Prevalence and type of haematological malignancies among adults in a tertiary hospital in Jos-Nigeria: a sixteen-year retrospective analysis

Ochaka J Egesie[1], Ezra D Jatau[1], Obadiah D Damulak[1], Ayuba Zakari[1], James Jasini[1], Oyekemi Akinola[1], Chinedu N Okeke[1], Emmanuel A Akor[1], Olusegun A Adeyemi[1], Luret S Lar[2], Umezuruike G Egesie[3]

Abstract

Background: Global cancer statistics in Nigeria estimated increasing cancer occurrence per year with many unreported cases. Information regarding haematologic malignancies epidemiology in Jos is limited. This study sought to determine the prevalence, pattern and distribution of haematologic malignancies among adults in Jos, Nigeria in a 16 year period.

Methods: Retrospective review of adults with haematologic malignancies diagnoses by bone marrow aspiration cytology or histology of tissue biopsies between 2000 and 2015 at the Jos University Teaching Hospital, Jos-Nigeria was conducted. Socio-demographic parameters and cytological/histologic diagnoses were extracted from the cancer register.

Results: A total of 1706 cases of cancers were diagnosed during this period. Of these, 330 cases were haematologic malignancies. The prevalence of haematologic malignancies among the adult patient population was 19.3% with a male (56.7%) dominance. Leukaemia occurred the most (64.5%) followed by lymphoma (30%) and multiple myeloma (5.4%). Chronic leukaemia occurred more frequently than acute leukaemia and non-Hodgkin's lymphoma was more common than Hodgkin's lymphoma. The mean ±SD were 44±17 years for leukaemia and 43±15 years for lymphoma. The haematologic malignancies showed an increasing pattern of occurrence.

Conclusion: This occurrence of haematologic malignancies among adult patients with cancer from this Centre is high. Evidence of increasing occurrence was observed. Measures targeted at improved diagnosis and care are advocated. Future studies to evaluate the genetic and environmental risk factors associated with haematologic malignancies development from this region are recommended.

Keywords: Haematologic malignancies, Prevalence, Pattern, Adults, Jos, Nigeria.

Highland Med Res J 2017;17(2):92-96

Introduction

Cancer was once considered a problem exclusive to western countries, but it is becoming a leading cause of death and disability in low- income countries. In 2012, more than 57% of the 14.1 million cancer cases and 65% of the 8.2 million cancer deaths occurred in low-income settings.[1] Global cancer statistics in Nigeria in 2012, estimated increasing cancer occurrence with 102,100 new cases diagnosed per year and 71,600 deaths from cancer per year.[2] These figures were likely to be underestimated as many cases go unreported due to various reasons like poor education, misconceptions about the causes of cancer and poverty, in addition to poor health systems and governance.[3]

Haematologic malignancies comprised approximately 6.5% of all cancer cases worldwide in 2012.[1] The World Health Organization (WHO) predicts that the number of blood-related cancer cases will increase by about 48% in less developed countries by 2030.[1] Haematologic malignancies represent the fifth most common cancer and the second leading cause of cancer deaths in developing countries.[4] Although the prevalence of these cancers is lower in Asia and Africa than in Western countries, the incidence of these malignancies is increasing substantially in low-income settings.[5-7]

Haematologic malignancies are heterogeneous group of malignant neoplasms, primarily originating from cells of the bone marrow and lymphatic system.[8] The three main categories are leukaemia, lymphoma and multiple myeloma. The aetiology of haematologic malignancies remain unclear, but they are believed to be linked to genetic factors, ionizing radiation, environmental exposure to chemicals like pesticides, benzene, smoking and infectious agents.[9] Haematologic malignancy incidence varies with geography, age and race/ethnicity, suggesting different aetiological factors may contribute to their development.[10,11]

Information regarding haematologic malignancy epidemiology in developing countries is limited. Such information may be useful for planning, formulation of policies for prevention, control, and treatment of these cancers.

[1]Department of Haematology and Blood Transfusion, Jos University Teaching Hospital, Jos-Nigeria [2] Department of Community Medicine, Jos University Teaching Hospital, Jos-Nigeria [3]Department of Human Physiology, University of Jos

All correspondences to:
Ochaka Julie Egesie
E-mail: juliegesie@yahoo.com

This study sought to determine the prevalence, pattern and distribution of haematologic malignancies among adults in Jos, Nigeria in a 16 year period.

Materials and Methods

Study design

We conducted a retrospective review of adult patients presenting with haematologic malignancies to the Jos University Teaching Hospital (JUTH), Jos-Nigeria between 2000 and 2015.

Ethical issues

Approval was obtained from Human Research Ethics Committee of the hospital.

Setting

JUTH is a tertiary institution located in Jos, the capital city of Plateau State, North Central Nigeria. It is a 550-bed facility and serves five neighboring States, offering specialized haematological services for both in and out patients. Records of Adults between age 17 and 90 years referred from clinics within the hospital and health facilities within the region, between January 2000 and December 2015 formed the study population.

Inclusion criteria

Inclusion criteria were documentation of haematologic malignancies diagnosis by morphology of bone marrow aspiration cytology or histology of tissue biopsies from Haematology and Histopathology laboratories/ departments respectively.

Exclusion criteria

Those younger than 17 years, no documented malignancy diagnosis by morphology of bone marrow aspiration cytology or histology of tissue biopsies and incomplete information were excluded.

Data collection

A review of cancer register was conducted and data were captured on a designed template. Information extracted were socio-demographic parameters and histologic/ cytological diagnoses.

Main outcome measure

Diagnoses of haematologic malignancies by morphology using "French American British (FAB)" classification system[12, 13] where applicable was the main outcome measure. FAB classification system utilizes the morphology of peripheral blood films and bone marrow smears in malignancies typing. We used the FAB classification because we lacked facilities for immunophenotyping or cytogenetics.

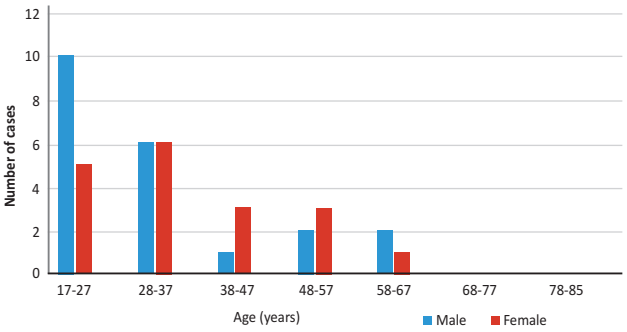
Statistical analysis

Data were analyzed using Epi Info version 7.1.3.0 (Center for Diseases Control; CDC Atlanta Georgia, United States of America). Chi-square and two-tailed students't-test were used to assess significant differences between classes of haematologic malignancies. A p –value ≤0.005 was considered statistically significant.

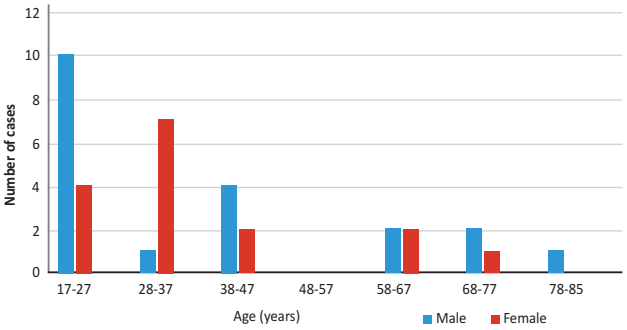
Results

A total of 1706 cases of cancers in adults were diagnosed during the period of study. Out of these, 330 (19.3%) cases were haematologic malignancies. Men accounted for 187 (56.7%) of cases, while women constituted 143 (43.3%) giving a ratio of 1.3:1. The patients were aged between 17 and 85 years with a mean age of 44±17 years for leukaemia and 43±15 years for lymphoma. The median age was however 43 and 40 years for leukaemia and lymphoma respectively.

Leukaemia was the most frequently occurring of the haematologic malignancy comprising 64.5% of all cases, followed by lymphoma with 30% and multiple myeloma, 5.4%. Chronic leukaemia occurred more frequently than acute leukaemia. The male to female ratio for leukaemia was 1.2:1 (54.9% vs 45.1%). However, Chronic Lymphocytic Leukaemia (CLL) occurred more frequently in females (21.7% vs 40.2%) with a ratio of 1:1.5. Chronic Myeloid Leukaemia (CML) occurred with the same frequency as CLL, while Acute Lymphoblastic Leukaemia (ALL) occurred more frequently than Acute Myeloblastic Leukaemia (AML), but the difference was not statistically significant (p > 0.05).

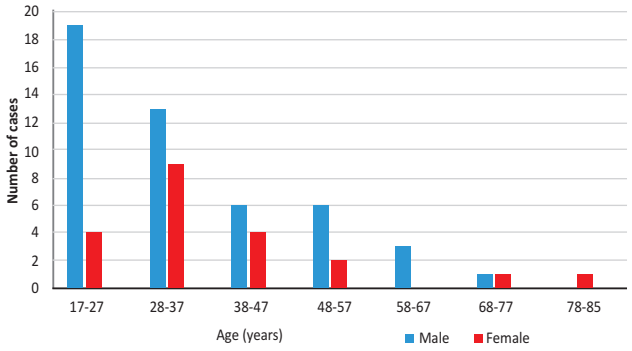


1(a)

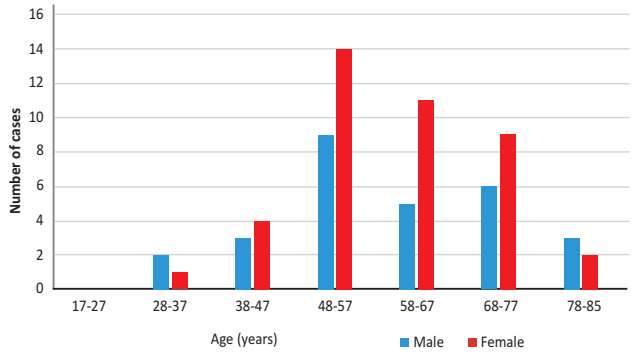


1(b)

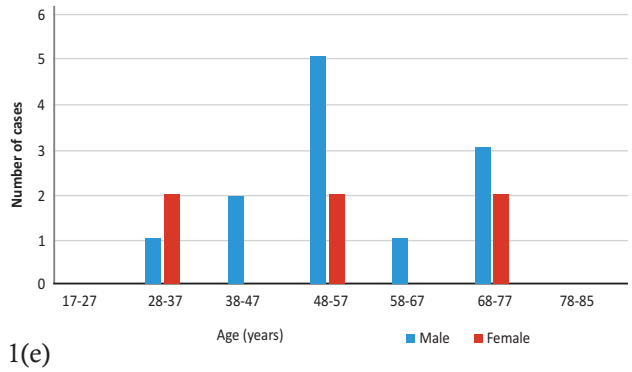
Age-group specific distribution showed that three types of leukaemia namely; ALL, AML and CML were found in young adults aged 17 – 37 years, whereas CLL affected older patients in the age group of 48 – 77 years (Figure 1).



1(c)



1(d)



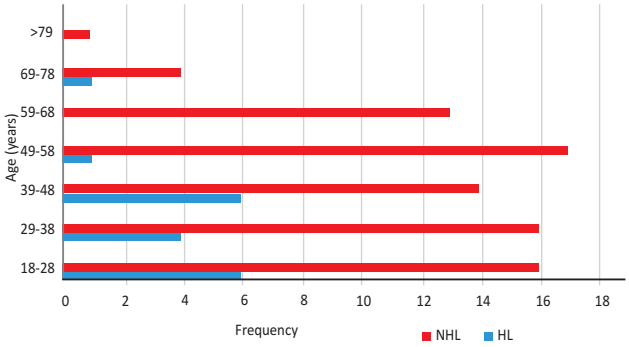
1(e)

*Acute Lymphoblastic Leukaemia +Acute Myeloblastic Leukaemia†† Chronic Lymphocytic Leukaemia ‡‡ Chronic Myeloid Leukaemia ||Multiple Myeloma ^ Frequency

Figure 1: Age and sex distribution of Adults with *ALL (a), +AML (b), ‡‡ CML (c), ††CLL (d) and ||MM (e) in JUTH, Jos-Nigeria 2000-2015

Lymphoma was the second most commonly occurring haematologic malignancy in Jos accounting for 30% of all cases. Hodgkin's Lymphoma (HL) affected mainly young adults with 88.9% of all cases of HL in the age group of 18-48 years. (Figure 2).

Non-Hodgkin's Lymphoma (NHL) constituted 81.8% of all cases of lymphomas seen within the period of study. A significant difference in NHL and HL occurrence was observed ($p \leq 0.005$)



HL = Hodgkin's Lymphoma; NHL = Non-Hodgkin's Lymphoma

Figure 2: Age distribution of adults with lymphoma in in JUTH, Jos-Nigeria 2000-2015

Multiple myeloma was the least occurring of the haematologic malignancies and constituted only 5.4% of all cases seen from this Centre. Men were affected more than women (9.3% vs 5.9%) and a ratio of 2:1. Majority (72.2%) of the cases were recorded in the age group of 48 to 77 years.

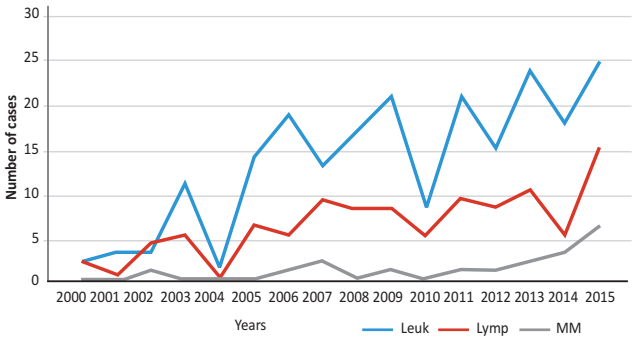


Figure 3: Annual occurrence of haematologic malignancies among Adults in Jos-Nigeria 2000 - 2015

The haematologic malignancies showed an increasing pattern of occurrence. Leukaemia showed a steady increase in annual occurrence, whereas multiple myeloma and lymphoma showed a gradual increase (Figure 3).

Discussion

We found the prevalence of 19.3%. This was similar to the reported prevalence from Benin City, Southern Nigeria and Ilorin, North-Central Nigeria, in which prevalence rates of 17.4% and 18.05% respectively were reported. [14, 15] We found a male dominance which agrees with previous studies. [5-8, 11-13] However, an unexpected finding in this study was that of a female dominance in CLL. This finding was similar to what was observed in

the Benin City study[14] but was at variance with the findings of Zenz *et al* and Dores *et al*[16,17] in which majority of the US patient population were males. The reason for this occurrence is not fully understood and the factors responsible for this disparity are yet to be elucidated.

We also found leukaemia was the most common occurring haematologic malignancy in this area and constituted 64.5% of all cases. This finding was similar to a study from Bangladesh[18] but differed from a study by Omoti *et al*[19] in Benin City, Nigeria and the Pakistani study[20] in which the most common occurring haematologic malignancy was non-Hodgkin's lymphoma. In USA, NHL is also the most common haematologic malignancy.[21] This has however, demonstrated the regional variation in the type of haematologic malignancies occurring in different geographical locations.

The majority of the patients with leukaemia and lymphoma were in their fifth decades of life. This was similar to the findings from Bangladesh where the median age was 42 years.[18] The bimodal peak age of occurrence for HL described for developed western countries was not observed in this study

This relatively younger age population affected by haematologic malignancies may lead to a lower life expectancy of these countries compared with western countries where older patients are frequently diagnosed with haematologic malignancy and life expectancy in the general population is higher.[22]

We observed in this study, an increasing frequency of occurrence of haematologic malignancies. The reasons for this were unclear, but maybe related to increasing patient consciousness to health issues and the availability of better diagnostic modalities. With the rising prevalence of these diseases, comes the need for training of Oncologists; a set of specialists, typically lacking in Nigeria. Training may improve the level of care given at this Centre where overall cancer care and management systems are below international standards. There is also need for availability of improved facilities for accurate diagnosis and treatment, as inadequate infrastructure is generally commonplace.

Our study was limited in that information on mortality and overall survival in patients was not provided due to inadequate data on follow up of patients diagnosed. Another limitation of this study was also the age restriction. Children were not included in this study. This may have affected the outcomes like the overall prevalence and age at presentation. Association between the disease prevalence and risk factors was also not evaluated.

Conclusion

The prevalence of haematologic malignancies among adult patients from this Centre is high. Men were more likely to be diagnosed with the disease than women and most of the patients were in their fifth decade of life. The most common haematologic malignancy was leukaemia. Evidence of increasing occurrence was observed. Measures targeted at improved diagnosis and care are advocated. Future studies to evaluate the genetic and environmental risk factors associated with haematologic malignancy development from this region are recommended.

Conflict of interest. None declared.

Acknowledgements

We acknowledge and appreciate all the Doctors who were part of the management team that took care of these patients and the relations who laboured so hard to support these patients throughout the period of their treatment.

References

1. Ferlay J, Soerjomataram I, Ervik M, et al. Cancer incidence, mortality and prevalence worldwide in 2012, Lyon, France: International Agency for Research on Cancer. 2013. Available at: http://globocan.iarc.fr/Default.aspx. Accessed March 22, 2016.
2. Nigeria cancer statistics. Globalcan 2012. Available at: www.cancerindex.org/Niger Accessed March 22, 2016.
3. Story HL, Love RR, Salim R, Roberto AJ, Krieger JL, Ginsburg OM. Improving outcomes from breast cancer in a low-income country: lessons from Bangladesh. Int J Breast Cancer. 2012; 2012: 423-562.
4. Pfizer Oncology. Hematologic Cancer Fact sheet. Available at: www.pizer.com/files/news/ash/Accessed March 22, 2016.
5. Gopal S, Wood WA, Lee SJ, et al. Meeting the challenge of Haematologic malignancies in sub-Saharan Africa. Blood. 2012, 119: 5078-5087.
6. Park HJ, Park EH, Jung KW, et al. Statistics of haematologic malignancies in Korea: incidence, prevalence and survival rates from 1999 to 2008. Korean J Hematol. 2012, 47: 28-38.
7. Wu SJ, Huang SY, Lin CT, Lin YJ, Chang CJ, Tien HF. The incidence of chronic lymphocytic leukaemia in Taiwan, 1986-2005: a distinct increasing trend with birth-cohort effect. Blood 2010, 116: 4430-4435.
8. Fey MF. Salient features of hematological diseases. Ann Oncol. 2007, 18 (Suppl 1): i54-i64.
9. Leukemia and Lymphoma Society: fighting blood cancers. Facts 2014-2015. Available at: http://www.lls.org/sites/default/files/file_assets/facts.pdf. Accessed March 22, 2016.
10. Lichtman MA. Battling the hematological malignancies: the 200 years' war. Oncologist. 2008, 13: 126-138.
11. Rodriguez-Abreu D, Bordoni A, Zucca E. Epidemiology of hematologic malignancies. Ann Oncol. 2007, 18 (Suppl 1): i3-i8.
12. Bennett JM, Catovsky D, Daniel M-T et al. Proposals for the classification of acute leukaemias. French-American-British (FAB) Co-operative group. Br J Haematol. 1976;

33:451-458.
13. Bennett JM, Catovsky D, Daniel M-T et al. proposed revised criteria for the classification of acute myeloid leukaemia. A report of the French-American-British Co-operative group. Ann Intern Med 1985; 103:620-625.
14. Nwannadi IA, Alao OO, Bazuaye GN, Halim NKD, Omoti CE. The epidemiology of haematological malignancies at the University of Benin Teaching Hospital: A ten year retrospective study. Internet J Epidemio. 2010; 9(2): 5-9 available from: http://ispub.com/IJE/9/2/11149 Accessed July 21, 2016.
15. Babatunde A, Amiwero C, Olatunji P, Durotoye I. Pattern of haematological malignancies in Ilorin Nigeria: A ten year review. The internet J Haematol. 2009; 5(2): Available from: http://archive.ispub.com/journal/the-internet-journal-of-hematology/volume-5-number Accessed May 8, 2013.
16. Zenz T, Mertens D, Küppers R, Döhner H, Stilgenbauer S. From pathogenesis to Treatment of chronic lymphocytic leukaemia. Nat Rev Cancer. 2010; 10:37-50.
17. Dores GM, Anderson WF, Curtis RE, et al. Chronic lymphocytic leukaemia and small lymphocytic lymphoma: overview of the descriptive epidemiology. Br J Haematol. 2007; 139(5):809- 919.
18. Hossain MS, Iqbal MS, Khan MA, et al. Diagnosed hematological malignancies in Bangladesh – A retrospective analysis of over 5000 cases from 10 specialized hospitals. BMC Cancer. 2014; 14:438-453.
19. Omoti CE, Nwannadi AI, Obieche JC, Olu-Eddo AN. The epidemiological features of lymphoid malignancies in Benin City, Nigeria: A 15years study. The Pan Afri Med. J 2012; 11:10-15.
20. Ahmed M, Khan AH, Mansoor A. NHL clinico-pathological pattern. J. Pak. Med. 1992; 42:205-209.
21. American Cancer Society: Cancer facts & figures 2012, Atlanta: American Cancer Society. Available at http://www.cancer.org/research/cancerfactsfigures/cancerfactsfigures/cancer-facts-figures-2012 Accessed April 10, 2017.
22. World Health Organization. World life expectancy: 2016 data. Available at: www.worldlifeexpectancy.com/usa/life-expectancy. Accessed April 29, 2017.