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Assosiation of Sociodemographic Determinants with Lymphoma, A Tertiary Care Hospital Study

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ABSTRACT

Objective: To determine frequency of socio-demographic determinants of lymphoma and to see association of socio-demographic factors with lymphoma type among patients presenting at a tertiary care hospital of Karachi, Pakistan.
Study Design: Cross-sectional study.
Place and Duration of Study: Department of Medical Oncology, Jinnah Postgraduate Medical College Karachi Pakistan, from May 2019 to Mar 2020.
Methodology: About 196 patients with the confirmed diagnosis of lymphoma of age more than 15 years of either gender were included in the study. Complete medical records and history were also evaluated to assess lymphoma type and stage of tumor.
Results: The mean age was estimated as 45.18±15.68 years and 146 patients were males (74.5%). About 112(57.1%) patients belonged from rural areas, 74(37.8%) were illiterate, 152(77.6%) had monthly income less 15,000 PKR, 165(84.2%) were married, 78 patients were Sindhi (39.8%), 49(25%) patients were obese, 41(20.9%) had diabetes mellitus and 47(24%) had hypertension. Out of 196, 141(72%) patients had Non-Hodgkin's lymphoma. The statistically significant association was found between lymphoma type and age (p=0.001), gender (p=0.028), locality (p=0.039), monthly income (p=0.037), obesity (p=0.054), hypertension (p=0.053) and diabetes mellitus (p=0.003).
Conclusion: Increased age, male gender, rural residency, low socio-economic background and comorbids are identified as major socio-demographic determinants and found to be highly associated with increased risk of non-Hodgkin's lymphoma.

Keywords: Hodgkin's lymphoma, Lymphoma, Non-Hodgkin's lymphoma, Socio-demographic determinants.

How to Cite This Article: *Sehar S, Haider G, Rani B, Rai V, Ather T, Batool AM. Study of Sociodemographic Determinants of Lymphoma At Tertiary Care Hospital Karachi. Pak Armed Forces Med J 2023; 73(Suppl-1): S18-22. DOI: https://doi.org/10.51253/pafmj.v73iSUPPL-1.5033*

INTRODUCTION

Lymphomas are known as the heterogeneous group of lymphocyte-derived malignant disorders, is the sixth common cancer and comprising approximately 3.37 percent of all cancers worldwide.[1,2] Lymphoma is categorized into Hodgkin's and Non-Hodgkin's lymphoma, both of which have different epidemiological, environmental, behavioral, racial and prognostic characteristics.[3] According to American Cancer Society, approximately 8,480 and 77,240 new cases of Hodgkin's (HL) and Non-Hodgkin's (NHL) lymphoma will be diagnosed in the US for 2020 respectively, whereas 970 deaths from Hodgkin's lymphoma and 19,940 deaths from non-Hodgkin's lymphoma will occur.[4, 5]

Among emerging and developed countries, Hodgkin's lymphoma is the second and third biggest malignancy.[6] HL constitutes about 0.5% of cancer worldwide with an Age Standardized Rate (ASR) of 0.9/100, 000. Asians generally have low incidence of HL as compared to Europeans. Compared to Europe, Asian nations have low frequency of Hodgkin's lymphoma.[7] In Pakistan, the third prevalent malignancy among men and women were lymphomas. Over 75% of the lymphomas were non-Hodgkin's lymphoma and common in men. In the first to third decades of life Hodgkin's lymphoma predominated throughout Pakistani men, while in the second to fifth decades of life in Pakistani women it generally happened.[8]

Number of factors contributes to development of Hodgkin's lymphoma and non-Hodgkin's lymphomasuch as age, gender, socio-economic status, infections and environmental factors. The aim of current research has therefore been to determine the socio-demographic characteristics among patients presenting with lymphoma at a tertiary care hospital of Karachi and further to see association of socio-demographic factors with lymphoma type. This research will lead to the identification of the actual lymphoma picture.

METHODOLOGY

The cross-sectional study was conducted at Department of Medical oncology, Karachi, Pakistan from May 2019-March 2020. Sample size of 196 was estimated using Open epi sample size calculator, by taking proportion of males as 51%,[9] absolute precision as 7% and 95% confidence level.

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Received: 17 Aug 2020; revision received: 12 Oct 2020; accepted: 19 Oct 2020

Inclusion Criteria: All the patients with confirm diagnosis of lymphoma, aged more than 15 years, of either gender were included in the study using non-probability consecutive sampling technique.

Exclusion Criteria: Patients who were mentally ill and pregnant were excluded from the study.

After taking approvalfrom ethical review committee (ERC approval NO.F.21-81/2019-GENL/20232/JPMC), data collection was initiated. Medical records were assessed for all the patients regarding socio-demographic factors like age, gender, locality, education, monthly income, marital status, ethnicity and medical history i.e. hypertension and diabetes and BMI was also estimated. BMI greater than 27.5 kg/m^2 was labelled as obese. The medical records was also evaluated regarding lymphoma type and stage of lymphoma. All information was noted on predesigned questionnaire by researcher herself.

Table-I: Baseline Characteristics of Study Participants (n=196)

Variables	Mean±SD
Age in years	45.18±15.68
	n(%)
Gender	
Male	146(74.5)
Female	50(25.5)
Locality	
Rural	112(57.1)
Urban	84(42.9)
Education	
Illiterate	74(37.8)
Primary	53(27)
Matric	30(15.3)
Intermediate	23(11.7)
Graduate	16(8.2)
Monthly income (PKR)	
<15,000	152(77.6)
15,000-30,000	33(16.8)
>30,000	11(5.6)
Marital status	
Single	31(15.8)
Married	165(84.2)
Ethnicity	
Balochi	20(10.2)
Pashto	19(9.7)
Punjabi	13(6.6)
Sindhi	78(39.8)
Urdu	66(33.7)
Obesity	
Yes	49(25)
No	147(75)
Diabetes	
Yes	41(20.9)
No	155(79.1)
Hypertension	
Yes	47(24)
No	149(76)

Data was entered and analyzed using SPSS version 23. Numeric variables were presented as Mean ±SD whereas categorical variables were presented as frequency and percentage. Chi-square test was used to assess the significance between socio-demographic factors and type of lymphoma. *p*-value≤0.05 was taken as statistically significant.

RESULTS

Total 196 lymphoma patients were included and the mean age was45.18±15.68 years and 146 patients were males (74.5%). About 112(57.1%) patients belonged from rural areas, 74(37.8%) were illiterate, 152(77.6%) had monthly income less 15,000 PKR and 165(84.2%) were married. Almost 78 patients were Sindhi (39.8%) and 66(33.7%) were Urdu speaking. About 49(25%) patients were obese, 41(20.9%) had diabetes mellitus and 47(24%) had hypertension. (Table-I).

About 141(72%) patients had Non-Hodgkin's lymphoma. In NHL, 48(24.5%) patients had stage 3 and 41(20.9%) had stage 4, whereas in HL 30(15.31%) had stage 3 and 11(5.61%) had stage 2 of tumor. Diffuse large B-cell lymphoma was the most frequent histology, among them 99(92.5%) were NHL and 8(7.5%) were HL (Figure-1, 2-3).

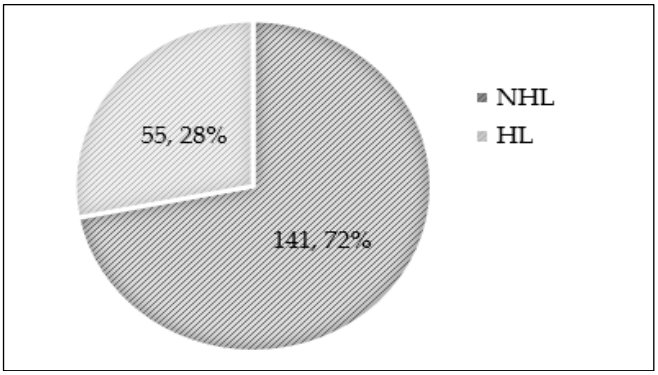

Figure-1: Frequency Distribution of Lymphoma Type (n=196)

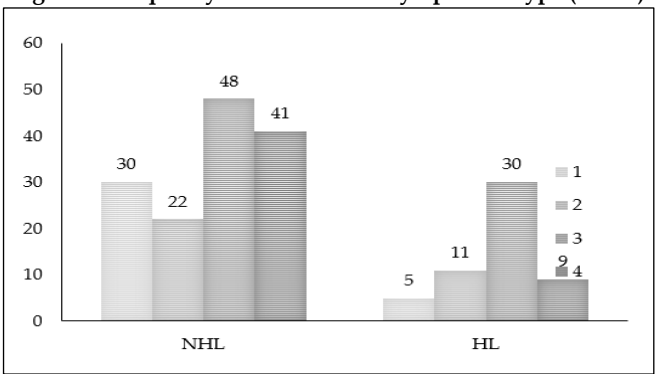

Figure-2: Frequency Distribution of Stage of Tumor (n=196)

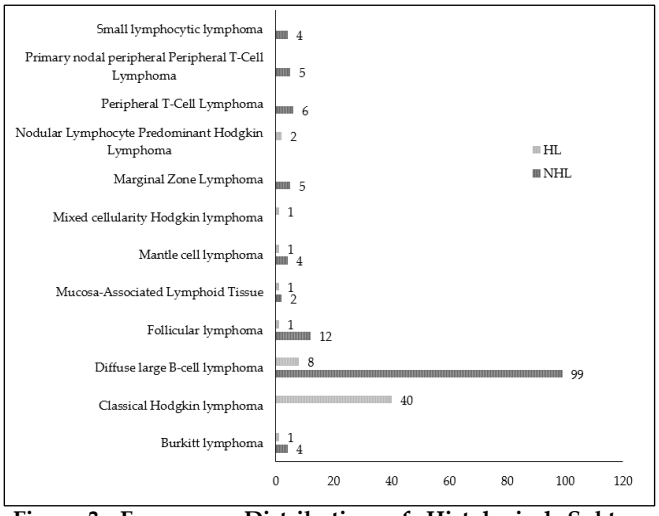

Figure-3: Frequency Distribution of Histological Subtype (n=196)

Majority of the patients were of age more than and equal to 45 years and among them 89(81.7%) had non-Hodgkin's lymphoma and 20(18.3%) had Hodgkin's lymphoma. In males, 99(67.8%) had non-Hodgkin's lymphoma and 47(32.2%) had Hodgkin's lymphoma. Whereas in females, 32(84%) had non-Hodgkin's lymphoma and 8(16%) had Hodgkin's lymphoma. In rural areas, 87 patients had non-Hodgkin's lymphoma (77.7%) and 25(22.3%) had Hodgkin's lymphoma. While in urban areas, 54(64.3%) had non-Hodgkin's lymphoma and 30(35.7%) had Hodgkin's lymphoma. The patients who had monthly income less than 15,000 PKR, 108 patients had non-Hodgkin's lymphoma (71.1%) and 44(28.9%) had Hodgkin's lymphoma. Statistically significant association was found between lymphoma type and age, gender, locality and monthly income ($p \leq 0.05$). The comorbid such as obesity, hypertension and diabetes mellitus showed statistically significant association with lymphoma type ($p \leq 0.05$). About 30(61.2%) obese patients had non-Hodgkin's lymphoma and 19(38.8%) had Hodgkin's lymphoma. Approximately 39(83%) hypertensive patients had non-Hodgkin's lymphoma and 8(17%) had Hodgkin's lymphoma. Wherein diabetic patients, 37(90.2%) had non-Hodgkin's lymphoma & 4(9.8%) had Hodgkin's lymphoma (Table-II).

DISCUSSION

Globally, lymphoma is the most frequent cancer. The distribution of its types i.e., non-Hodgkin's lymphoma and Hodgkin's lymphomavaries throughout the world.[10] Socio-demographic factors and type of lymphoma are extensively dispersed from South-western Asia to northern Africa.[11] While Hodgkin's lymphoma accounts for just 10 percent of all lymphomas, with the majority 90 percent of non-Hodgkin's lymphoma-type cases worldwide.[12] The goal of this research was to determine frequency of socio-demographic determinants of lymphoma and to see association of socio-demographic factors with lymphoma type.

Table-II: Association Of Type Of Lymphoma with respect to Risk Factors (n=196)

Variables	Non-Hodgkin's Lymphoma	Hodgkin's Lymphoma	*p*-value
Age			
<45 years	52 (59.8%)	35(40.2%)	0.001
≥45 years	89(81.7%)	20(18.3%)	
Gender			
Male	99(67.8%)	47(32.2%)	0.028
Female	42(84%)	8(16%)	
Residence			
Rural	87(77.7%)	25(22.3%)	0.039
Urban	54(64.3%)	30(35.7%)	
Ethnicity			
Balochi	17(85%)	3(15%)	0.266
Pashto	15(78.9%)	4(21.1%)	
Punjabi	7(53.8%)	6(46.2%)	
Sindhi	58(74.4%)	20(25.6%)	
Urdu	44(66.7%)	22(33.3%)	
Marital Status			
Unmarried	20(64.5%)	11(35.5%)	0.316
Married	121(73.3%)	44(26.7%)	
Education			
Illiterate	52(70.3%)	22(29.7%)	0.464
Primary	42(79.2%)	11(20.8%)	
Matric	22(73.3%)	8(26.7%)	
Intermediate	15(65.2%)	8(34.8%)	
Graduate	10(62.5%)	6(37.5%)	
Monthly Lncome (PKR)			
<15,000	108(71.1%)	44(28.9%)	0.037
15,000-30,000	28(84.8%)	5(15.2%)	
>30,000	5(45.5%)	6(54.5%)	
Obesity			
Yes	30(61.2%)	19(38.8%)	0.054
No	111(75.5%)	36(24.5%)	
Hypertension			
Yes	39(83%)	8(17%)	0.053
No	102(68.5%)	47(31.5%)	
Diabetes			
Yes	37(90.2%)	4(9.8%)	0.003
No	104(67.1%)	51(32.9%)	

We found majority of the patients presented with non-Hodgkin's lymphoma (71.9%). similar results were observed in the study by Hingorjo *et al*. 81.6% had non-Hodgkin's lymphoma and 18.3% were diagnosed as Hodgkin's lymphoma.[13] Another Pakistani study conducted at Faisalabad is also in

agreement with the current study findings, 67% of the patients had non-Hodgkin's lymphoma and 33% had Hodgkin's lymphoma.[14] A study conducted in Karachi also found 25% of the patients with Hodgkin's lymphoma and 75% with non-Hodgkin's lymphoma.[15]

We found 39.8% of the patients had stage 3 of tumor followed by stage 4(25.51%). Wherein NHL, 24.5% had stage 3 and 20.9% had stage 4, whereas in HL 15.31% had stage 3 and 5.61% had stage 2 of tumor. The majority of cases diagnosed in advance stage are in our study. This problem in Pakistan, is painful because of lack of awareness, ignorance of people who belong to backward or rural areas which is evident by Faizaan M *et al*.[16] who compared the incidence of Hodgkin's lymphoma among 100 children between Lahore & UK and found that 90 percent of patients in Lahore had stage III or IV of disease, while most patients in the UK had stage II & III of disease. This could be due to delay in diagnosis due to low socio-economic status.[17]

In the present research, 54.59% of the patients had diffuse large B-cell lymphoma subtype followed by classical Hodgkin's lymphoma (20.41%). In a study conducted at Indonesia found diffuse large B-cell lymphoma as the most frequent lymphoma type comprising 44.4% cases. Bukhari *et al.* found diffuse large B-Cell lymphoma as the most frequent histological subtype of non-Hodgkin's lymphoma. 11Similar results were observed in the studies by Nawaz *et al*. Chiu *et al*. Hingorjo *et al*. and Neeravari *et al*.[13,14,18, 19]

The mean age of our study sample was 45 years old and majority of the patients were in age group of≥45 years, the age also showed statistically significant association with type of lymphoma (p<=0.05). Hodgkin's lymphoma typically impacts younger individuals as well as adults whereas the incidence of non-Hodgkin's lymphoma increases with age and usually most prevalent in elderly.[16] In our study majority of the patients were of age more than and equal to 45 years and among them 81.7% had non-Hodgkin's lymphoma and 18.3% had Hodgkin's lymphoma. In a study conducted at Karachi, showed non-Hodgkin's lymphoma was prevalent in age group 52-62 years and Hodgkin's lymphoma was prevalent in 12-21 years.[13] In another study conducted at Faisalabad the mean age of the patients with lymphoma was estimated as 46 years and most of the patients presented with Hodgkin's lymphoma were in age group<15 years.[14] Reasons for elevated risk of non-Hodgkin's lymphoma with increase in age have been correlated with decreased immune function and possibly elevated vulnerability to infection.[11]

In the present study, 84.2% of the patients were married, majority of the patients were Sindhi and Urdu speaking, 57.1% belonged from rural areas, 37.8% of the patients were illiterate and 77.6% had monthly income less than 15,000 PKR. The locality and monthly income showed statistically significant difference across the lymphoma type (p<=0.05). Patients with low socio-economic status were generally more likely to have poor prognosis due to advanced tumor stage. 20 Lack of education and diagnostic delay are directly related to the socioeconomic status. In Pakistan, the prevalence of non-Hodgkin's lymphoma & Hodgkin's lymphoma is increasing due to several factors that play a part in the development of diseases such as age, gender, environmental factors, infections and socioeconomic status. Since most patients belonged to rural areas where illiteracy is very high, people presented mostly with advance stage of tumor.[21]

Obesity, hypertension, and diabetes mellitus were found to be independent risk factors for non-hodgkin's lymphoma (p<0.05) in our study. The association of lymphomas and obesity are very unusual among European and Asian individuals. In Asian, overweight and obesity can be a risk factors for non-Hodgkin's lymphoma,[16] in a meta-analysis of,[22] studies showed obesity was significantly associated with mild to high risk of non-Hodgkin's lymphoma and Hodgkin's lymphoma development.[22] In a study conducted at Mascat, author found 8.5% of the non-Hodgkin's lymphoma patients had diabetes mellitus and 9.5% had hypertension.[19]

ACKNOWLEDGEMENT

We would like to thanks our supervisor and colleagues for the support and guidance throughout the work.

CONCLUSION

Increased age, male gender, rural locality, low socio-economic background and comorbids are identified as major socio-demographic determinants of lymphoma in our study. However, to confirm the results of present study, larger number of patients from different localities from Pakistan needs to be evaluated.

Conflict of Interest: None.

Author's Contribution

Following authors have made substantial contributions to the manuscript as under:

BR: & GH: Study design, analysis and Interperitation of data, Critical review, approval for the final version to be published.

SS: & VR:, Data analysis and interpretation, manuscript writing , approval for the final version to be published.

TA: & BAM: Critical review Drafted manuscript, concept, approval for the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investi-gated and resolved.

REFERENCES

1. Huh J. Epidemiologic overview of malignant lymphoma. The Korean journal of hematology 2012; 47(2): 92-104. https://doi: 10.5045/kjh.2012.47.2.92.
2. Reksodiputro A. Multicentre epidemiology and survival study of B cell non Hodgkin lymphoma patients in Indonesia. J Blood Disord Transfus 2015; 6(2): 1-5.
3. Muto R, Miyoshi H, Sato K, Furuta T, Muta H, Kawamoto K, et al. Epidemiology and secular trends of malignant lymphoma in Japan: Analysis of 9426 cases according to the World Health Organization classification. Cancer Medicine 2018; 7(11): 5843-5858. https://doi: 10.1002/cam4.1805. Available from: https://onlinelibrary.wiley.com/doi/abs/10.1002/cam4.1805.
4. ACS. Key Statistics for Non-Hodgkin Lymphoma: American Cancer Society; 2020 [cited 2020 1 Feb]. Available from: https://www.cancer.org/cancer/non-hodgkin-lymphoma/about/key-statistics.html.
5. ACS. Key Statistics for Hodgkin Lymphoma: American Cancer Society; 2020 [cited 2020 1 Feb]. Available from: https://www.cancer.org/cancer/hodgkin-lymp/about/key-statis.html.
6. Faizan M, Taj MM, Anwar S, Asghar N, Ahmad A, Lancaster D, et al. Comparison of Presentation and Outcome in 100 Pediatric Hodgkin Lymphoma Patients Treated at Children Hospital, Lahore, Pakistan and Royal Marsden Hospital, UK. J Coll Physicians Surg Pak 2016; 26(11): 904-907.
7. Zhou L, Deng Y, Li N, Zheng Y. Global, regional, and national burden of Hodgkin lymphoma from 1990 to 2017: estimates from the 2017 Global Burden of Disease study. J Hematol Oncol 2019; 12(1): 107. https://doi: 10.1186/s13045-019-0799-1.
8. Ahmad Z, Idrees R, Fatima S, Uddin N, Ahmed A, Minhas K, et al. Commonest Cancers in Pakistan-Findings and Histo-pathological Perspective from a Premier Surgical Pathology Center in Pakistan. Asian Pac J Cancer Prev 2016; 17(3): 1061-1075. https://doi: 10.7314/apjcp.2016.17.3.1061.
9. Obtel M, Berraho M, Abda N, Quessar A, Zidouh A, Bekkali R, et al. Factors Associated with Delayed Diagnosis of Lymphomas: Experience with Patients from Hematology Centers in Morocco. Asian Pac J Cancer Prev 2017; 18(6): 1603-1010. https://doi: 10.22034/apjcp.2017.18.6.1603.
10. Phillips AA, Smith DA. Health Disparities and the Global Landscape of Lymphoma Care Today. American Society of Clinical Oncology Educational Book 2017; (37): 526-534. Available from: https://ascop.org/doi/abs/10.12/EDBK_1744.
11. Bukhari U, Jamal S, Lateef F. NON HODGKIN'S LYMPHOMA" A STUDY. Pakistan Oral and Dental Journal. 2015; 35(3).
12. Shankland KR, Armitage JO, Hancock BW. Non-Hodgkin lymphoma. Lancet 2012; 380(9844): 848-857. https://doi: 10.1016/s0140-6736(12)60605-9.
13. Hingorjo MR, Syed S. Presentation, staging and diagnosis of lymphoma: a clinical perspective. J Ayub Med Coll Abbottabad 2008; 20(4): 100-103.
14. Nawaz M, Bilal M, Asgher M. Prevalence of Lymphoma Cancer in Punjab, Pakistan. Inter J Applied Scien Biotechnol 2015; 1(2): 3-6. https://doi: 10.3126/ijasbt.v3i2.12756.
15. Shahid R, Gulzar R, Avesi L, Hassan S, Danish F, Mirza T. Immunohistochemical Profile of Hodgkin and Non-Hodgkin Lymphoma. Journal of the College of Physicians and Surgeons--Pakistan: JCPSP 2016; 26: 103-107.
16. Shabbir S. Epidemiological features of Lymphoma in Pakistan. Pure and Applied Biology 2019; 1(1): 8-10. https://doi: 10.19045/bspab.2019.80039.
17. Faizan M, Taj MM, Anwar S, Asghar N, Ahmad A, Lancaster D, et al. Comparison of Presentation and Outcome in 100 Pediatric Hodgkin Lymphoma Patients Treated at Children Hospital, Lahore, Pakistan and Royal Marsden Hospital, UK. Journal of the College of Physicians and Surgeons--Pakistan: JCPSP 2016; 26(11): 904-7. https://doi: 2474. Available from: http://europepmc.org/abstract/MED/27981925 https://doi.org/2474.
18. Chiu BC, Weisenburger DD. An update of the epidemiology of non-Hodgkin's lymphoma. Clin Lymphoma 2003; 4(3): 161-168. https://doi: 10.3816/clm.2003.n.025.
19. Neeravari VS, Bannigidad DM, Rao L. Association of Hyper-tension and Diabetes Mellitus with non-Hodgkin lymphoma-A hospital based study of 410 cases. Ind J Pathol Oncol 2016; 3(4): 696-700.
20. Biasoli I, Castro N, Delamain M, Silveira T, Farley J, Pinto Simões B, et al. Lower socioeconomic status is independently associated with shorter survival in Hodgkin Lymphoma patients—An analysis from the Brazilian Hodgkin Lymphoma Registry. Int J Cancer 2018; 142(5): 883-890. https://doi: 10.1002/ijc.31096. Available from: https://onlinelibrary.wiley.com/10.1002/ijc.16.
21. Shabbir S, Ahmed KN, Marri M, Mengal M, Jan MH, Jamali MS, et al. Epidemiological features of Lymphoma in Pakistan. Pure and Applied Biology (PAB) 2019; 8(1): 977-994.
22. Ingham RR, II, Reagan JL, Dalia S, Furman M, Merhi B, Nemr S, et al. The Relationship Between Obesity and Lymphoma: A Meta-Analysis of Prospective Cohort Studies. Blood 2011; 118(21): 5198. https://doi: 10.1182/blood.V118.21.5198.5198.