THE TRAJECTORIES OF BREAST CANCER PATIENTS - COMPARISON OF TWO SIMILAR POPULATION SIZE REGIONS FROM FRANCE AND ROMANIA (RHONE ALPES AND TRANSYLVANIA)

Main Author:
Elena Dana BURDUJA, MD, MSc, PhD Student
Universite Jean Monnet St Etienne, France

Co-authors:
Prof. Bernard BOUREILLE, Director of the “Institut Superieur Economie Administration Gestion (ISEAG)”, University “Jean Monnet”, St Etienne, France

Prof. Jean Marie RODRIGUES, MD, Service de Sante Publique et d’Informatique Medicale (SSPIM), University “Jean Monnet”, St Etienne, France

As. Prof. Beatrice Trombert PAVIOT, MD, Service de Sante Publique et d’Informatique Medicale (SSPIM), University “Jean Monnet”, St Etienne, France

Simona MUŞAT, MD, PhD, National School of Public Health Bucharest, Romania

INTRODUCTION

During 2007, Prof. Bernard Boureille, As. Prof. Myriam Normand, Olivier Parent and As. Prof Beatrice Trombert Paviot decided to analyze the link between the organization of the health services delivery system and the real trajectory of the patients using the system [1]. Their research focused on the trajectory of the breast cancer patients within the region of Rhones Alpes (6021293 inhabitants) from France, especially considering the reorganization of the oncology services delivery within the concept of “integrated care networks” in France starting with 1996.

The study looked at individual breast cancer hospital oncology services delivered in Rhones Alpes region during 2002, from the point of view of the health catchment area – where the services were delivered, for which patients (residence of the patients) and how the actual picture of this “maps” can or should influence the (re)organization of the oncology services in more flexible and socially, geographically and economically relevant networks [2], [3]. The study used the breast cancer patients trajectories as an example for oncology services, but it is notable that different pathologies can have different models of the their respective networks organization, based on more than only the geographical distribution of the patients.

The main conclusions of their study is that for oncology, the trajectories of the patients are related to network effects, whether from the point of view of increasing the medical effectiveness (as sought by French government with the plan for cancer), or from the point of view of incorporation or concentration of hospital industry groups, as is the trend in the private hospital sector at the time of the analysis.

Based on the idea and partially on the methodology used by the French colleagues, the work described in this article tries to apply similar considerations to a similar (population size) region from Romania, in order to understand if results and recommendations are replicable, for a better reorganization of the oncology hospital network in the respective region and
in order to demonstrate for the Romanian region the importance of patients’ trajectories.

The region selected for analysis in Romania is composed of 16 counties from Transylvania with a population size of 6931893 (year 2008). The population of the patients analyzed is represented by all patients discharged from Hospitals in this region between January 1st 2005 and December 31st 2005. The region is presented in Figure 1.

**Goal and Objectives of the Study**

The goal of our work was to understand if in two different health systems (France and Romania) breast cancer patients’ trajectories in 2 similar regions (Rhone Alpes and Transylvania, similar population size), identified using similar standardized information could predict and influence a more efficient and equitable organization and financing of the oncology services. The model used for breast cancer and the 2 regions could then be extended and used for other pathologies or territories.

**Methodology**

The study and the comparison presented in this article are part of a larger study [4] that tries to incorporate some other dimensions of this initial work: study of equity in utilization and financing of health services (starting from the population analyzed here) and replication and comparisons of different classification systems of patients’ morbidity and resources allocation models using similar information for different populations/ countries/ regions [4].

The analysis in this initial study was possible mainly because of the similarities between the hospitals information system design and utilization in both countries health systems: individual hospitals discharged patient data is being collected on a regular basis, using a unique patient identifier (UPI) and including, among other standardized information [5]:

- the geographical information about patient’s residence and hospital location
- the (similarly) coded clinical information about the patient’s pathology (using WHO ICD 10 classification system for main and secondary diagnoses) and medical procedures (all relevant medical procedures performed in the hospital coded using the French “Classification commune des actes médicaux” classification system or the Australian modification of the WHO ICD - ICDAM)

The organization and delivery of the health services in the 2 countries (and respective regions) have similarities but also major differences [6, 7, 8, 9], so the idea was just to initially understand the influence of the patients trajectories in a somehow standardized model of clinical practice like oncology – more precisely breast cancer patients’ trajectories and their predictability for the organization of the services delivery in an efficient manner. The Hospitals selected are all hospitals submitting the electronic Minimum Basic Data Set (MBDS) as by year 2005 in the respective region: 153 Hospitals, 1 National Institute, 33 clinical and county Hospitals (16 county Hospitals, 3 University Hospitals, 14 other type of clinical Hospitals), 65 municipal Hospitals, 54 other categories (e.g. army, transportation, small rural hospitals etc) from the 16 counties of Transylvania (Table 1). Based on the unique patient identifier for the Romanian database, cases and patients had been filtered: 7437 episodes (cases), 5079 patients.

It is recognized by the authors that some limitations exist in the proposed analysis, mainly related to the following aspects:
• a “snapshot” picture of the breast cancer patients is analyzed (one calendar year, 2005) and probably the continuity of care for these oncology services is not 100% reflected; patients with cancer can have repetitive and long episodes of inpatient care, that are not necessarily reflected in a one calendar year database
• the geographical location of patients and hospitals influenced the utilization of services outside the described geographical region and this was not 100% captured, as the purpose of the analysis was to some extent to apply the methodology to the respective region (Transylvania)

The methodology was adapted so it reflects Romania/Transylvania region reality but is still comparable with the one used by the French authors and followed the steps presented below:
• Analysis of patients general utilization of services by type of hospital
• Analysis of patients trajectories: a. by residence of the patients ("where do patients from each county seek care?" and by location (and type) of hospital ("the patients in my hospital – where do they come from?")
• For this analysis, reference was done to the entire data base, as patients or Hospitals outside the analyzed region (Transylvania) are a distinct part of the activity reflected by looking at this geographical territory
• Analysis of the general health policy framework at national level in relationship with the reorganization of the cancer network and possible links with evidences from the data analyzed previously
• Comparisons with Rhones Alpes/ France situation presented in the article by Prof. Boureille and co.

RESULTS

A. Utilization of oncology services for breast cancer patients in Transylvania - 2005

In average, each patient used 1.5 hospitalizations where an ICD10 diagnosis from the group C50 was present, either as a main or secondary diagnosis, irrespective if the patient had a related main surgical procedure performed. In this aspect, based on existing data, it was more difficult to investigate very precise, as in the case of the Rhones Alpes study, the exact purpose of the hospitalization: surgery, radiation therapy or chemotherapy.

Considering the 3 levels of care available in the region, we differentiated the utilization rates in 2 categories: more than 3 (including 3 and presuming the patient went along the referral chain through all levels of care) and less than 3: 495 patients used 3 or more episodes during 2005 in the region (10.25%) and 3653 patients (75.65%) used 1 episode (reference table available on request from the author). The region at the time of the hospitalization of the patients (2005) had 9 radiotherapy departments scattered around the 16 regions.

Within the limitation of the data set we can still assume that the remaining 681 of the patients (14.15%) were the ones that “shortcut” the referral mechanism (as the law allows free choice of physician and provider) or came back to the same facility for a sequence of treatment (which the pathology of the disease also could support).

When we look at the trajectory of the patients exclusively within the data set, we see that only 443 patients (9.17%) were visiting more than 2 hospitals; combined with the information on number of episodes, we can estimate that the vast majority of the breast cancer patients seek treatment in only one hospital. This could be a consequence of organization of the hospital curative oncology services in Romania or could be also influenced by the time limitation of the data set (one calendar year). If possible, a more extensive study (ideally on at least a 5 years data base) should be conducted in order to directly link these assumptions and the data used should include all day stay episodes too, for either chemotherapy or radiotherapy, in both public and private hospitals.

101 patients that used more than 1 hospital for their episodes had one of their disease episodes in the National Oncology Institute from Cluj; this represents 22.8% of patients that used more than 1 hospital. The numbers show a very low utilization of the National Institute as the last point in the referral system and also can be explained by the organization of the cancer network delivery system in Romania, with only 2 institutes (Cluj Napoca and Bucuresti), inducing limited access (including for the population in the respective geographical region). As a result, recently the Romanian MoH decided to “upgrade” 2 existing county clinical oncology centres to the institute statute, one being located within the analyzed region (in Timisoara, Timis county).

In comparison, 123 patients that used more than 1 hospital for their episodes had one of their disease episodes in the small municipal hospitals; we can estimate that these patients used the referral chain to a higher-level hospital (county or institute), but it shows a very small percentage addressing this type of units (2.55%). This number is still higher than patients using the institute as part of their trajectory (when we talk about more than 2 episodes), reflect that lower level institutions preserve (as proved by patient trajectories) some of organizational aspects in terms of oncology services coverage and access.

Preliminary findings and results – utilization of services

Anticipated patterns based on the organization of the cancer hospital services delivery network are not being fully respected by the population analyzed, as we would expect; most likely, diagnosis of the disease was initiated at a lower level type of hospital and consequently final
diagnosis and treatment administered at higher level institutions, but a significant percentage seemed to seek treatment directly at the secondary and tertiary level.

An average of 1.5 hospitalization episodes/patient could be considered adequate for this pathology and time interval that was analyzed, especially in the context of radiation therapy being delivered mainly as an inpatient type of service in Romania, but further investigation of this number in relationship with a major surgery being performed can offer more information.

Both the vertical and horizontal dimensions of the oncology services in hospitals (type of hospital and geographical region) show discrepancies in access and utilization: hospitalization for breast cancer diagnosis and treatment in small urban or rural hospitals might be inefficient, as both precise diagnosis and adequate treatment require higher end technical platforms, usually not available at that level; it is also true that access of the patients to these platforms is limited by the availability (number) of these centers and geographical location when compared with residence of the patients.

B. Trajectory of the patients breast cancer patients in Transylvania - 2005

The analysis in this chapter was done from 2 separate perspectives and in a larger study an investigation will be added trying to localize also the money flow for the patients trajectories presented in this article:

1. Location of the Hospital and attraction of patients from different counties

The general picture of these patients flow is shown in a reference table (available on request from the author due to size) and the situation by county is summarized below. For Cluj county a graphic representation is used and for all others graphics are available with a larger presentation of this study. The summary for each county considers the level 2 (county) and level 3 (national institute) hospitals as the main catchment hospital for the respective county and patients are presented separately with urban (“u”) and rural (“r”) residence area.

The migration of patients with breast cancer diagnosis from other counties than Bihor to the County Hospital in Oradea BH01 is insignificant:

- 1100 total cases (414u, 686r)
- 7 cases from other counties (6u, 1r)

Similar situation for Bistrita Nasaud county, BN01 Bistrita county hospital:

- 309 total cases (170u, 139r)
- 1 case (r) from other county

Brasov county, BV01 Brasov county hospital:

- 381 total cases (310u, 71r)
- 20 cases from other counties (9u, 11r)

Cluj county

CJ01 Cluj Napoca county University hospital:

- 374 total cases (236u, 138r)
- 301 cases from other counties (80.48%, 182u, 119r)

CJ08 Cancer Institute "I. Chiricuta" Cluj-Napoca:

- 1712 total cases (1283u, 429r)
- 1364 cases from other counties (79.67%, 996u, 368r)

Caras Severin county, CS01 County Hospital Resita:

- 91 total cases (71u, 20r)
- 3 cases from other counties (3u)

Figure 2. Cluj County Hospital catchment area for breast cancer patients

Figure 3. Cluj National Oncology Institute catchment area for breast cancer patients
Hunedoara county, HD01 County hospital Deva:
- 119 cases (77u, 42r)
- 2 cases from other counties (1u, 1r)

Harghita county, HR01 County Hospital Miercurea Ciuc:
- 87 total cases (43u, 44r)
- 23 cases from other counties (13u, 10r)

Maramures county, MM01 County Hospital Baia Mare:
- 174 total cases (116u, 58r)
- 9 cases from other counties (6u, 3r)

Mures county, MS01, University County Hospital Tîrgu Mureș:
- 428 total cases (241u, 187r)
- 187 cases from other counties (43.69%, 80u, 52r)

Sibiu county, SB01 County Hospital Sibiu:
- 102 total cases (55u, 47r)
- 13 cases from other counties (7u, 6r)

Salaj county, SJ01 County Hospital Zalău:
- 79 total cases (24u, 55r)
- 1 case (u) from other county

Satu Mare county, SM01 County Hospital Satu Mare:
- 255 total cases (133u, 122r)
- 10 cases from other counties (u)

Timis county, TM01 University County Hospital Tîmisoara:
- 81 total cases (64u, 17r)
- 26 cases from other counties (%, 19u, 7r)

3 counties treated during 2005 exclusively patients with the residence in the same county: Alba (AB), Arad (AD) and Covasna (CV)

2. Residence of the patient versus the hospital location where the patients seek care

The general situation is presented again in a reference table, as well as all graphics for each county and they will be made available with the larger study (4); main findings when looking at the reference table and graphics are as follows:

- all counties in the region have patients that seek care in Cluj county, including patients from counties that have secondary or tertiary care oncology services available (Mures, Timis, Arad etc). Notable that the Cluj county is the location of the only National Cancer Institute in the region
- in the same line, patients from Cluj county seek care almost exclusively in Cluj county (out of a total of 527 cases and 432 patients, only 3 patients for 3 cases respectively were treated outside the Cluj county hospitals)
- most of the counties send patients to an average of 3 different counties for treatment (including the respective county), but the number of counties receiving patients for treatment from an individual county can be as large as 6 (even though proportions for some are quite low, see Brașov county data)
- the lowest percentage of cases treated within the county of residence is 30%, for Alba county and the highest is 92%, for Timis county (if we don’t include here Cluj county, where the National Oncology Institute is located)
- in general, 77% of the cases in the region where treated in the residence counties of the respective patients
- for all counties, the number of patients seeking care within the residence county is higher from the urban than rural area, except for Satu Mare and Salaj (rural higher than urban) and Mures, where absence of residence area for some patients didn’t permit a correct calculation. As a reminder, Romania (and Transylvania) has a 44.8% of population leaving in rural areas.

Figure 4. Distribution of patients with residence in Alba county

Legend
- Localities with Hospitals frequented by patients from Alba County
- Localities in Alba County with Hospitals frequented by the patients
- Counties receiving patients from Alba County
- Alba County

Preliminary findings and results – trajectory of the patients

Most of the county general hospitals treat (almost) exclusively breast cancer patients within the respective
The only notable interventions of the Ministry of Health at the time of the study (before 2009) were as follows:

- an annual increase of 20-40% of the payments to the cancer national program during the last 5 years; unfortunately, this increase didn’t reflect an extension of services to larger categories of patients, investments or structural reform. 90% of this increase was constantly represented by the increase in the unit price of necessary drugs, not even a significant increase in the number of units purchased
- regulation issued for reorganization of existing oncology department within two major University Hospitals as stand alone Oncology Institutes in Iasi and Timisoara; the draw back of these decisions is the fact that needed funds for the reorganization were not allocated from the MOH level (in charge with major capital and high tech equipment acquisitions) and no consistent strategy was developed at regional level for the old and new cancer centres to act as regional coordinators of the oncology network activity

Specialists from the cancer network
Is notable the effort of Cluj Oncology Institute specialist in the area of reorganization of the network in respect with radiotherapy, a major component of the curative cancer services [10]. If prevention, basic diagnosis facilities and basic curative services (surgery and chemotherapy) are affordable even for medium size county hospitals, it is well known that the level of finance and training of staff for radiotherapy is very high, so it needs to be concentrated in the highest level oncology services. The analysis performed by the National Sub Commission on Radiotherapy revealed that the equipment is outdated and insufficient: all around the country, only 16 centers have high-energy radiotherapy machines (11 linear accelerators and 15 telecobalt machines) and the rest of the centers have brachytherapy and/or conventional radiotherapy machines. It is estimated that only one-third of all the patients that require radiotherapy have access to treatment, mostly because of a lack of facilities for such treatment.

Based on the results of the study presented by the cancer network specialists to Ministry of Health from Romania [5], it was agreed at that level to use the suggested model in the reorganization of the centres and try to attract private financing in a Public Private Partnership; unfortunately, repeated changes of Ministers and the general evolution of the health system cancelled or at least postponed the initiative.

Preliminary findings and results – analysis of the health policy framework:
Reorganization of the oncology network in Romania, as supported by literature review, specialists’ research, health policy priorities and results of this study should address the following:
- standardization of the level of intervention in correlation with type of equipment (mostly to be renewed) and specialization of available medical staff
- methodological and clinical coordination by at least 4 regional centers (Bucharest, Iasi, Timisoara and Cluj Napoca) of lower level units
- migration of inpatient care to outpatient and day stay as by clinical guidelines and new (international) best practices – and reorganization of existing units accordingly
- allow private initiative in the reorganization process (financing and/or operation of the centres)
Further filtered were applied, with the pathology criteria of presence of any breast cancer diagnosis (main or secondary) in the C50 category of ICD 10 classification for female patients discharged from the Hospitals in the respective counties. The types of services analyzed are acute inpatient care, excluding day stay (average length of stay – ALOS - more than 1 day).

CONCLUSIONS AND FUTURE WORK
The main conclusion of this study is that similar with the case of Rhone Alpes region, for highly standardized oncology services like the breast cancer diagnosis and treatment, the trajectories of the patients are related to network effects, whether from the point of view of services delivery and organization (including technology distribution) and/or from the geographical access point of view.

If a new dimension will be added to the study (reimbursement of these services and money flows across the region), as well as a larger period of time or expansion to the entire population and area of the country, the conclusions will probably better support the ongoing efforts of the Romanian central and local Government to extend and reorganize the oncology health care delivery model respecting population access and utilization patterns.

Considering the resources intensity of the diagnostic and treatment oncology services, as well as the difficulty to cover an extend geographical area with these resources, potential consideration might be sought for participation of the private sector into this reorganization of the cancer network, both at regional and national level.

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