

## A pattern of lymphadenopathies seen in a tertiary care hospital in Lahore, Pakistan

Sobia Sadiq NASEEM<sup>1</sup>, Abdul H.NAGI<sup>2</sup>, Muhammad ASHRAF<sup>3</sup>, Saira BİLAL<sup>4</sup>,  
Maham AKHLAQ<sup>4</sup>, Nausheen HENNA<sup>4</sup>, Waqas SAMI<sup>5</sup>

**Aim:** This cross sectional study was conducted to assess various clinicopathological parameters in 1785 patients from various regions of Punjab.

**Materials and methods:** These cases were collected from Gulab Devi Chest Hospital, Lahore, Pakistan. The data were collected from all patients during a period of 2 years, from June 2006 to June 2008. All the cases were diagnosed after routine hematoxylin and eosin staining.

**Results:** Our observations revealed that the most prevalent lymphadenopathy in these patients was tuberculous lymphadenitis 53% (n = 946), and the most common group of lymph nodes involved is cervical lymph nodes. A significant association was observed between tuberculosis and gender ( $P < 0.01$ ) as 69.13% (n = 654) of the females presented with tuberculous lymphadenitis that was seen only in 30.86% (n = 292) of the males. Hodgkin's lymphoma was seen in 72 (4.03%) and non-Hodgkin's lymphoma in 27 (1.51%) patients. These lymphomas were seen more in the male patients as compared to the female ones ( $P < 0.008$  and  $< 0.043$ , respectively). However, in the remaining lymph nodes non-specific inflammatory conditions of the lymph nodes (non-specific lymphadenitis, non-caseating granuloma and reactive hyperplasia), were seen with no difference in the distribution of disease in male or female,  $P$  value  $< 0.636$ ,  $< 0.8267$ , and  $< 0.7507$ , respectively. A significant association was observed between metastatic lymph nodes and gender  $P$  value being  $< 0.01$  as 68.70% (n = 90), were males whereas 31.29% (n = 41) were females.

Mean age of the patients with tuberculosis was 34 years. On the other hand, both Hodgkin's and non-Hodgkin's lymphomas were seen more prevalent in the second and third decades of their lives. Mixed cellularity and diffuse small cell lymphoma were the commonest histopathological subtypes among Hodgkin's and non-Hodgkin's lymphoma, respectively.

**Conclusion:** Tuberculosis is more common in females ( $P < 0.01$ ) whereas lymphomas ( $P < 0.008$  in Hodgkin's lymphoma and  $P < 0.043$  in non-Hodgkin's lymphoma) and metastatic carcinoma are more common in males ( $P < 0.01$ ). The commonly occurring histopathological subtypes of both Hodgkin's (mixed cellularity) and non-Hodgkin's lymphoma (diffuse small cell) in our study differ from those in Western countries.

**Key words:** Tuberculous lymphadenopathy, cervical lymphadenopathy, Hodgkin's lymphomas, non-Hodgkin's lymphoma, metastatic carcinomas

Received: 09.02.2010 – Accepted: 30.06.2010

<sup>1</sup> C/O Mr. Naeem Asad.1815 Bagley Dr., 08, Lawrence, Kansas, 66044 - U.S.A

<sup>2</sup> Pathology Department University of Health Sciences Lahore - PAKISTAN

<sup>3</sup> Histopathology Department, Head of the Pathology Department Gulab Devi Chest Hospital Lahore - PAKISTAN

<sup>4</sup> University of Health Sciences Lahore - PAKISTAN

<sup>5</sup> Biostatistics Department, University of Health Sciences Lahore - PAKISTAN

**Correspondence:** Sobia Sadiq NASEEM, C/O Mr. Naeem Asad.1815 Bagley Dr., 08, Lawrence, Kansas, 66044 - U.S.A

E-mail: sobia259@yahoo.com

## Introduction

Tuberculosis kills about 2 million people each year (1) and is more prevalent in developing countries (2). The diagnosis of tuberculosis is mostly clinical, and wherever facilities are available, it is diagnosed by histopathological means of lymph node biopsy (2). Clinical diagnosis is easy when features like matting, ulceration, sinuses, caseation, and liquefaction are present. However, in early cases and some of the late cases these features are absent, resulting in diagnostic difficulties (3). Sometimes cases diagnosed as chronic non-specific lymphadenitis show positive cultures of mycobacteria; this is because early tuberculous cases could not be recognized on histopathology since the formation of granuloma and emergence of classical histological picture is a late phenomenon (4). Infectious agents, immunological reactions, and various other stimuli may cause reactive changes in lymph nodes. While some of these reflect the underlying abnormality of the immune system and cell control process, others are related to viral infections (5).

Hodgkin's lymphoma is relatively rare and its incidence varies with geographic location (6). WHO classified Hodgkin's lymphoma into 5 subtypes as lymphocyte rich, nodular sclerosis, mixed cellularity, lymphocyte depleted, and lymphocyte predominance (7,8). Hodgkin's lymphoma is characterized histopathologically by the presence of Classic Reed-Sternberg cells and/or its variants (9). The annual incidence of non-Hodgkin's lymphoma is increasing by 3% to 4% in different parts of the developed countries (10). It constitutes a large and heterogeneous group of malignant tumors (11). Secondary lesions in lymph nodes are in the form of metastases (5). Tumor cells spread from primary tumors to form distant metastatic deposits by both lymphatic and blood routes (12). The present study is an attempt to assess various clinicopathological parameters in 1785 patients with lymphadenopathies, from various regions of Punjab.

## Materials and methods

This is a cross sectional study conducted in the department of Morbid Anatomy and Histopathology

at University of Health Sciences, Lahore. It included a total of 1785 cases of lymphadenopathy, collected from Gulab Devi Chest Hospital during a period of 2 years, from June 2006 till June 2008. The cases were diagnosed on the basis of routine hematoxylin and eosin staining.

Paraffin embedded blocks were collected from this 500 bedded tertiary care hospital. From each block, 3-5 micron thick sections were prepared using a Leica Rotary Microtome. One section of each case was collected on frosted slides and stained with conventional hematoxylin and eosin stains. The sections were examined by at least 2 pathologists to reach a final diagnosis.

## Statistical analysis

The data were entered and analyzed using SPSS 16.0. Mean  $\pm$  S.D is given for quantitative variables. Frequencies and percentages were given for qualitative variables. Pearson chi-square was applied to observe associations between qualitative variables. A P value of  $<0.05$  was considered to be statistically significant.

## Results

Among the total lymph nodes included in this study ( $n = 1785$ ), 87.11% ( $n = 1555$ ) were inflammatory in nature, 7.33% ( $n = 131$ ) were metastatic, 4.03% ( $n = 72$ ) were Hodgkin's lymphoma, and 1.51% ( $n = 27$ ) were non-Hodgkin's lymphoma. Sites of lymph nodes involved by various pathological conditions of lymph node are listed in Table 1.

## Gender

A significant association was observed between tuberculosis and gender with a P value  $<0.01$  as 69.13% ( $n = 654$ ) of the females presented with tuberculous lymphadenitis whereas only 30.86% ( $n = 292$ ) of the males were affected. No significant association was observed between non-specific lymphadenitis and gender, the P value being  $<0.636$ , as it was seen in 50.68% ( $n = 185$ ) males and 49.31% ( $n = 180$ ) females. No significant association was observed between reactive hyperplasia and gender, the P value being  $<0.7507$  as it was found in 56.69% of the males and in 43.30% of the females. No significant association was observed between non-tuberculous

Table 1. Various pathological conditions of the lymph nodes along with the sites of lymph nodes involved.

| Site            | Pathological conditions in lymph nodes |                         |                            |                |                          |                    |                  |
|-----------------|--|-------------------------|----------------------------|----------------|--------------------------|--------------------|------------------|
|                 | T.B<br>n (%)                           | N-C. Granuloma<br>n (%) | Ch.non.sp<br>lymphadenitis | R.H<br>n (%)   | Chol. Granuloma<br>n (%) | Lymphomas<br>n (%) | Metastatic nodes |
| Cervical        | 649(68.60)                             | 84 (70)                 | 284(77.80)                 | 89(72.95)      | 0(0)                     | 43(59.72)          | 60(45.80)        |
| Axillary        | 68(7.18)                               | 9(7.5)                  | 36(9.86)                   | 21(17.21)      | 1(50)                    | 9(12.5)            | 21(16.03)        |
| Inguinal        | 8(0.84)                                | 0(0)                    | 14(3.83)                   | 1(0.81)        | 0(0)                     | 0(0)               | 3(2.29)          |
| Submandibular   | 56(5.91)                               | 10(8.33)                | 8(2.19)                    | 7(5.73)        | 1(50)                    | 1(1.38)            | 2(1.52)          |
| Submental       | 7(0.73)                                | 1(0.83)                 | 3(0.82)                    | 1(0.81)        | 0(0)                     | 0(0)               | 0(0)             |
| Supraclavicular | 151(15.96)                             | 14(11.66)               | 18(4.93)                   | 3(2.45)        | 0(0)                     | 16(22.22)          | 45(34.35)        |
| Preauricular    | 3(0.31)                                | 0(0)                    | 0(0)                       | 0(0)           | 0(0)                     | 0(0)               | 0(0)             |
| Mediastinal     | 1(0.10)                                | 2(1.66)                 | 1(0.27)                    | 0(0)           | 0(0)                     | 1(1.38)            | 0(0)             |
| Paratracheal    | 1(0.10)                                | 0(0)                    | 0(0)                       | 0(0)           | 0(0)                     | 0(0)               | 0(0)             |
| Occipital       | 1(0.10)                                | 0(0)                    | 1(0.27)                    | 0(0)           | 0(0)                     | 0(0)               | 0(0)             |
| Postauricular   | 1(0.10)                                | 0(0)                    | 0(0)                       | 0(0)           | 0(0)                     | 0(0)               | 0(0)             |
| Mediastinal     | 0(0)                                   | 0(0)                    | 0(0)                       | 0(0)           | 0(0)                     | 1(1.38)            | 0(0)             |
| Pelvic          | 0(0)                                   | 0(0)                    | 0(0)                       | 0(0)           | 0(0)                     | 1(1.38)            | 0(0)             |
| Total           | 946<br>(60.83)                         | 120<br>(7.71)           | 365<br>(20.44)             | 122<br>(12.89) | 2<br>(0.21)              | 72<br>(4.03)       | 131<br>(7.33)    |

Abbreviations: T.B.=Tuberculosis, N.C. Granuloma= Non-caseating granuloma, Ch.non.sp lymphadenitis= Chronic non-specific lymphadenitis, R.H.= Reactive hyperplasia, Chol Granuloma= Cholesterol granuloma.

granulomatous lymphadenitis and gender, the P value being  $<0.8267$  as it was seen in 52.5% (n = 63) of females and 47.5% (n = 57) of males. There were 2 cases of cholesterol granuloma; both were in females (100%). Among the lymphomas, Hodgkin's disease was found to be more common, 72.72% (n = 72), than non-Hodgkin's lymphoma, 27.27% (n = 27). A significant association was observed between Hodgkin's lymphoma and gender type, the P value being  $<0.008$  as Hodgkin's lymphoma was seen more in males as 72.22% (n = 52) as compared to females, 27.77% (n = 20).

A significant association was observed between non-Hodgkin's lymphoma and gender, the P value being  $<0.043\%$ . In non-Hodgkin's lymphoma males were affected in 74.07% (n = 20) of the cases, and females in 25.92% (n = 7). As regards the metastatic lymph nodes males were involved in 68.70% (n = 90) cases, whereas females were involved in 31.29% (n = 41) of the cases.

### Age

Mean age of tuberculous patients was 34 years, with the youngest patient being 3 years of age and the

oldest 65 years. Mean age of patients with non-specific lymphadenitis was 34 years with the youngest patient 3 years of age and the oldest 65 years. The age range of the patients with reactive hyperplasia in the present study was from 6 to 75 years and mean age was 40.5 years. Mean age of patients with non-tuberculous granuloma was 32 years, with the youngest patient 4 years old and oldest 60 years. There were 2 cases of cholesterol granuloma: one in a 14 year old and the other in a 26 year old. Hodgkin's lymphoma was seen more commonly in the second and third decades of life. Mean age was 44.5 years, with the youngest patient 4 years of age and the oldest 85 years. Non-Hodgkin's lymphoma was also seen more commonly in the second and third decades of life. Mean age was 35 years, with the youngest patient being 5 years of age and the oldest 65 years. The mean age of patients with metastatic nodes was 49 years, with the youngest patient being 13 years old and the oldest 85 years. Clinical features of the pathological conditions are given in Table 2.

Among Hodgkin's lymphoma, mixed cellularity was the most common subtype, seen in 43.05% (n =

Table 2. Clinical features of lymphadenopathies included in this study.

| Clinical features    | H L n (%) | NHL n(%)  | T.B n(%)   | Inf. Conditions n(%) | Metastatic n(%) |
|----------------------|-----------|-----------|------------|----------------------|-----------------|
| Cough                | 24(33.33) | 11(40.74) | 520(54.96) | 125(20.52)           | 50(38.16)       |
| Fever                | 47(65.27) | 17(62.96) | 712(75.26) | 200(32.84)           | 55(41.98)       |
| Swelling             | 31(43.05) | 11(40.74) | 751(79.38) | 174(28.57)           | 36(27.48)       |
| Hepatosplenomegaly   | 2(2.77)   | 2(7.4)    | 0(0)       | 0(0)                 | 0(0)            |
| Chest pain           | 5(6.94)   | 2(7.4)    | 0(0)       | 0(0)                 | 20(15.26)       |
| Anorexia             | 8(11.11)  | 1(3.7)    | 303(32.02) | 0(0)                 | 2(1.52)         |
| Weight loss          | 16(22.22) | 2(7.4)    | 416(43.97) | 0(0)                 | 21(16.03)       |
| ATT                  | 4(5.55)   | 2(7.4)    | 49(5.17)   | 0(0)                 |                 |
| Pleural effusion     | 1(1.38)   | 4(14.81)  | 19(2.00)   | 0(0)                 | 22(16.79)       |
| Mediastinal widening | 6(8.33)   | 3(11.11)  | 0(0)       | 0(0)                 | 0(0)            |
| Dyspnea              | 8(11.11)  | 5(18.51)  | 73(7.71)   | 0(0)                 | 35(26.71)       |
| Opacities            | 0(0)      | 0(0)      | 101(10.67) | 83(13.62)            |                 |
| Smoking              | 0(0)      | 0(0)      | 8(0.84)    | 6(0.98)              | 18(13.74)       |
| Hemoptysis           | 0(0)      | 0(0)      | 4(0.42)    | 0(0)                 | 2(1.52)         |
| Night sweats         | 0(0)      | 0(0)      | 3(0.31)    | 0(0)                 | 0(0)            |
| Hoarseness of voice  | 0(0)      | 0(0)      | 0(0)       | 0(0)                 | 9(6.87)         |
| Dysphagia            | 0(0)      | 0(0)      | 0(0)       | 0(0)                 | 3(2.29)         |

HL; Hodgkin's lymphoma, NHL; Non-Hodgkin's lymphoma, T.B; Tuberculosis, Inf; Inflammatory.

31) patients, followed by nodular sclerosis in 26.38% (n = 19), lymphocyte rich in 19.44% (n = 14), lymphocyte depleted in 8.33% (n = 6), and lymphocyte predominance in 2.77% (n = 2). Among the non-Hodgkin's lymphoma, diffuse small cell lymphoma was the most commonly seen subtype, i.e. 48.14% (n = 13), followed by diffuse large cell lymphoma 37.03% (n = 10), mantle cell lymphoma 7.40% (n = 2), follicular lymphoma 3.70% (n = 1), and plasmacytoid lymphoblastic lymphoma 3.70% (n = 1). Among the various types of tumors metastasizing the lymph nodes large cell carcinoma and poorly differentiated carcinoma were the commonest, both comprising 19.84% (n = 26) each, followed by adenocarcinoma in 13.74% (n = 18), small cell carcinoma in 11.45% (n = 15), non-small cell carcinoma and anaplastic tumor in 7.63% each (n = 10), and many other tumor types.

## Discussion

After decades of decline, tuberculosis has come back (13) and is still one of the most frequently occurring infectious disease worldwide (14). The

results of the present study showed that tuberculosis was the most common disease among the lymph nodes included in this study, making up 53% (n = 946) of all the 1785 cases. A study carried out by Khan et al. from Peshawar reported 37.2% of lymph nodes diagnosed as tuberculous; they also showed that cervical lymph node was most commonly involved site that is also similar to the results of the present study (15). Similar results were observed in another local study performed by Akmal et al. (6). The studies performed in Indian populations showed tuberculous lymphadenitis being the most common lymphadenopathy (2,4) Ilgazlı et al. also showed in their study from Turkey that the most common form of extrapulmonary tuberculosis is lymph nodes. In contrast Ilgazlı et al. revealed that the most common site of extrapulmonary tuberculous lymphadenitis was intrathoracic lymph nodes followed by cervical lymph nodes (16). In a Malaysian study, the most common lymph node pathology was reactive hyperplasia followed by metastatic lymph node (17). Like Asian and North African populations, in the U.S. tuberculous lymphadenitis was found to be more common in females as compared to males (18,19).

As far as the clinical features of inflammatory lymphadenitis are concerned, they may vary from painful to painless lymph nodes and are not much different from the features of tuberculous lymphadenitis (18,20). This is also true for our study. As regards the chronic (non-specific) lymphadenitis, it may be associated with regional bacterial and viral infection or chronic conditions such as rheumatoid arthritis. Another Pakistani reported that non-specific lymphadenitis was seen in only 9.3% of the patients. However, in the present study, this incidence was 20.44% (15). On the other hand, a Malaysian study showed a contrast to the present study in which only 2.18% cases were of non-specific lymphadenitis (17). As regards the reactive hyperplasia the results of the above mentioned studies were in contrast to our results (13.9%), whereas in the present study only 6.83% were diagnosed as reactive lymph nodes (17). Khan et al. from Peshawar reported reactive hyperplasia in 26.7% cases, which is in contrast to our results (15).

The association of Hodgkin's lymphoma with age, gender, and histological types in different countries is shown in Table 3 (6,21-24). In developed countries there is a bimodal distribution of the disease, with the first peak near 20 years of age and the second peak near 55 years of age (24,25). In contrast to the above mentioned studies, the present study and other studies reported from this region do not show any bimodal age distribution; they rather showed clustering of cases in the second and third decades of life (6,26). As regards the non-Hodgkin's lymphoma, Hu et al. showed that men are affected more commonly by non-Hodgkin's lymphoma (27). This is comparable to the present study ( $P < 0.043$ ). A study reported by Greiner et al. showed that diffuse large cell lymphoma constitutes nearly 30% of all

lymphomas and was the most common histological type, similar to the present study (28). Among the non-Hodgkin's lymphomas diffuse large cell type makes up 37.03% of all lymphomas, but in contrast to the above mentioned study it was the second commonest type in the present study (28). The commonest type in our study was diffuse small cell lymphoma, making up 48.14%. As far as the age of patients suffering from non-Hodgkin lymphoma is concerned Izarzugaza et al. showed that age adjusted incidence is increasing rather more rapidly in European adolescents as compared to European children under 15 years of age (11). Similarly in the present study, most of the patients were involved in the second and third decades of life. The distribution of metastatic lymph nodes among both sexes depends upon the tumor type (primary), as metastatic lymph nodes in patients with breast carcinoma will be seen more in female patients and vice versa (5).

### Conclusion

The most common lymphadenopathy in the present study is tuberculous lymphadenitis, and the most common group of lymph nodes involved is cervical lymph nodes among all the lymphadenopathies. Females were more affected by tuberculosis as compared to males ( $P < 0.01$ ). The second largest group of lymphadenopathy was of chronic non-specific lymphadenitis. In both Hodgkin's ( $P < 0.008$ ) and non-Hodgkin's lymphomas ( $P < 0.043$ ) males were more affected than females. Among the Hodgkin's lymphoma, mixed cellularity was the most common subtype and among the non-Hodgkin's lymphoma, diffuse small cell lymphoma was the most common subtype. Metastatic lymph nodes were also more common among males.

Table 3. Distribution of Hodgkin's lymphomas in different parts of the world according to gender, age and type (21-24).

| Parts of the world      | Gender              | Age group    | Types of HL |
|-------------------------|---------------------|--------------|-------------|
| Local study in Pakistan | More in males       | —            | M.C.        |
| Western Europe & U.S.   | Equal in both sexes | Young adults | N.S.        |
| Eastern Europe          | Equal in both sexes | Children     | N.S.        |
| Middle East             | More in males       | —            | —           |
| Present study           | More in males       | Young adults | M.C.        |

HL Hodgkin's lymphoma, M.C. Mixed cellularity, N.S. Nodular Sclerosis.

## Acknowledgements

The authors are thankful to the administration of Gulab Devi Chest Hospital, Lahore, Pakistan, for providing facilities to carry out this work. The authors

are also thankful to Mrs. Sadia Hasnat, Mr. Tanveer, Mr. Shaukat, and Mr. Sameer for their technical help in carrying out this work.

## References

1. Wolf H, Mendez M, Gilman RH, Sheen P, Soto G, Velarde AK et al. Diagnosis of pediatric pulmonary tuberculosis by stool PCR. *Am J Trop Med Hyg* 2008; 79: 893-8.
2. Verenkar MP, Kamath K, Pinto WMJ, Rodrigues S, Pinto RGW. Mycobacteriological study in fine needle aspirates in cervical lymphadenitis. *Indian J Tuberculosis* 1996; 43: 187-9.
3. Dandapat MC, Panda BK, Patra AK, Acharya N. Diagnosis of tuberculous lymphadenitis by fine needle aspiration cytology. *Indian J Tuberculosis* 1987; 34: 139.
4. Jindal N, Devi B, Aggarwal A. Mycobacterial cervical lymphadenitis in childhood. *Indian J Med Sci* 2003; 57: 12-5.
5. Adelusola KA, Sabageh DO, Ukah CO. Lymphoreticular diseases in Nigerians. *Afr Health Sci* 2008; 8: 20-24.
6. Jamal A, Khatoon S, Junejo A, Rasool B. Frequency of Hodgkin's Lymphoma in Patient with Cervical Lymphadenopathy Presenting in a Public Hospital in Pakistan. *J Liaquat Uni Med Health Sci* 2008; 7: 173-6.
7. de Jong D, Bosq J, MacLennan KA, Diebold J, Audouin J, Chasle J et al Lymphocyte-rich classical Hodgkin lymphoma (LRCHL): clinico-pathological characteristics and outcome of a rare entity. *Ann Oncol* 2006; 17: 141-5.
8. Pileri SA, Ascani S, Leoncini L, Sabattini E, Zinzani PL, Piccaluga PP. Hodgkin's lymphoma: the pathologist's viewpoint. *J Clin Pathol* 2002; 55: 162-76.
9. Barakzai MA, Pervez S. CD20 positivity in classical Hodgkin's lymphoma: Diagnostic challenge and targeting opportunity. *Indian J Pathol Microbiol* 2009; 52: 6-9.
10. Masala G, Di Lollo S, Picoco C, Crosignani P, Demicheli V, Fontana A. Incidence rates of leukemias, lymphomas and myeloma in Italy: Geographic distribution and NHL histotypes. *Int J Cancer* 1996; 68: 156-9.
11. Izarzugaza MI, Foucher ES, Martos MC, Zivkovic S. Non-Hodgkin's lymphoma incidence and survival in European children and adolescents (1978-1997): Report from the Automated Childhood Cancer Information System project. *Eur J Cancer* 2006; 42: 2050-63.
12. Barkhordar RA, Berston ED, Ramos DM. Cervical lymph node metastasis: Model for study of head/neck melanoma. *Eur J Cancer* 1995; 31: 49-52.
13. Long NH, Johansson E, Diwan VK, Winkvist A. Different tuberculosis in men and women: beliefs from focus groups in Vietnam. *Soc Sci Med* 1999; 49: 815-22.
14. Geldmacher H, Taube C, Kroeger C, Magnussen H, Kirsten DK. Assessment of Lymph Node Tuberculosis in North Germany. *Chest* 2002; 121: 1177-82.
15. Khan KN, Javaid A, Ahmad H. Lymph node diseases: a histopathological analysis of 86 cases at a tertiary care teaching hospital in Peshawar. *Pak J Chest Med* 2005; 11: 9-12.
16. Ilgazlı A, Boyacı H, Başyigit I, Yıldız F. Extrapulmonary tuberculosis: clinical and epidemiological spectrum of 636 cases. *Arch Med Res* 2004; 35: 435-41.
17. Kim LH, Peh SC, Chan KS, Chai SP. Pattern of Lymph Node Pathology in a Private Pathology Laboratory. *Malays J Pathol* 1999; 21: 87-93.
18. Artenstein AW, Kim JH, Williams WJ, Chung RC. Isolated peripheral tuberculous lymphadenitis in adults: current clinical and diagnostic issues. *Clin Infect Dis* 1995; 20: 876-82.
19. Cailhol J, Decludt B, Che D. Sociodemographic factors that contribute to the development of extrapulmonary tuberculosis were identified. *J Clin Epidemiol* 2005; 58: 1066-71.
20. Chao SS, Loh KS, Tan KK, Chong SM. Tuberculous and nontuberculous cervical lymphadenitis: A clinical review. *Otolaryngol Head Neck Surg* 2002; 126: 176-9.
21. Memon W, Samad A, Shiekh GM. Hodgkins lymphoma in cervical lymphadenopathy. *Pak J Med Sci* 2008; 24: 118-21.
22. Stiller CA. International patterns of cancer incidence in Adolescents Cancer Treatment Review. *Cancer Treat Rev* 2007; 33: 631-45.
23. Mughal TI, Robinson WA, Padmos MA. Adult Hodgkin's disease in Saudi Arabia. *Eur J Surg Oncol* 1985; 11: 41-5.
24. de Alacron PA, Metzger M. Hodgkin Disease: Treatment & Medication. Available from URL: <http://emedicine.medscape.com/article/987101-overview>
25. Liang R, Choi P, Todd D, Chan TK, Choy D, Ho F. Hodgkin's disease in Hong Kong Chinese. *Haematol Oncol* 1989; 76: 395-403.
26. Siddiqui N, Ayub B, Badar F, Zaidi A. Hodgkin's Lymphoma in Pakistan: A clinico-epidemiological study of 658 cases at a cancer center in Lahore. *Asian Pac J Cancer Prev* 2006; 7: 651-5.
27. Hu S, Ma F, Collado- Mesa F, Kirsner RS. Ultraviolet radiation and incidence of non-Hodgkin's lymphoma among Hispanics in the United States. *Cancer Epidemiol Biomarkers Prev* 2004; 13: 59-64.
28. Greiner TC, Medeiros LJ, Jaffe ES. Non-Hodgkin's lymphoma. *Cancer* 2006; 75: 370-80.