Patterns of Incidence Rate, Mortality Rate and the Case Fatality Rate of NHL in Nineveh Province for the Period from 2010 – 2014

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Abstract

Non-Hodgkin's lymphoma (NHL) is a cancer that originates in the lymphatic system and spreads throughout the body and develops from lymphocytes. Which is more common than the Hodgkin lymphoma.The aim of the present study is to study the incidence rates, the mortality rates and the case fatality rates of NHL in Nineveh Province, according to age group, sex and stage of extension. A five-year retrospective review of cancer records from the year 2010 to 2014 was conducted in the MCRC.Chi-square test and A P-value of ≤ 0.05 was considered to denote statistical significance. The results show many patients with NHL were ≤54 years and the majority of deaths in the same age group andthe total number of the included subjectswere 412 (NHL) with male predominance. The overall case fatality rate of female showed no statistical significance differences than in male.

Key words: Mosul Cancer Registry center (MCRC), Non-Hodgkin's lymphoma (NHL), case fatality rate (CFR), incidence rates, the mortality rates.

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INTRODUCTION

Non-Hodgkin's lymphoma is a cancer that originates in the lymphatic system and spread throughout the body. In non-Hodgkin's lymphoma, tumors develops from lymphocytes — a type of white blood cell. Non-Hodgkin's lymphoma is more common than the other general type of lymphoma — Hodgkin lymphoma [1]. The most common non-Hodgkin's lymphoma subtypes include diffuse large B-cell lymphoma and follicular lymphoma.

In 2012: An estimated 385,700 new cases of non-Hodgkin lymphoma (NHL), of which 199,700 deaths occurred[1]. It is more common in developed countries, while the lowest rates are found in developing countries[2]. Malignant lymphoma is the third most commonly reported malignancy in Iraq [3]. There was non-Hodgkin lymphomas (NHL) are more than three times as common as Hodgkin lymphomas (HL) [4].

In Iraq, Non-Hodgkin lymphoma (NHL), is one of the four most commonly diagnosed types of cancer among males with cancers of the lung and bronchus, bladder and leukemia, they are accounting for 37.7% of estimated cancer cases in males, 3782 NHL cases, of which 2283 (60.4%) in males and 1499 (39.6%) in the females[5], more than (7.1 - 9.0 and 5.3 -7.0) rate per 100,000 male and female population respectively [4].

Like most cancers, the risk of developing NHL increases with age. In our country the age range of NHL patients was 2−87 years with a median age of 45 years, with a male to female ratio 2:1 [4].

The present study affords the incidence rates, the mortality ratesand the case fatality rates of NHL in Nineveh Province, stratified by age group, sex and stage of extension.

Aim of the Study

The aim of the present study is to examine the incidence rates, the mortality rates and the case fatality rates of NHL in Nineveh Province during2010-2014

Objectives:

1. To measure the incidence rates,the mortality ratesand the case fatality rates of NHL, according to, age, sex of the patients and stage of cancer for each year of the study period.
2. To make comparisons among patients diagnosed with NHL, according to ages, sex and stage of cancer.

MATERIALS AND METHODS

Administrative Agreement:
Administrative agreement was obtained from all the study settings included in the research. Ethical consideration was extensively followed by the investigator during data collection and analysis in this research.

Study Settings:
The study was conducted at the Mosul Cancer Registry center (MCRC). This center collects information on all cancer cases in the area, according to the preformed information referral form. The center was established in Mosul city in 1993 for obtaining information and data collection of cancer patient in all hospitals in Nineveh Province.The center publishes cancer statistics annually.

Study period:
Data collection of this study was done from the first of January, 2010 to 31th of December, 2014

Study sample:
Nineveh Province has an area of 37,300 Km^2 and a total population of 3,026,307. 3,188,726. 3,335,200.3,438,194 and 3,524,348 million for the years of 2010, 2011, 2012, 2013 and 2014 respectively. Population data were obtained from the directorate of health in Nineveh taking into consideration the annual population growth rate of 3.2% [(6)].

The sample of the present study included all cancer patients registered at the Mosul cancer registry center and the related hospitals of NHL in Nineveh in 2010 to 2014 of all ages and both sexes.

The cancer cases are registered by trained personnel with respect to patient number, age, sex, clinical stage, cancer and coded according to the International Classification of Diseases (ICD10)[(7)]. Primary-site codes was NHL C859 [(8,9)]. All the data are fitted on Can Reg 3 format and fed into the computerized database of the MCRC,

Staging is done according to the summary stage system [(10,11)]; in which the stage is considered in situ, if cancer cells are present only in the layer of cells where they developed. The cancer has become invasive and is categorized as local, regional, or distant based on the extent of spread, if cancer cells have entered beyond the original layer of tissue, [(10)]. Stage "unknown" has been recorded to include tumour morphologies for which the Summary stage system is not strictly applicable.In this analysis according to stage, patients with cancer of an unknown stage or carcinoma in situ were excluded from the present study.The SEER (The Surveillance, Epidemiology, and End Results) database does not group cancers by AJCC stage, but instead groups cancers into local, regional, and distant stages [(10,11)].

The criteria of the age groups chosen were those used for the international standard cancer patient population [(12)]**.** With age been categorized into three groups (0–54, 55–69 and 70+ years).

The sex was examined as a potential confounding variable for NHL for presentation of some descriptive results.
The final number of included subjects was 412 Non-Hodgkin Lymphoma (NHL) (male and female patients).

Study design:
A retrospective (*historical cohort*) based on cancer registry and prospective (*concurrent cohort*) based on cancer patients follow up was used in this study.

A five-year retrospective review of cancer records from the year 2010 to 2014 was conducted.

Statistical Analysis:
Three of the most commonly reported outcome measures are estimated in this study: the incidence, the mortality, and the case fatality rate.

Cancer incidence, (i.e. The rate at which newly diagnosed cases occur in the population per unit of time), is the single most important measure of the cancer occurrence [13]. Cancer mortality, the rate at which deaths due to cancer occur in the populationper unit of time. Cancer incidence and mortality are usually reported as the number of events per 1,000 or 100,000 person-years [14]. Other statistical method; the case fatality rate,(i.e. A number of specific cancer deaths during one year in total cancer cases during that year per 100) according to the each year of the period 2010 – 2014[14]. Chi-square test for independence is an important method for determining if there is a relationship between variables, was used to study the relationship between sex variable and some results [15].A P-value of ≤ 0.05 was considered to denote statistical significance.

RESULTS

Many patients with NHL were ≤54 years;255 cases (61.9%).The distribution of the NHL cases shows;it was not possible to determine the stage for 204 (49.5%) cases, a very high proportion, 132 (32.1%) of all cases are of distant stage. Male cases more than female cases in all the period of the study; 2010 to 2014, with a p value < 0.001, this result was statistically significant at p value ≤ 0.05.

Table 3.1: The distribution of the NHL cases, according to age, stage and sex of disease (2010-2014)

NHL N= 412		Year of diagnosis					Total	%
		2010	2011	2012	2013	2014		
Age	0-54	43	62	56	54	40	255	61.9
	55-69	16	33	22	23	18	112	27.2
	70+	5	9	13	10	8	45	10.9
Stage	Local	2	6	10	11	2	31	7.5
	Regional	3	22	11	6	3	45	10.9
	Distant	17	34	30	33	18	132	32.1
	Unknown	42	42	40	37	43	204	49.5
Sex	Male	34	66	48	59	37	244	59
	Female	30	38	43	28	29	168	41

Table 3.2shows the deaths of NHL cases, according to age, stage of cancer and sex, in whichthe majority of the NHL deaths at the age ≤ 54 years were 63.1%, also most of death occurs in distant stage; 54 (34.0%) of thedeaths,while (57%) of NHL deaths was in the males, with no statistical significance was seen by sex difference deaths as a p value ≤ 0.05 and a score of 0.094.

Table 3.2: The deaths of the NHL, according to age, stage and sex of disease (2010-2014)

NHL N= 157		Year of diagnosis					Total	%
		2010	2011	2012	2013	2014		
Age	0-54	24	21	17	18	19	99	63.1
	55-69	5	6	9	10	7	37	23.6
	70+	4	7	4	3	3	21	13.4

Stage	**Local**	2	1	1	1	1	6	4%
	Regional	2	2	3	3	3	13	8%
	Distant	12	13	10	10	9	54	34%
	Unknown	17	18	16	17	16	84	54%
Sex	**Male**	19	20	15	18	17	89	57%
	Female	14	14	15	13	12	68	43%

In table 3.3 the incidence rates of NHL had the top out figure 3.3 per100000 at 2011 and the lowest one was seen in 2014, of 1.9 per100000. While having a highest case fatality rate (CFR) of 51.6 % at 2010, of the study period, mortality rates of NHL were near to each other except in 2014 in which the lowest mortality rate was seen as 0.8 per100000 of the population.

Table 3.3: The incidence rate, the case fatality rate and mortality rate of NHL for the period from 2010 – 2014

Site of Cancer	Rate	Year ofdiagnosis				
		2010	**2011**	**2012**	**2013**	**2014**
NHL (N=412)	**Incidence Rate /100000**	2.1	3.3	2.7	2.5	1.9
	Case Fatality Rate%	51.6	32.7	33.0	35.6	43.9
	Mortality Rate/ 100000	1.1	1.1	0.9	0.9	0.8

DISCUSSION

The aim of the present study is to examine the incidence and various mortality rates patterns of the patients with NHL in Nineveh Province.

The ultimate objective of all cancer programs is to decrease the mortality rate from cancer as minimum as possible. Tumors of NHL represent 412 cases were recorded, with a male to female ratio of 1.5:1.The distribution of the NHL cases shows, male cases more than female cases in all the period of the study; 2010 to 2014, with a p value score < 0.001 and statistically significant at a p value ≤ 0.05.

The incidence rates of NHL had the top out figure 3.3 per100000 at 2011 and the lowest one was seen in 2014 of1.9 per100000. While having a highest case fatality rate (CFR) of 51.6 % at 2010, of the study period, mortality rates of NHL were near to each other except in 2014 in which the lowest mortality rate was seen as 0.8 per100000 of the population.Male deaths of NHL were more than female deaths. However, there was no statistical significance seen as a p value ≤ 0.05 and a score of < 0.094. In the NHL, the overall case fatality rate of female 40.5% was not so higher than in male 36.5% and showed no statistical significance differences, of a p value score 0.411.

For NHL, the proportion of patients aged 0-54 years was relatively high (61.9%). This was also similarly seen in Cuba [16], while it rises steeply with age ≤54, reaching an overall peak in the 85-89 age group in the UK[17]. The majority of the NHL deathswere in 0-54 yearage group (63.1%). This finding was also seen in another study[18].

Annual incidence rates were estimated for each period of the NHL from 2010 until 2014. Whereas, the NHL had the highest incidence rate in 2011 of (3.3 per 100000) and the lowest one (1.9 per 100000) in 2014.

According to the analyses of sex relations in this investigation, NHL showed a strong male predominance.While NHL had small differences between the male and female case fatality rates, as was seen in US 11.510 deaths in 41.730 cases of male and 8.400 deaths in 32.950 cases in female of NHL [19].Moreover, in Izmir, Turkey, males was affected more than females by 1.3 to 1 ratio and were distinguished by higher case fatality rate [20].

CONCLUSION

Cancer is currently one of the major public health problems in Nineveh.
Many patients with NHL were ≤54 years and the majority of the NHL deaths in 0-54 year of age. The study revealed that, NHL showed a strong male predominance.

The overall case fatality rate of female showed no statistical significance differences than in male.

RECOMMENDATIONS

- This provided an important information about cancer forms in Iraq, which can be useful in planning and establishing control programs for the common cancers, which can be amenable to prevention, early detection and cure.
- Proper documentation system in Iraqi hospitals is important, to achieve proper management measures.
- The report of new cancer cases to the cancer registry must be licensed by the law and the cancer registry center must be receives copies of all death certificates where the cancer is discovered.
- To successfully control the cancer, must be there a national cancer plan, introduced by the government and implemented in all Iraq provinces to attain proper management standards in our country.

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