Editorial

Childhood Lymphoma and Leukaemia

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Pakistan falls into a low risk region for Non-Hodgkins Lymphoma (NHL) in males and females, graded 1 on a scale of 1-5. Males and females fall into a moderate risk region for leukaemia, graded 2 for males and 3 for females on the same scale (Figure 1).[1] These estimates are based on the data of Karachi South published in the Cancer Incidence in the Five Continents.[2]

Karachi South (KS) is the southern-most district of Karachi with a population of 1,724,915; 929,394 (54%) males and 795,521 (46%) females; annual growth rate of 1.94% as calculated by the Federal Census Bureau.[3] The population distribution of KS is similar to the population distribution of Pakistan as regards age, gender, and religion. KS has the distinction of being the only district in the country with a representation of all ethnic and socio-economic groups of the country. It thus qualifies as a sample population of the country in the absence of other data sources.

The pattern of childhood malignancies in KS is predictable, with the lymphoid and haematopoietic malignancies forming the most common diagnostic group, tumours of the eye and brain forming the second diagnostic group and tumours of the bones forming the third most common malignancy in both genders. Subsequently mesothelial and soft tissue tumours, oral cavity and pharynx, urinary tract, digestive organs and thyroid and endocrine malignancies formed the descending list of malignancies in males (Figure 2). Oral cavity and pharynx are atypical inclusions as childhood malignancies and reflect the high prevalence of associated risk factors. In females, malignancies of the genital system, mesothelial and soft tissue tumours, skin, thyroid and endocrine malignancies and malignancies of the respiratory

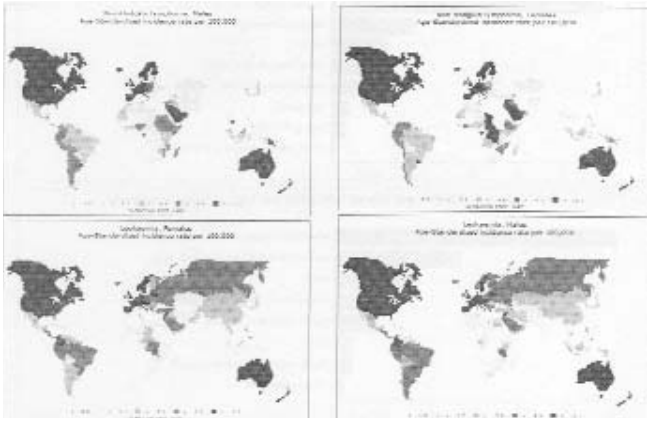

Figure 1. Pakistan falls into a low risk region for NHL in males and females and leukemia in females. Males fall into a moderate risk region for leukemia.

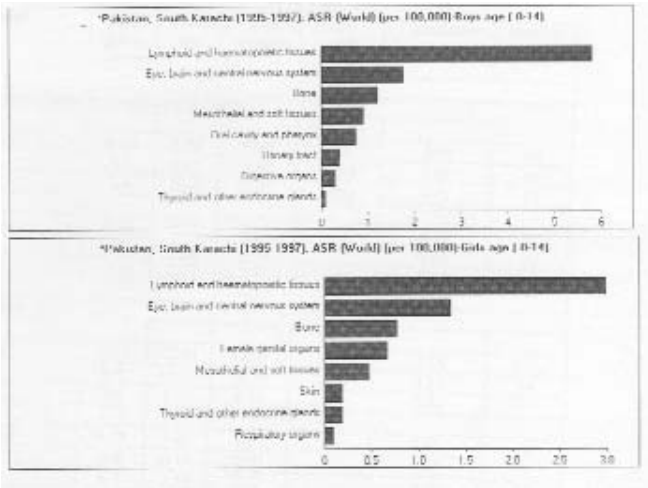

Figure 2. The pattern of childhood malignancies in Karachi

Table. Pakistan, South Karachi (1995-1997).

Gender	Age-group (years)	Crude rate	ASR (World)	Male: Female	Cumulative risk	Number of cases
Lymphoid and haematopoietic tissues						
Males	0-14	5.96	5.80	2:1	0.09	65
	0-9	6.11	5.87	2.3:1	0.06	46
	0-4	3.45	3.45	1.6:1	0.02	13
Females	0-14	3.02	2.99		0.05	31
	0-9	2.76	2.71		0.03	20
	0-4	2.17	2.17		0.01	08
All Sites						
Males	0-14	12.01	12.01	1.7:1	0.18	131
	0-9	11.16	10.89	2.2:1	0.11	84
	0-4	8.23	8.23	2.3:1	0.04	31
Females	0-14	7.21	7.11		0.11	74
	0-9	5.10	4.99		0.05	37
	0-4	3.52	3.52		0.02	13

Lymphoid and haematopoietic tissues malignancies	**0-4**	**5-9**	**10-14**	**0-4**	**5-9**	**10-14**
	ASR-Boys			**ASR-Girls**		
Hodgkin's Disease	0.3	4.5	2.7	0.3	0.3	0.7
Non Hodgkin's Lymphoma	1.1	1.9	1.2	0.3	0.3	0.7
Lymphoid Leukaemia	1.6	1.6	1.2	1.1	2.0	1.0
Myeloid Leukaemia	-	0.5	0.6	0.5	0.6	0.7
Leukaemia nos.	0.5	0.3	-	-	0.3	0.7

tissue tumours, skin, thyroid and endocrine malignancies and malignancies of the respiratory tract formed the hierarchical descending list of tumours (Figure 2).

Lymphoid and haematopoietic tissues malignancies, the most common diagnostic group in children accounted for approximately half (49.6%) of the cases in males and 41.9% of the cases in the females. Males dominated and outnumbered the females 2:1 in the 0-14 year age group, 2.3:1 in the 0-9 group and 1.6:1 in the 0-4 year age group (Table).

Lymphoma

Lymphoma was the most common childhood cancer, accounting for a fifth of the childhood cancer cases. A six times higher risk in males for Hodgkin's disease and thrice the risk for non-Hodgkin's Lymphoma was observed, with a high peak in the 5-9 year age group.

During 1995-2002, a slow upward variation in the annual incidence of NHL was observed.[4] The increase in the incidence affected all age groups in both genders. During this period, the mean age of childhood lymphoma was 7.9 years (95% CI 6.3; 9.4) in males and 8.4 years (95% CI 6.1; 10.6) in females. The youngest male patient was 2 years and the youngest female patient was 3 years; the oldest male and female children were 14 and 13 years respectively. The component of childhood NHL was 10.4% and 9.3% in males and females respectively. The adult to childhood ratio (A:C) was 8.6 in males and 10.7 in females.

Children and adolescents were at the highest risk of developing NHL,[4] 0-4 years OR 4.5 (95% CI 0.3; 6.7) in males, 5.4 (95% CI 0.3; 9.8) in females; 5-9 years, OR 8.9 (95%CI 0.2; 12.2) in males, 10.1 (95% CI 0.2; 16.4) in females and 10-14 years, OR 5.0 (95% CI 0.3; 6.7) in males, 5.8 (95% CI 0.3; 8.2) in females.

The risk factors of non-AIDS-associated NHL are a causal link between infectious agents, and lymphomagenesis, particularly human T-cell leukaemia/lymphoma virus type 1 (HTLV-1) in adult T-cell lymphoma/leukaemia and Epstein-Barr virus (Burkitt lymphoma, sinonasal lymphoma in Asia and South America, lymphomas in immunocompromised patients), Hepatitis C-virus and Helicobacter pylori (gastric MALT lymphoma) infections.[5-7] There is no study from this population giving evidence of the etiological links in the development of primary lymphomas in children in Pakistan.

Leukaemia

Leukaemia formed the second most common childhood cancer diagnostic group, marginally behind Lymphoma. Lymphoid series were responsible for three fourths of the leukaemias' in the males and two-thirds in the females. The myeloid series were responsible for a fourth and a third of the cases in males and females respectively.

Lymphoid leukaemia was seen uniformly distributed in all childhood age-groups in the boys, whereas myeloid leukaemia was seen in the older age groups i.e. 5-9 and 10-14. Similarly in the girls, lymphoid leukaemia though more common in the 5-9 year age group was also registered in other age groups. Myeloid leukaemia was predominantly observed in the older childhood age groups.

References

1. Ferlay J, Bray F, Pisani P, Parkin DM (2004) Globocan 2002: Cancer Incidence, Mortality and Prevalence Worldwide IARC CancerBase No. 5. version 2.0, IARC Press, Lyon.
2. Bhurgri Y, Bhurgri A, Hasan SH, Usman A, Hashmi KZ, Khurshid M, et al. Pakistan, South Karachi; in Cancer Incidence in the Five Continent, Vol. VIII; eds. Parkin DM, Whelan SL, Ferlay J, Teppo L and Thomas DB. (2002) IARC Scientific Publications No. 155 Lyon, IARC.
3. Census Bulletin-1 (1998) Population and Housing Census of Pakistan, Population Census Organisation Statistics division, Federal Bureau of Statistics, Government of Pakistan.
4. Bhurgri Y, Pervez S, Bhurgri A, Faridi N, Usman A, Kazi LA. Increasing incidence of non-Hodgkin's lymphoma in Karachi, 1995-2002 Asian Pac J Cancer Prev. 2005 6:364-9
5. Timuraglu A, Colak D, Ogunc D, Karadogan I, Undar L Hepatitis C virus association with non-Hodgkin's lymphoma. Haematologia (Budap) 1999; 29:301-4.
6. Thorburn C, Rodriguez L, Parsonnet J. Epidemiology of gastric non-Hodgkin's lymphoma patients: parallels with Helicobacter pylori. Helicobacter 1996; 1:75-8.
7. Joab I. Epstein-Barr virus and Burkitt's lymphoma. Med Trop 1999; 59:499-502.