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PREVALENCE OF LYMPHOMA CANCER IN PUNJAB, PAKISTAN

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Abstract

Pakistan has a high magnitude of cancer from its independence. The burden of lymphoma cancer continues to increase in Pakistan. The low socioeconomic districts of Punjab such as those in Faisalabad most severely affected by lymphoma. The objective of this study was to analyze the lymphoma cancer registry record of patients from the districts in Faisalabad in order to achieve a net lymphoma incidence for use in raising future health program against cancer. The medical records of 110 patients registered at the Punjab Institute of Nuclear Medicine in Faisalabad were investigated. Information regarding age, gender, socioeconomic status, affected sites and cancer type were obtained. Among 110 cases of lymphoma cancer, the male: female ratio was 3:1, with an age range of 5-85 years. Of the 110 patients, 74% were male and 26% were female. Similar to the subtype distribution of lymphoma in the different areas of Faisalabad and its surroundings, Non-Hodgkin's lymphoma (NHL) was more frequent, 74 cases (67%) than Hodgkin's disease (HD), 36 cases (33%). The leading cancers were breast 36% (n=248), lymphoma 16% (n=110), and prostate cancer 10% (n=68). The growing burden of cancer especially lymphoma in Faisalabad is extremely alarming. Since the current work was an initial investigation, it could play a leading role in prevention and future planning regarding the battle against lymphoma in Pakistan.

Keywords: cancer in Pakistan; incidence rate; site-wise cancer registry

Introduction

Pakistan has been facing a great number of cancer incidences, from the day of independence in 1947 to the present. The elevating load of non-communicable diseases throughout the world warrants an immediate public health reaction, particularly for Pakistan. Many cancer registries are working in the Pakistan to diagnose and provide best perceptive treatment. But Pakistan lack of a national level cancer registration schemes so the exact death ratio and number of new cases of any type cancer is difficult to measure at the national and community levels.

Lymphoma is the fifth most common malignancy present among the both genders of all age groups throughout the world. Lymphomas are diverse group of cancers that are expressed by abnormal growth of cells in the lymphatic system. These cancers develop from B-lymphocytes, T-lymphocytes, and natural killer (NK) cells. The initial identification of lymphomas as specific clinical entities is mostly ascribed to Thomas Hodgkin's observations. There are two major types of lymphomas Hodgkin and Non Hodgkin. Both these types can be differentiated on the basis of presence of specialized Reed Sternberg cells in diseased

tissue that are only present in the Hodgkin lymphoma (Reed 1902).

In Pakistan, the incidences of lymphoma patients are increasing tremendously therefore large amount of clinical data about lymphoma is available. This data is helpful in developing a deeper understanding of risk factors, prognostic factors and in determining the recent trends of lymphoma cancer. The medical records of all patients attending PINUM during June 2010 to June 2011 have been studied. The 690 files of already diagnosed malignant patients were studied. Out of 690 patients, 110 (16%) patients were diagnosed with lymphoma cancer. Out of 110 lymphoma cases, 36 cases of Hodgkin Lymphoma and 74 cases of Non Hodgkin Lymphoma were observed. Gender based study showed that among 110 patients, 81 (74%) were male and 29(26%) were female. Patient age ranged from 7 years to 85 years, mean age being 46 years.

Faisalabad also known as the Manchester of Pakistan, the third largest city of Pakistan and the second largest with the population of almost 5429547 in the province Punjab. It is situated in the north east of the province Punjab. The occurrence of lymphoma in various parts of Faisalabad and among distinctive ethnic groups such as the Punjabis,

Pashtun (Pathan) and Urdu-speaking peoples has also been highlighted. The overall purpose of this study was to collect and analyze the lymphoma cancer related data in order to report the recent trends of lymphomas regarding the low socioeconomic areas of Pakistan especially from Punjab.

Methods

The study was carried out at the Punjab Institute of Nuclear Medicine (PINUM), Faisalabad. All the neoplasm of lymphoma was retrieved from the tumour registry files of PINUM, Faisalabad between the periods of June 2010 to June 2011. The lower socioeconomic area of Faisalabad division and its surroundings was chosen for this study. The medical records of 690 patients were analysed, and information on tendency of tumour, spread of tumour, and site of tumour were obtained. The residential status of patient was verified and rechecked. The cases of lymphoma cancer were classified according to REAL/ World Health Organization classification pattern of hematopoietic and lymphoid tumours (Kalyan *et al.*, 2006). For this purpose, a Performa was designed to collect the data from the cancer registry files of PINUM by taking in consideration the best possible parameters and filled by extracting information from the patient's record files. The variables inscribed were: hospital patient number, sex, age, date of incidence, history with diabetes and hypertension, family history, site address, cancer type and sub type of lymphoma.

Mislaid information was assembled telephonically and by visiting patients. Data related to possible risk factors and prognostic factor was also collected. The data was gathered according to maintain the data standards and coding instructions.

Result

Total 690 patients of cancer were analysed. The breast cancer was observed as the most leading type of cancer with 36% (n=248) and followed by the lymphoma with 16% of all malignancies at PINUM (Fig. 1). The 110 cases of malignant lymphomas were classified according to WHO classification were included in this study. Out of 110

lymphoma patients 74% (n=81) were male and 26% female patients were observed. The male to female ratio was 3:1 for almost all types of lymphoma cancer. Non-Hodgkin's lymphoma (NHL) was more frequent, 74 cases (67%) than Hodgkin's disease (HD), 36 cases (33%) lymphomas were reported amongst patients with an age range of 5 to 85 years (Fig. 2).

The lymphoblastic lymphoma, Burkitt's lymphoma and Hodgkin's lymphoma were most frequently seen among children. Thirty six cases (33%) of Hodgkin's disease (HD) were found. The mixed cellularity was the most frequent (22% of total 67% of HD) followed by nodular sclerosis (6% of total and 5% of HD). The two cases of lymphocytic depletion and a single case of lymphocyte rich Hodgkin lymphomas were found (Table 1). Mostly the Highest number of cases of Hodgkin lymphoma was observed between the age group of less than fifteen years.

In the Non-Hodgkin lymphomas group, total 12 patients of Lymphoblastic Lymphoma were found out of which 75% (n=9) were B cell Lymphoblastic lymphomas and 25% (n=3) T cell Lymphoblastic Lymphoma (n=24) were observed. Total 47 cases of the B cell Non Hodgkin lymphomas were seen, 26 cases were diagnosed as Diffuse large B cell lymphoma (55%), followed by follicular lymphoma 17% (n=8) and 5cases (11%) of Burkett's lymphoma. 3 cases (6%) were diagnosed as CLL/SLL. Mantle cell lymphoma and extra nodal marginal zone lymphoma each had two cases reported (Table 1). Of the diffuse large B cell lymphoma, one case of lympho plasmacytic lymphoma was reported. The T cell lymphomas were rare (20%). With 6 cases, Peripheral T cell lymphomas were the 40 % followed by anaplastic large cell lymphoma 33% (n=5) of all Tcell lymphomas. Three cases of cutaneous T cell lymphomas and a single case of angioimmunoblastic lymphoma was reported. Malignant lymphoma of paediatric age group (<15 years) was seen in 77 patients where Hodgkin's disease (14cases) was most frequent, followed by 05 cases of Lymphoblastic (03 cases of B and 2 of T cell type) and Burkitt's lymphoma each.

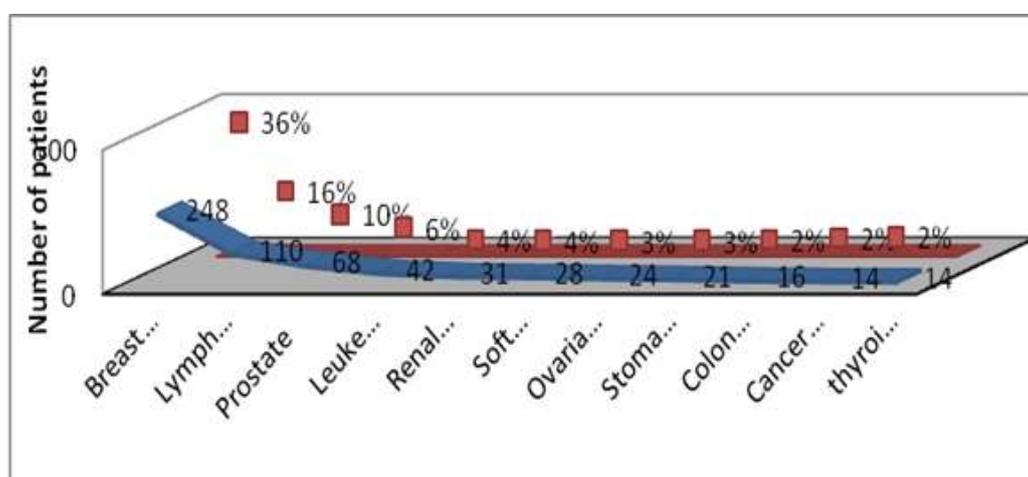
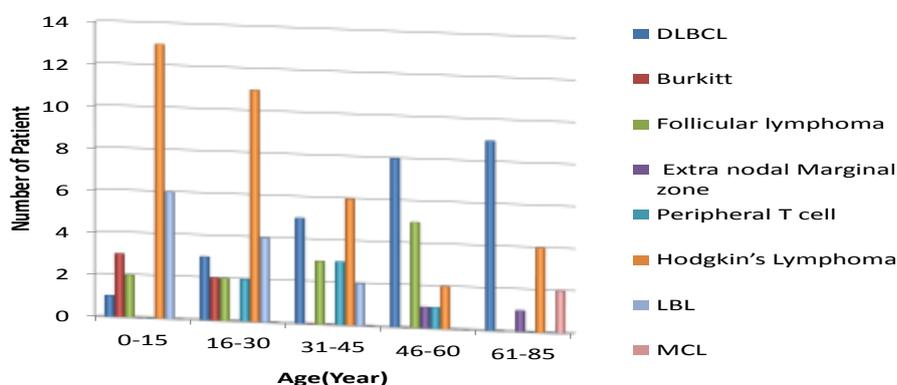


Fig. 1: Types of cancer with percentage observed at PINUM

Table 1: Major classes of lymphoma

Type and sub Type	Total	Male	Female
Non Hodgkin Lymphoma	74	53	21
B- Cell Lymphoid Neoplasms	47	32	15
DLBCL	26	17	9
Follicular lymphoma	8	6	2
Extra nodal Marginal zone	2	2	0
CLL/SLL	3	2	1
Burkitt's	5	4	1
Mantle cell	2	1	1
Lympho plasmacytic	1	0	1
T/NK Lymphoid Neoplasm	15	12	5
Cutaneous T cell	3	2	1
Angioimmunoblastic	1	0	1
Anaplastic large cell	5	4	1
Peripheral T cell	6	4	2
Lymphoblastic Lymphoma	12	9	4
B – cell	9	6	3
T – cell	3	2	1
Hodgkin's Lymphoma	36	29	7
Nodular Sclerosis	7	6	1
Mixed Cellularity	24	19	5
	3	2	1
Lymphocyte depleted	2	2	0
Lymphocyte rich			

**Fig. 2:** Various sub types of lymphoma cancer in different age groups seen at PINUM

Discussion

The current work was a preliminary investigation of lymphoma cancer in the Faisalabad in the Punjab of Pakistan. The data show information with relation to the most influenced persons, specifically age-wise, gender-wise and site-wise. Lymphoma was observed as 16% of all types of cancer seen at PINUM Faisalabad during 2010 to 2011. The data comprised patients of all ages and both sexes. About 70- 100% cases of lymphoma cancer were found in the areas with low socioeconomic status of the developing countries while only 30-50% cases of lymphoma were in the developed countries (Naresh *et al.*, 2000; Dinand *et al.*,

2006). In developing countries lymphoma might be attained at the early years of life, and this compounded by the lower socioeconomic status might act as a key player in modifying the immunological status of the lymphoma affected children. Thus poverty, age and ethnicity may function as biological attributes that could account for in lymphomas (Naresh *et al.*, 2000).

Sex wise distribution revealed that men were more affected than women: 81(74%) of the patients were male and 29 (26%) were female. This high frequency of cancer in males as compared to females is alike with a study from Karachi, which reported 54% of males and 46% of females. With

regard to age, predominant studies have discovered higher rates of Hodgkin lymphoma between children as contrast to adult onset (Lukes *et al.*, 1996). The most significant and probable reasons for this high rate of lymphoma are lack of awareness, life style, high burden of work and financially poor status of people in Punjab especially in Faisalabad.

Only 29 female patients of lymphoma cancer were observed most of them were 41-50 years of age and the second most influenced age group was 51-60 years. Majority of patients belong to gender male with age group was 51–60 years and followed by the age group between 61 to 70 years. The lymphomas were rarely seen in male with the age between 11-20 years. This systematic arrangement was mainly based on the affected sites.

The data was organized on the basis of primary infected site by cancer reveal that cancer of breast and lymphatic vessels sites was the most common among the patients at PINUM. Particular type of cancers included breast cancer, Hodgkin's lymphoma, non-Hodgkin's lymphoma, myeloid leukaemia and multiple myeloma. This work encourages a report of the International Network of Cancer Treatment and Research 11 considering the high rate of lymphoma incidences. The second leading cancer in our study was that of the lymphatic system with 16% of all cancer observed. Various types and subtypes of Hodgkin and non-Hodgkin lymphoma are easily sorted by using WHO systematic arrangement pattern with the help of immunohistochemical techniques (Turner *et al.*, 2004).

Immunohistochemical techniques act as ancillary tests in the diagnosis of lymphoid malignancies. In most of the cases reported in this study, the outcomes of the immunohistochemistry carry the morphological diagnosis and just few in number did the consequences vary? There are small percentages of lymphoid malignancies where morphology alone is so deceptive, that it is difficult to determine the cases to be, Hodgkin or Non-Hodgkin lymphoma on morphology alone (Hartge *et al.*, 1994). Immunohistochemistry techniques provide very significant information about the prognostic factors and act as a key player for pathologists and oncologists to classify the lymphomas as B and T cell type (Akpek *et al.*, 2000). Updated WHO classification scheme helps the oncologists to classify lymphomas into B and T cell types and identifying special entities (Turner *et al.*, 2004; Shivarov *et al.*, 2005).

The rate of lymphoma especially Hodgkin's lymphoma has not altered much, when compared to our prior analysis (Ahmed *et al.*, 1993) and same results were observed here. The frequency of B and T cell Non-Hodgkin lymphomas was same as observed in the previous Pakistani studies. T cell lymphomas have been reported greater in number in Pakistan as compared to western studies but generally T cell lymphomas are less frequent all over the world excluding

the Far East Asian countries due to unfamiliar reasons (Khan *et al.*, 1993; Khan *et al.*, 1995; Muzaffar *et al.*, 1997; Aziz *et al.*, 1999)

Anyway identification and diagnosing various subtype of T cell lymphomas according to WHO classification gives vital prognostic information. As generally the prognosis of T cell lymphomas is poorer than B cell lymphomas (Lee *et al.*, 2005).

Diffuse large B cell lymphoma is the most common malignant Amongst the B cell lymphomas, is the commonest malignant lymphoma around the world (Chiu and Weisenburger, 2003; Fisher and Fisher, 2004), and the same was observed in the present study. These results were not much different when compared to the rate of large cell lymphomas in previously conducted studies in Pakistan. The second most common Non- Hodgkin lymphoma in this study was follicular lymphomas which were similar to the studies reported in an earlier work in Karachi (Ahmed *et al.*, 1993; Khan *et al.*, 1993; Aftab *et al.*, 2006). Pakistan has developed National Cancer Control Program (NCCP) in 1994, but not openly accessible to the people and medical services provider so the negligible information has been made available to related doctors and persons. The efficiency of NCCP will based on the availability of accurate cancer related information with numerical facts (Bhurgri, 2004; Nishtar *et al.*, 2004). To-date very small attempt has been made at creating reactivity to its current status, goals, functions in the long run, and its execution therefore far as per WHO acceptable outline (World Health Organization, 2002).

Conclusion

In conclusion, Data from hospital-based registry files practices hint that patients with more low socioeconomic status may be at high risk of developing lymphoma, whereas population based studies have not exhibit an increased risk across all poor. The accurate incidences, death rates, number of new cancer cases per annum for the every part of the country and in the districts of Faisalabad are mysterious.

In Pakistan no extensive factual and valid information is available about the frequency of lymphoma. For obtaining precise estimated risk of lymphoma cancer long range data in wide numbers of patients are needed. For prevention against the lymphoma occurrence Pakistan should begin impressive public awareness campaign, registration of cancer prevalence and incidence especially in the low socioeconomic region of the Punjab a about lymphoma cancer should begin immediately at regional level. The main hub of this preliminary study was to identify the appropriate or 'big picture' of selected regions of Pakistan in terms of frequency and trend of lymphoma. The outcomes from this preliminary study have begun to clarify

the increasing trend of lymphoma in low socioeconomic areas.

References

- Aftab K, Bhurgri Y and Pervez S (2006) Small B cell non-Hodgkins lymphoma in Pakistan. *J. Pak. Med. Assoc.* **56**: 22-25.
- Ahmed M, Khan A and Mansoor A (1993) Non – Hodgkin’s lymphoma: Perspective in Pakistan (Monograph) Ist Ed, AFIP Publication, Rawalpindi.
- Akpek G, Seifter EJ and Borowitz MJ (2000). A clinician’s guide to the updated REAL/WHO classification of non-hodgkin’s lymphoma: part II (aggressive lymphomas).*Turkish J. Cancer* **30**: 53-67.
- Aziz Z, Rehman A, Akram M and Saeed A (1999). Non-Hodgkin's lymphoma in Pakistan: a clinicopathological profile of 175 patients. *J. Pak. Med. Assoc.* **49**: 1.
- Bhurgri Y (2004) The role of cancer registration in National Cancer Control Pakistan. *J. Pak. Med. Assoc.* **54**: 402-404.
- Chiu BC and Weisenburger DD (2003) An update of the epidemiology of non-Hodgkin's lymphoma. *Clin. Lymphoma* **4**: 161-168.
- Dinand V and Arya LS (2006) Epidemiology of childhood Hodgkin’s disease: Is it different in developing countries? *Indian Pediatrics* **43**: 141-145.
- Fisher SG and Fisher RI (2004) The epidemiology of non-Hodgkin's lymphoma. *Oncogene* **23**: 6524-34.
- Hartge P, Devesa SS and Fraumeni JF Jr (1994) Hodgkin's and non- Hodgkin's lymphomas. *Cancer Surv.* **19**: 423-53.
- Kalyan K, Basu D and Soundararaghavan J (2006) Immunophenotyping of Hodgkin's disease--an aid to its classification. *Ind. J. Pathol. Microbiol.* **49**: 173-177.
- Khan MA, Ahmad M, Mushtaq S, Mamoon N and Khan AH (1995) Immunophenotypes of Diffuse large cell lymphoma. *Pak Armed Forces Med. J.* **45**: 32 –37
- Khan MS, Ahmad M, Khan AH, Mushtaq S (1993) Immunophenotyping of non–Hodgkin’s Lymphomas: a study of 100 cases in Pakistan. *Pak Armed Forces Med. J.* **43**: 5-12.
- Lee MY, Tsou MH, Tan TD and Lu MC (2005) Clinico pathological analysis of T-cell lymphoma in Taiwan according to WHO classification: high incidence of enteropathy type intestinal T-cell lymphoma. *Eur. J .Haematol.* **75**: 221-226.
- Muzaffar S, Pervez S, Aijaz F, Aziz S and Hasan SH (1997) Immunophenotypic analysis of non-Hodgkin’s lymphoma. *J. Pak. Med. Assoc.* **47**: 106-109.
- Naresh KN, Advani S, Adde M, Aziz Z, Bavali S, Bhtia K, Belgaumi A, et al. (2004) Report of an International Network of Cancer Treatment and Research workshop on non-Hodgkin’s lymphomain developing countries. *Blood Cell Mol. Dis.* **33**:330–337.
- Naresh KN, Johnson J, Srinivas V, et al (2000). Epstein-Barr virus association in classical Hodgkin’s disease provides survival advantage to patients and correlates with higher expression of proliferation markers in Reed-Sternberg cells. *Annals Oncol.* **11**: 91-96.
- Nishtar S, Ahmed A, Bhurgri Y, et al (2004). Prevention and control of cancers: National Action Plan for NCD Prevention,Control and Health Promotion in Pakistan. *J .Pak. Med. Assoc.* **54 (Suppl 3)**: S45-56.
- Shivarov V, Dimitrov J and Guenova M (2005) Lymphoid neoplasms in Bulgaria according to the WHO classification (2001). The experience of the National Center of Haematology. *Haematologica*, 90 (Suppl)
- World Health Organization (2002) Managing a National Cancer Control Program. 2nd edition. Part III. pp 114-47.