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Epidemiological aspects of lymphoma in Bihor County

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Abstract. Objectives: This epidemiological study aims to determine the incidence, prevalence and death rates of lymphomas in Bihor County and to compare these data with the international data available. Bihor county is located in the North-Western part of Romania, an Eastern European country and has a closed Uranium mine, which was transformed into a storage facility of the National Uranium Company in Stei. Material and method: The recordings between 2003 and 2009 from the Hematology Department at the City Hospital in Oradea as well as the recordings from the Hematology Hospital within the Oncology Institute in Cluj-Napoca have been considered for this retrospective-descriptive epidemiological study. The assessment of the incidence, prevalence and death rate from lymphomas in Bihor County was investigated, divided by the types of lymphomas considered, such as follows: Non-Hodgkin Lymphoma (NHL), Hodgkin Lymphoma (HL), Chronic Lymphocytic Leukemia (CLL) and Multiple Myeloma (MM). The distribution by gender, environment origin, age, stage of disease and the histological type have been also determined. Results: We observed an increase in morbidity and death rate for all types of studied lymphomas; a male predominance for NHL and CLL and a female predominance for HL and MM; a higher frequency for the age of 61 to 80 for the NHL, CLL and MM; and a bimodal distribution for HL: 18-40 years and 40-60 years. Conclusion: The data collected in this study provide information on the lymphoma epidemiology in Bihor County.

Key Words: epidemiology, lymphomas, morbidity, death rate.

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Introduction

The epidemiology represents a basis science in the preventive medicine and is one of the main sciences in the clinical research besides the semiology and the clinic endorsed specialty – it entails the exact knowledge of the related issues with the specific methods of study. We can refer about a deeper study only after the correct assimilation of the basic concepts of theoretical epidemiology, necessary in order to understand the meaning of the health state – normal or pathological – and to study its cause for screening, prevention and control purposes (Brumboiu 2005). The analysis of the distribution of the aspects and events correlated with the state of health or of their definition at certain populations applies to two basic strategies: a descriptive one and an analytical one (Brumboiu 2005).

The descriptive studies are limited to the description of the mode of evolution of disease within a population or to the general characteristics of certain fluctuations of interest at the population level or make the description of the state of health of a community, using the data which are commonly available or those obtained following a special investigation (Sabău et al 2005b). These do not try to analyze the connections between the exposure to the action of one or more risk and effect factors, so they do not attempt to establish certain causal relations, they do not check a causal hypothesis. They often represent the first step within an epidemiological research (Sabău et al 2005b).

The incidence represents the number of new cases of the specified disease, appeared in a population at risk, in a defined period of time. The prevalence represents the total number of individuals having the specified disease from a population in a defined period of time.

The mortality represents the number of deaths due to the specified disease reported in a defined population (the inhabitants of Bihor County, in this study) in a defined period of time.

The malignant lymphomas are spread all over the globe, with epidemiological indexes depending on the: geographical area, age, gender, race, socio-economical conditions, etc.

As a result of the epidemiological studies (of the data from the National Cancer Institute in the United States), an increasing of the Non-Hodgkin Lymphoma (NHL) incidence of at least 5% in the past years has been observed, both on a national and international level, which was labeled as a real epidemic (De Vita 2001). Also Lichtman showed a dramatically increased incidence of NHL during the second half of the 20th century, with an increased frequency in the male gender (Lichtman 2006, Degos 2005).

The NHL death rate increased since 1960, but slower than the incidence rate (De Vita 2001, Lichtman 2006). The increasing of the death rate is relatively specific to the NHL given the fact that other hematologic malignancies, such as Hodgkin Lymphoma (HL), decreased lately.

The HL represents 10% of the hematologic malignancies with an increased incidence in the male gender, with a bimodal age-specific incidence: first peak at age 20-24 years and the second peek begins at age 50 (Degos 2005, Lichtman 2006, Furie 2003, Sekeres 2007). The Chronic Lymphocytic Leukemia (CLL) is the most common form of leukemia which affects the adults from the Western countries, a familial incidence having been determined: 20% of the patients with CLL have relatives with this disease or other lymphatic malignancy (Lichtman 2006, Furie 2003).

CLL represents 30% of all types of leukemia in Western countries and only 10% of all leukemias in Asian population (Degos 2005). CLL is more frequent in males than in females (Bruce 2003, Degos 2005, Hoffmann 2013).

The Multiple Myeloma (MM) represents 10% of the hematologic malignancies, and is on the second place as frequency among the hematological cancers in the USA, following the NHL (De Vita 2001); it also represents 1% of all malignancies (Lichtman 2006, Hoffmann 2013, Greer 2014).

Less than 2% of the MM patients are aged under 40. More than 40% are aged over 70 (De Vita 2001). MM is more frecvent in the male gender, the male to female ratio is 1.3:1 (Sekeres 2007, Hoffmann 2013, Greer 2014).

The MM is the only malignancy with a higher incidence among blacks (Furie 2003, Sekeres 2007).

This epidemiological study aims the assessment of the incidence, prevalence and death rates from lymphomas in Bihor County during 2003-2009.

Material and method

The recordings from the Hematology Department from the City Hospital in Oradea and the recordings from the Hematology Hospital within the Oncology Institute in Cluj have been taken into consideration and, excepting the incidence, prevalence and mortality, the repartition for genders, ages, level of disease and histological forms of NHL, HL, CLL and MM, noticed in the population of Bihor County during the period 2003-2009, have been determined. The study was made under the advice of the Ethical Comitee, with signed informed consent of the patients and the granted access to the medical records archive from the managers of the Hematology departments Oradea and Cluj Napoca.

Results

The total number of lymphoma cases as a result of this descriptive study was 361, and the distribution of the lymphoma types may be seen in Table 1.

Table 1. The distribution of the total number of hematological malignancies recorded during the period 2003-2009 in Bihor County divided per lymphoma types

Lymphoma type	Number of cases
NHL	89
HL	58
CLL	138
MM	76
Total number of hematological malignancies in Bihor County between 2003-2009	361

During the studied period 2003-2009 we observed an increased incidence of all types of lymphomas. For NHL the incidence

was 5 cases/2003, 11 cases/2004, 13 cases/2005, 10 cases/2006, the higher incidence with 21 cases/2007, 19 cases/2008 and 10 cases/2009. For HL the incidence was 4 cases/2003, 1 case/2004, 5 cases/2005, 4 cases/2006, 11 cases /2007, 6 cases/2008 and 6 cases/2009. For CLL the incidence was 6 cases/2003, 14 cases/2004, 15 cases/2005, 11 cases/2006, 24 cases/2007, 21 cases/2008, 13 cases/2009. For MM the incidence was 1 case/2003, 6 cases/2004, 10 cases/2005, 8 cases/2006, 11 cases/2007, 14 cases/2008 and 15 cases/2009, as shown in Figure 1.
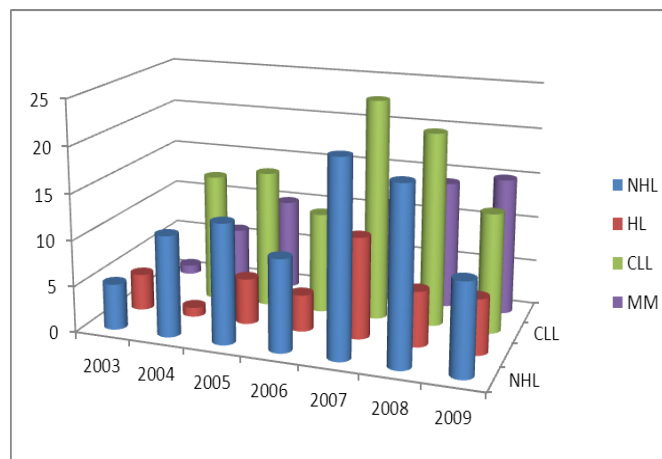

Figure 1. The incidence of hematological malignancies in Bihor County between 2003-2009

The prevalence of all types of lymphoma was also increased during the studied period 2003-2009. The prevalence for NHL was 20 cases/2003, 28 cases/2004, 31 cases/2005, 41 cases/2006, 51 cases/2007, 51 cases/2008, 50 cases/2009. For HL the prevalence was 24 cases/2003, 25 cases/2004, 30 cases/2005, 32 cases/2006, 42 cases/2007, 45 cases/2008, 47 cases/2009. For CLL the prevalence was 39 cases/2003, 50 cases/2004, 59 cases/2005, 60 cases/2006, 80 cases/2007, 92 cases/2008, 83 cases/2009. For MM the prevalence was 12 cases/2003, 16 cases/2004, 25 cases/2005, 30 cases/2006, 36 cases/2007, 44 cases/2008, 44 cases/2009, as shown in Figure 2.
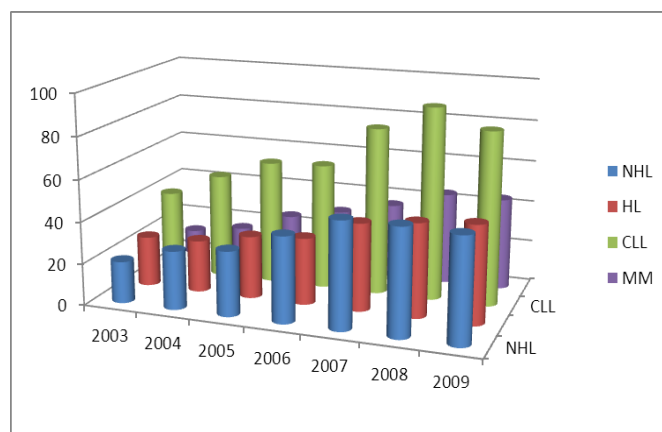

Figure 2. The prevalence of hematological malignancies in Bihor County between 2003-2009

Similar to the incidence and prevalence, the mortality presented the same increased tendency for the period 2003-2009, the mortality for NHL was 6 deaths/2003, 7 deaths/2004, 6 deaths/2005, 11 deaths/2006, 14 deaths/2007, 13 deaths/2008, 13 deaths/ 2009. For HL the mortality was 2 deaths/2003, 1 death/2004, 2 deaths/2005, 3 deaths/2006, 2 deaths/2007, 4 deaths/2008, 4 deaths/2009. For CLL the mortality was 1 death/2003, 4 deaths/2004, 7 deaths/2005, 6 deaths/2006, 5 deaths/2007, 19 deaths/2008, 12 deaths/2009. For MM the mortality was 1 death/2003, 2 deaths/2004, 2 deaths/2005, 5 deaths/2006, 7 deaths/2007, 15 deaths/2008 and 13 deaths/2009, as shown in the Figure 3.
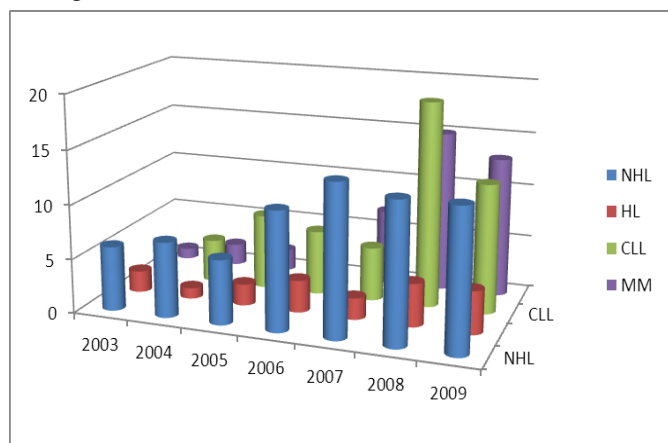

Figure 3. The mortality due to hematological malignancies in Bihor County between 2003-2009

A high frequency for the 61-80 aged has been determined for the NHL, CLL and MM, as well as a bimodal distribution for the 18-40 and 40-60 aged for the HL as it is shown in Figure 4. So, in our study for the 18- 40 aged there were 17 cases of NHL, 1 case of CLL and 2 cases of MM. For the 41-60 aged there were 25 cases of NHL, 19 cases of CLL and 21 cases of MM. For the 61-80 aged there were 44 cases of NHL, 107 cases of CLL and 53 cases of MM. For >81 aged there were 3 cases of NHL, 11 cases of CLL and none of MM . For the HL we observed a bimodal distribution : for the 18- 40 aged there were 23 cases, for 41-60 aged therewere 21 cases, for 61- 80 aged there were 14 cases and for the >81 aged no case.
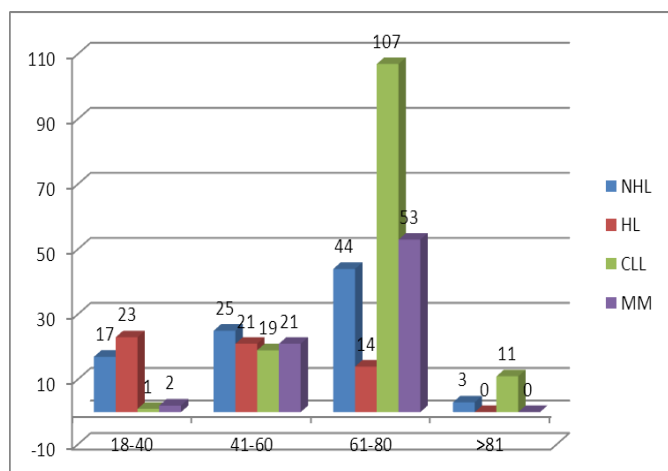

Figure 4. Age related distribution of hematological malignancies in Bihor County during 2003-2009

We also obtained for the NHL and CLL a male gender predominance, in our study there were 50 men and 39 women with NHL, 78 men and 60 women with CLL. For the HL and MM we found a female gender predominance with 28 men and 30 women for HL and 36 men and 40 women for MM, as it can be seen in Figure 5.
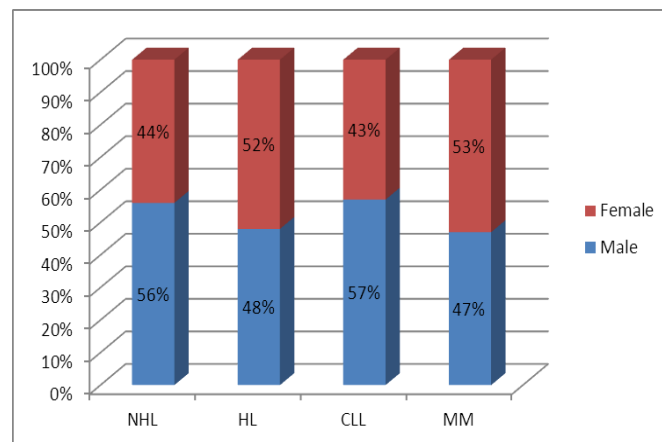

Figure 5. Sex distribution of hematological malignancies in Bihor County for the mentioned period of time (2003-2009)

Discussion

The descriptive studies aim to gather the necessary information, the description of the state of health of a community, using the data which are commonly available or data obtained within a special investigation.

In the domestic specific literature we have no referring to any epidemiological study made in Romania, only data reports from the foreign literature.

This way, De Vita showed the same increasing tendency of the incidence and death rate for the NHL in USA; Greer showed also that the rise in NHL has been faster than that of all others malignancies except prostate cancer, melanoma and lung cancer in women (Greer 2014), with predominance for the male gender, with a maximum top for the group of age of 50, the NHL representing the 6th cause of death in the USA (De Vita 2001).

In a similar way, it was observed an increased incidence of HL in Europe and America, a predominance for the male gender and a nodular sclerosing regarding the histo-pathological form, but the bimodal age-specific incidence was presented differently, with a major pick between the age 20-29 and a minor pick at the age of 60 (Provan 2004, Greer 2014, Hoffman 2013).

We obtained similar results as Williams (Lichtman 2006) for the predominance of the male gender in our study, and we observed that the CLL is the most frequent form of adult's leukemia.

De Vita also agree on the same increasing tendency of death rate and morbidity for the MM, the increased peak around the age of 70 and a high incidence for the male gender (De Vita 2001). The predominance of the female gender is different than the data in the specific literature, but this could be explained by the high female population in Bihor County (51.5%F/ 48.5%M). (National Institute of Statistics Romania-D.A.B.D.R.P. Bihor-July 2008).

Conclusion

The present epidemiologic study made on the population from Bihor County within 7 years (2003-2009) represents the first

data from the specific literature referring to Romania and particularly to Bihor County, and presents both, similarities and various differences such as the higher incidence of these lymphomas than the existent data in the world. This study can be used as reference for the national epidemiological studies to follow.

Acknowledgements

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