nursing diagnoses and interventions in victims of trauma in advanced pre-hospital care[13]. The results of this study indicated that the correctly stored information and the follow-up time were ideal to search for diagnosis and interventions. It was concluded that implementation of the system optimized the time spent in drawing up the nursing diagnosis of patients victims of trauma[13].

For example, by means of analysis of the information extracted from the HCR database, the high incidence of colon and rectum cancer in the age group 70 years or older was identified, which can be explained by the fact that this cancer has a slow and silent development. The diagnosis is habitually made at older ages, and consequently, at a later stage of disease, significantly worsening the patient's prognosis [14].

Moreover, stage II had the highest incidence among the patients analyzed. Stage I cancers are the least advanced, and generally have a better prognosis; those of stages III and IV are more advanced, but in many cases they can also be successfully treated[10].

The treatment is more efficient in cancer patients at advanced stage of the disease. The cost of metastatic tumor treatment is approximately double that for patients diagnosed with local disease[15].

For management and care in a service or hospital specialized in oncology, it is extremely important to know the epidemiological profile of its population. Within this context, owning a reliable database is an enormous help in decision-making, for example, about the types of treatments that will be offered and the establishment of campaigns for early detection of cancer, besides serving as a basis for planning its physical structure.

In order to transmit more precise data, the HCR of the HIAE performs dynamic data collection, with information coming from six different sources, as shown in figure 4.

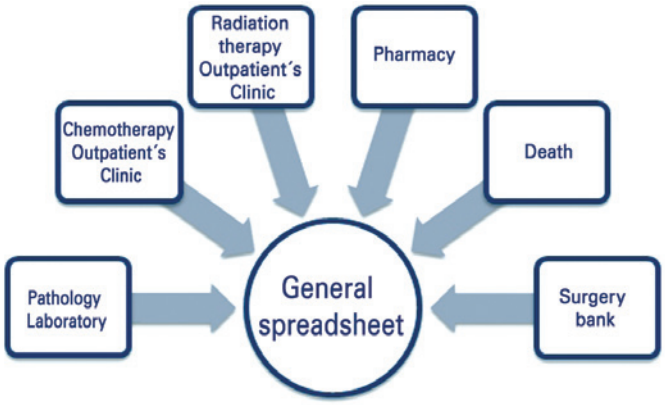


Figure 4. Demonstration of flow of capture of oncology patients for the Hospital Cancer Registries

After preparing the general spreadsheet, the data were analyzed and tabulated by the FOSP SisRHC software, and based on that, it was possible to carry out studies on the different types of cancers.

The information generated by the HCR is transmitted periodically to the steering committee of the Oncology and Hematology Center of the organization, to inform and support continuous improvement of the management and care processes of this healthcare segment.

The improvement implemented by means of the information extracted from the HCR justifies the importance of the existence of a database that helps in management of the healthcare services in a Oncology and Hematology Center. For these reasons and as a complement to this study, a second study will be developed, seeking to strengthen the importance of this managerial tool and to describe the improvements of the processes implemented in the HCR of the HIAE.

CONCLUSION

The present study suggested that the information of the HCR database plays a relevant role for the various oncological services and hospitals, since it is able to generate a pool of important data related to cancer.

By means of this information, it is possible to carry out epidemiological studies and use them as resources that allow an analysis, for example, of the quality of care given to oncology patients, which consequently, may generate improvement measures in the care offered to this population. Additionally, with the use of the results obtained with this database, it is possible to obtain information capable of helping in administrative planning, and therefore, to improve the management of healthcare services of the institution.

Therefore, it was concluded that an oncology database is extremely important for the processes of management and care, as long as its information is collected, tabulated, stored and monitored with safety.

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