RESEARCH

Healthcare Insurance is Not Linked with Better Outcomes in Hispanic Patients with Certain Lymphoma Subtypes

Carolina Velez-Mejia[1,] Esteban Toro Velez[2], Daniel Rosas[3], Qianqian Liu[4] Joel E Michalek[5], Anand Karnad[6], Adolfo Enrique Diaz Duque[7]*

[1, 2] Virginia Commonwealth University [3]Memorial Healthcare, [4,5]University of Texas Health at San Antonio – [6,7] University of Texas Health at San Antonio/Mays Cancer Center, Antonio, TX 78229

*Corresponding author: Adolfo Enrique Diaz Duque diazduque@uthscsa.edu.

Variables that determine overall survival (OS) in patients diagnosed with Hodgkin lymphoma (HL) and Non-HL have been widely studied in the United States. However, healthcare disparities exist within the different cancer subtypes and ethnic minorities. This is the first large statewide population-based study differentiating ethnicity, insurance status, and survival for HL, diffuse large B cell lymphoma (DLBCL), and primary central nervous system (PCNS) lymphoma in Texas. Retrospective analysis of patients with histopathologic proven disease recorded in the Texas Cancer Registry from 2006-2017 was carried out. Demographic, clinical, and survival variables were analyzed. Survival distributions were determined on Kaplan-Meier curves. Cox proportional hazards regression analysis was carried out in subsequent review. From 2006-2017, 21,229 patients with HL, DLBCL, and PCNS were diagnosed in Texas (6,004, 14,366, and 859, respectively). Median survival was outstanding and superior for uninsured compared to insured patients. Survival probability at 2, 5, and 10 years among insured vs uninsured was noteworthy for the three malignancies. Overall survival (OS) was statistically significant for uninsured Hispanics with p-values of <0.0001 for HL and <0.0001 for DLBCL. However, for PCNS, uninsured non-Hispanics had the highest OS rate. Based on the Cox results, the significance of these results is significant for patients diagnosed with DLBCL and PCNS. For DLBCL and PCNS, the uninsured Hispanic population had significantly better survival. Although in HL the OS for Hispanics was outstanding, this effect seems to fade away with the adjustment of other covariables. This finding may be due to standardized treatment, immediate healthcare enrolling after diagnosis, and/or different community healthcare practices. Nonetheless, lack of insurance may delay diagnosis, necessitate multiple lines of chemotherapies, increase the rate of metastatic disease or recurrences. As more expensive and personalized therapies evolve, insurance status can limit access to these. Although we showed that insurance is no longer a determinant for improving OS within certain subsets of patients, it could have potential implications for other oncological outcomes.

KEYWORDS: Lymphomas, Hispanics, Healthcare Disparities, Survival, Healthcare Insurance.

Citation: Velez-Mejia C, et al (2024). Healthcare Insurance is Not Linked with Better Outcomes in Hispanic Patients with Certain Lymphoma Subtypes. Cancer Health Disparities. 8: e1-8. doi:10.9777/chd.2024.1003

Background

The Hispanic/Latino population is the second-largest racial/ethnic group in the United States (US), accounting for 18% (60.6 million) of the total population. Non-Hodgkin lymphoma (NHL) is the sixth leading cause of new cancer cases in US Hispanic men (6%) and women (4%) and is among the top ten causes of cancer deaths (4%) in this population. Insurance status significantly affects the quality of cancer care, with ethnic minority groups more likely to be uninsured or covered by Medicaid, which has shown a higher risk of presenting with advanced-stage cancer at diagnosis. However, there is limited literature on the impact of insurance status on outcomes of curable malignancies, including lymphoma.

The impact of healthcare insurance on overall survival (OS) for various types of lymphoma, including diffuse large B-cell lymphoma (DLBCL), follicular lymphoma (FL), and primary central nervous system (PCNS) lymphoma, has been studied with mixed results. While healthcare insurance is generally associated with better survival for most types of lymphoma, recent studies in the Hispanic population have shown similar outcomes regardless of insurance status. Most studies on this topic have relied on the Surveillance, Epidemiology, and End Results (SEER) program, which does not fully represent states with significant Hispanic populations like Florida and only recently included data from Texas.

There is a need for high-quality data on the impact of insurance and other health disparity factors on Hispanic patients with lymphoma. This study represents the first large statewide population-based analysis from Texas evaluating insurance status and survival outcomes for Hodgkin lymphoma (HL), DLBCL, and PCNS lymphoma.

Material and Methods

This retrospective cohort study analyzed patients diagnosed with HL and NHL (DLBCL and PCNS) from the Texas Cancer Registry (TCR) from 2006 to 2017. Patients were identified using the International Classification of Diseases for Oncology Third Edition (ICD-O-3) code list and were provided in a de-identified format. Collected demographic variables included gender, race, ethnicity, birthplace, occupation, diagnosis and death dates, primary payer at diagnosis, lymphoma subtype, stage, treatment type, poverty index, and vitality status.

Categorical outcomes were summarized with frequencies and percentages, and age was summarized with the mean and standard deviation. The significance of variation in categorical outcomes with ethnicity (Hispanic vs. Non-Hispanic) was assessed using Fisher's Exact tests or Pearson's Chi-square tests, while age was assessed with T-tests or Wilcoxon tests. Cox proportional hazards regression analysis was conducted subsequently.

Patients were divided into Hispanic (HI) and Non-Hispanic (NH) groups, and further categorized by insurance status into insured (i) and uninsured (un), resulting in four cohorts: iHI, unHI, iNH, and unNH. Survival time was measured in years from diagnosis to death, with patients not coded as dead considered censored at the last follow-up. Survival distributions were described with Kaplan-Meier curves, and significance was assessed with log-rank testing. All statistical testing was two-sided with a significance level of 5%. The R language was used for analysis.

Results

From 2006-2017, 21,229 patients with HL, DLBCL, or PCNS were diagnosed in Texas. Of these, 6,004 were diagnosed with HL (iHI: 1,369; unHI: 376; iNH:

3,781; unNH: 478), 14,366 with DLBCL (iHI: 2,810; unHI: 635; iNH: 10,273; unNH: 648), and 859 with PCNS (iHI: 195; unHI: 54; iNH: 559; unNH: 51) (Figure 1-3).

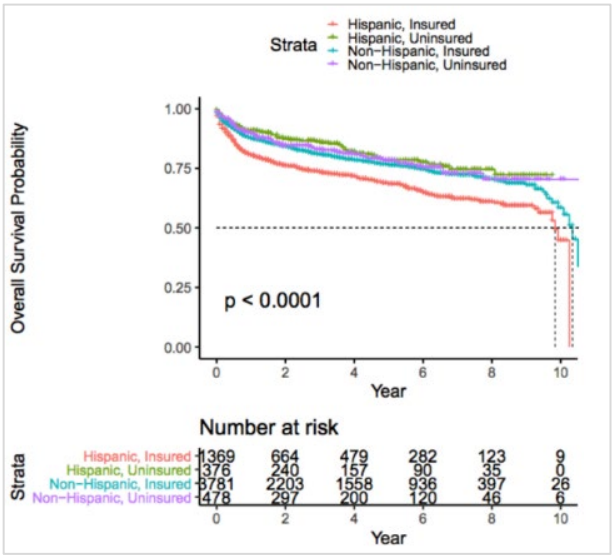

Figure 11. Survival Analysis for HL

Comparison of the survival outcomes of the 4 groups analyzed (iHI, unHI, iNH, and unNH) showing better outcomes for uninsured Hispanics.

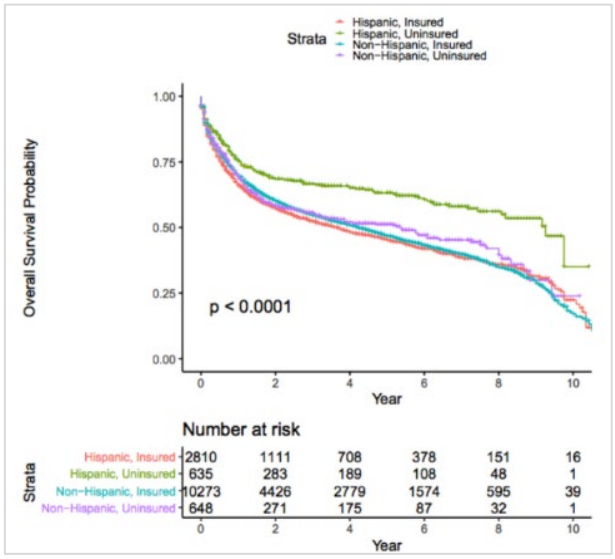

Figure 2. Survival Analysis for DLBCL

Comparison of the survival outcomes of the 4 groups analyzed (iHI, unHI, iNH, and unNH) showing better outcomes for uninsured Hispanics.

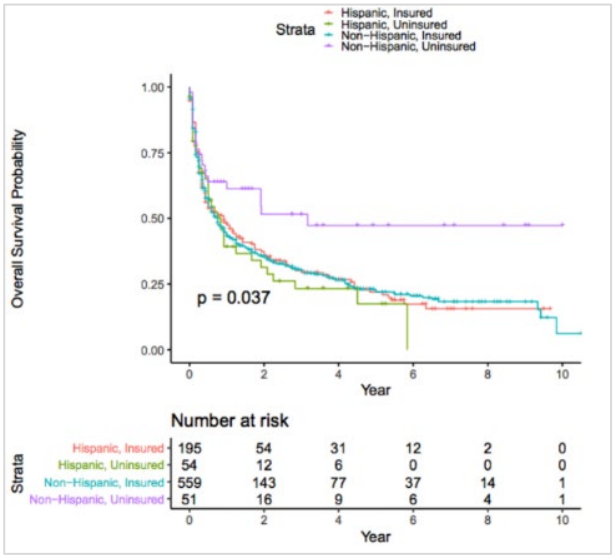

Figure 3. Survival Analysis for PCNS

Comparison of the survival outcomes of the 4 groups analyzed (iHI, unHI, iNH, and unNH) showing better outcomes for uninsured Non-Hispanics.

Medial Survival (MS) was outstanding for uninsured compared to insured patients with HL, DLBCL and PCSN. In HL, MS for iHI was 9.8 y, unHI was not reached, iNH was 10.3 y, and unNH was 10.8 y. In DLBC, MS was 3.7 y, 9.3 y, 4.2 y and 5.3 y, respectively. In PCNS, MS for these groups corresponded to 0.9 y, 0.8 y, 0.7 y and 3.2 y.

Survival probability at 2, 5, and 10 years differed between insured and uninsured groups in HL, DLBCL, and PCNS (Table 1). In HL, iHI was 0.762, 0.686 and 0.448; unHI was 0.873, 0.784 and N/A; iNH was 0.843, 0.765 and 0.584, and unNH was 0.846, 0.782 and 0.703, respectively. In DLBCL, for iHI it was 0.573, 0.456 and 0.222; unHI was 0.685, 0.631 and 0.350; iNH was 0.602, 0.469 and 0.174; unNH was 0.583, 0.510 and 0.239, accordingly. In PCNS, for iHI it was 0.374, 0.219 and N/A; unHI was 0.314, 0.174 and N/A; iNH was 0.354, 0.229 and 0.061; unNH was 0.516, 0.473 and 0.473, correspondingly.

Table 1: Survival Comparison for iHI, unHI, iNH and unNH

		HI – insured			HI - uninsured			NH - insured			NH - uninsured			Survival at 10 years
		Number at risk	Survival Probability	CI	Number at risk	Survival Probability	CI	Number at risk	Survival Probability	CI	Number at risk	Survival Probability	CI	[p-value]
HL	2	664	0.762	[0.737, 0.787]	240	0.873	[0.838, 0.909]	2203	0.843	[0.83, 0.855]	297	0.846	[0.812, 0.881]	<0.0001
	5	380	0.686	[0.658, 0.716]	125	0.784	[0.735, 0.837]	1235	0.765	[0.749, 0.781]	160	0.782	[0.739, 0.881]	
	10	9	0.448	[0.338, 0.593]	N/A	N/A	N/A	26	0.584	[0.516, 0.661]	6	0.703	[0.643, 0.769]	
	Median overall survival	9.8			Not reached			10.3			10.8			
DLBCL	2	1111	0.573	[0.554, 0.593]	283	0.685	[0.646, 0.725]	4426	0.602	[0.592, 0.612]	271	0.583	[0.543, 0.625]	<0.0001
	5	536	0.456	[0.434, 0.478]	152	0.631	[0.588, 0.677]	2119	0.469	[0.458, 0.481]	139	0.51	[0.468, 0.556]	
	10	16	0.222	[0.175, 0.283]	1	0.35	[0.191, 0.644]	39	0.174	[0.147, 0.205]	1	0.239	[0.138, 0.414]	
	Median overall survival	3.7			9.3			4.2			5.3			

PCNS	2	54	0.374	[0.308, 0.454]	12	0.314	[0.203, 0.484]	143	0.354	[0.314, 0.399]	16	0.516	[0.383, 0.695]	<0.0001
	5	21	0.219	[0.16, 0.301]	3	0.174	[0.079, 0.385]	50	0.229	[0.191, 0.275]	7	0.473	[0.336, 0.667]	
	10	N/A	N/A	N/A	N/A	N/A	N/A	1	0.061	[0.013, 0.278]	10	0.473	[0.336, 0.667]	
	Median overall survival	0.9			0.8			0.7			3.2			

Overall Survival difference was statistically significant for uninsured patients diagnosed with HL, DLBCL and PCNS, with p values of <0.0001, <0.0001 and 0.037, respectively (Figure 1-3). For those with HL and DLBCL, the group with the best OS was unHI. For PCNS this trend was noted in unNH. In both three malignancies, the highest OS rate was reported in uninsured population.

The Cox regression model showed that findings for HL were not significant after adjustment but remained statistically remarkable for DLBCL and PCNS (Table 2).

	Variable	Coef	exp(coef)	Pr(>|z|)	Lower .95	Upper .95
HL	Non-Hispanic Insured	-0.23	0.79	0.00E+00	0.69	0.91
	Hispanic uninsured	-0.56	0.57	0.00E+00	0.43	0.75
	Non-Hispanic uninsured	-0.4	0.67	0.00E+00	0.53	0.84
DLBCL	Non-Hispanic Insured	-0.04	0.96	0.28	0.9	1.03
	Hispanic Uninsured	-0.52	0.6	0.00E+00	0.51	0.7
	Non-Hispanic uninsured	-0.15	0.86	0.02	0.75	0.98
Primary CNS	Non-Hispanic Insured	0.14	1.15	0.2	0.93	1.41
	Hispanic Uninsured	0.3	1.35	0.06	0.99	1.85
	Non-Hispanic Uninsured	-0.45	0.64	0.08	0.38	1.05

	Contrast Group	Estimate	Std. Error	X value	Pr (>|z|)
HL	Non-Hispanic Uninsured vs Hispanic Uninsured	0.16	0.16	1	0.7380688
DLBCL		0.36	0.09	3.81	0.0006352
Primary CNS		-0.75	0.27	-2.77	0.0249769

Table 2: Cox Analysis and Contrast: HL, DLBCL, Primary CNS

Discussion

Uninsured patients had better survival, statistically significant for DLBCL and PCNS. For HL, the effect faded after adjustment. Possible reasons include standardized treatment, immediate enrollment into available insurances, distinct healthcare practices, higher compliance/adherence rates, favorable environmental exposures, or genetic predispositions in the Hispanic population.

This study has limitations typical of retrospective data, such as inability to control for all confounders (e.g., comorbidities, serum lactate dehydrogenase levels, lymph node involvement) (4,6,7,16). It also lacked data on adherence, dual insurance coverage, changes in insurance status, military healthcare insurance, subclassification of the Hispanics based on their birthplace or country of origin and timeframe from symptom onset to diagnosis, and from

diagnosis to receiving treatment. Furthermore, this study does not consider costs associated with care such as hospital admissions, emergency department visits, skilled nursing facilities, home health agencies, and hospice services.

Despite no survival difference noted between insured and uninsured Hispanic patients with lymphoma, the uninsured Hispanic patients may experience substantial barriers to quality care in the form of access, cost of care and thus may experience lower quality of life. Future studies should include specifics on treatment, completion rates, adverse events, and follow-up care.

This study uses data from the Texas Cancer Registry including information from Bexar County in San Antonio, where the uninsured population has access to CareLink, a stopgap health insurance program through the University Health System (17). Therefore, these results may reflect the implementation of health policies like the Affordable Care Act.

As personalized therapies evolve, insurance status may limit access to such treatments, and further studies are needed to understand the impact of ethnicity on treatment response. Therefore, although our report indicates that insurance is no longer a determinant for improving OS for Hispanic patients diagnosed with DLBCL or PCNS in Texas, it also raises important questions that must be answered through prospective analysis in this population using comprehensive national databases.

Conclusions

Uninsured Hispanic patients with DLBCL and PCNS in Texas had significantly better OS compared to insured patients after controlling for sociodemographic, clinical, and treatment factors. Therefore, if healthcare insurance is no longer a determinant of OS for certain lymphoma subtypes, delivering the best standard of care should be prioritized. The ultimate goal is to create accountable care organizations that incentivize providers to administer needed care regardless of insurance status, fostering partnerships to offer ideal cancer care for all.

ACKNOWLEDGEMENT

To the Lymphoma Research Group and the Internal Medicine Residency from the University of Texas Health at San Antonio.

Cancer incidence data have been provided by the Texas Cancer Registry, Cancer Epidemiology and Surveillance Branch, Texas Department of State Health Services, 1100 West 49th Street, Austin, TX 78756, https://www.dshs.texas.gov/tcr/."

Conflicts of interest

The authors declare no conflict of interest.

Authors' contributions

Study Concept & Design: CVM, EDD, AK; Acquisition, Analysis & Interpretation: CVM, QL, JEM; Writing of the Manuscript: CVM, ETV, DR

Study Supervision: EDD

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