Impact of English Proficiency on Cancer Treatment Decision Making and Outcomes

Rachael Eileen Baker

A thesis

submitted in partial fulfillment of the

requirements for the degree of

Master of Public Health

University of Washington

2018

Committee:

Lloyd Mancl

Ian Painter

Program Authorized to Offer Degree:

Health Services

University of Washington

Abstract

Impact of English Proficiency on cancer treatment decision making and outcomes

Rachael Eileen Baker

Chair of the Supervisory Committee:

Lloyd Mancl

Department of Oral Health Sciences

With the increasing proportion of households in the US speaking a language other than English, it is important to understand the impact of limited English proficiency on health outcomes, in particular among patients with cancer diagnoses. A recognized indicator for reducing disparities in cancer outcomes in minority patients is participation in clinical trials. This study aimed to assess for differences in English proficient and Limited English Proficient (LEP) patients seeking or with established care at Providence Cancer Center in Portland, Oregon between July 2013 and June 2014. One hundred and seventy-three patient records were selected for review, with 103 classified as English proficient patients and 70 patients classified as LEP. Differences in cancer treatment decisions (defined as clinical trial enrollment, standard of care, and palliative care alone), time to first treatment from diagnosis, and overall and progression-free survival were assessed between the cohorts using chi-square methods. Using $P<0.05$ for significance, a difference was detected between the groups in treatment decisions. English proficient patients were 2.7 times more likely than LEP patients to participate in a clinical trial ($P=0.016$). No statistically significant differences were detected in time to first treatment, classified as treatment delay (>30 days to first treatment), or no treatment delay (≤30 days to first treatment). Additionally no statistically significant differences were detected in overall or progression-free

survival. These results demonstrate a need for future study on effective strategies for enrolling LEP patients in clinical trials and a need for further research involving larger, more sociodemographically diverse patient populations to better assess for differences between English proficient and LEP patients in time to treatment and survival outcomes.

Introduction

An estimated 1,735,350 people in the United States will be diagnosed with cancer in 2018 and 609,640 will die from their disease (Siegel, 2018). A disproportionate amount of those cancer-related deaths will occur among ethnic minorities (NCI, 2008). Among minority populations with some of the highest cancer death rates in the US, Limited-English Proficient (LEP) patients present unique challenges and barriers to timely diagnosis and treatment while representing a growing population in the US. Between 1980 and 2009 the use of a language other than English at home increased by 148 percent, with the US Census Bureau projecting continued increases in languages other than English spoken at home over the next 10 years (Ryan, 2013).

For many cancers two significant factors impacting clinical outcomes are 1) time to diagnosis, and 2) time from diagnosis to first treatment (Neal, et al, 2015; Porter, et al, 2009; Wang, et al, 2009). An additional critical step identified in reducing disparities in cancer care is increasing participation in cancer clinical trials among minority patients (ACS, 2014). The stated "gold-standard" for decreasing disparities in cancer outcomes among LEP patients is the provision and use of interpreter services (Karliner, et al, 2007). However, despite the implementation and organizational policy to utilize medical interpretive services, LEP patients remain at disproportionately higher risk for cancer death and are underrepresented in clinical trials.

There exists a knowledge gap in understanding cancer treatment decision making, and if there are significant delays in time to diagnosis and time from diagnosis to first treatment among LEP patients. We assessed for differences between LEP and English-proficient patients in 1) stage of initial cancer diagnosis, 2) time to first treatment from diagnosis, and 3) treatment decisions, including standard-of-care, clinical trial participation, or palliative care alone.

Methods

Patients seen at Providence Cancer Center, a large, multi-specialty, not-for-profit Cancer Center and Research Institute in Portland, Oregon between July 2013 and June 2014 were identified from a retrospective analysis of electronic medical records. Each patient included in the analysis met inclusion criteria: 1) men and women over age 18; 2) have a new or existing cancer diagnosis (non-cancer hematology cases were excluded); 3) have documented treatment information; and 4) have documented language and interpreter information. Patients were classified as Limited-English Proficient if they were identified as benefiting from interpreter services, either from themselves or a provider. Of the 487 patients seen in the Cancer Center during this time frame, 173 patient records were selected for review and followed for survival data until December 2017. All 70 LEP patients seen at the Cancer Center who met inclusion criteria were included in the LEP cohort. One hundred twenty-five EP patients were randomly selected and reviewed, 103 of which met inclusion criteria and were included in the English proficient cohort.

Several dependent variables were collected to assess the impact of English proficiency, including time to first treatment from diagnosis, categorized as no delay (< 30 days to first treatment), moderate delay (30-45 days to first treatment), and significant delay (>45 days to first treatment). Subjects were excluded in this analysis if diagnosis and treatment occurred on the same day, i.e. diagnosis was confirmed at time of surgery. Impact of English proficiency was further assessed on treatment decision, categorized as standard of care, clinical trial participation (selected if patient participated in clinical trial at any point during treatment), and palliative care alone. Additional outcomes were overall survival status, categorized as alive, deceased, and alive on

hospice, and progression-free survival, a binary categorization of progression of disease from diagnosed state was also evaluated.

Other variables of interest compared between the cohorts included stage at diagnosis, age at diagnosis, patient insurance information, and Eastern Cooperative Oncology Group (ECOG) performance status. EOCG status was used to assess performance status, scaled 0 equaling no disease impact on normal activities to 5, equaling death from disease. Full scale information can be found in Table 1. Each variable selected for analysis may impact disease prognosis, overall survival, and appropriateness for clinical trial consideration.

Table 1: ECOG Performance Status

ECOG	Description
0	Fully active, able to carry on all pre-disease performance without restriction
1	Restricted in physically strenuous activity, but ambulatory and able to carry out work of a light or sedentary nature, e.g., light house work, office work
2	Ambulatory and capable of all selfcare but unable to carry out any work activities. Up and about more than 50% of waking hours
3	Capable of only limited selfcare, confined to a bed or chair more than 50% of waking hours
4	Completely disabled. Cannot carry on selfcare. Totally confined to bed or chair
5	Dead

Frequency and percent were used to summarize categorical patient data, specifically time-to-treatment, treatment decision data, survival status and progression-free survival data, race and sex, and type of insurance data. Mean and standard deviation were used to summarize quantitative measures, including age at study start, age at diagnosis, ECOG status, and stage at diagnosis.

Chi-square tests were conducted to assess for differences between English proficiency and delay in initial treatment, survival status, treatment decision, and insurer type. Mann-Whitney testing was conducted to assess for differences for continuous variables: age at study start, age at diagnosis, stage at diagnosis, and ECOG status.

All differences and associations were considered significant $P<0.05$ using SPSS Version 19.

Results

Sociodemographic and clinical characteristics of the study participants are described in Table 2. There was a total of 173 participants (103 English Proficient and 70 Limited English Proficient). Participants in the English Proficient group were overwhelmingly white, non-Hispanic, 91.2% versus only 20% in the LEP group ($P<0.0001$). Language and racial distribution of Limited English Proficient patients is described in Table 3.

There were no significant differences between English Proficient (EP) and Limited English Proficient (LEP) patients in age (mean 61.2 vs 62.5, $P=0.650$), sex (55.3% female vs 48.6% female, $P=0.382$), age at diagnosis (mean 58.6 vs 58.1, $P=0.777$), stage at diagnosis (mean 3.29 vs 2.78, $P=0.224$), or ECOG performance status (mean 2.7 vs 3.2, $P=0.254$). There was a significant difference in primary insurance type between EP and LEP patients (private insurance 46.6% vs 14.3%, $P=<0.0001$) (Table 2).

Assessment for differences in treatment decision revealed a significant difference between EP and LEP patients with English proficient patients 2.7 times more likely than LEP patients to participate in a clinical trial (27.2% vs 10%, $P=0.008$). Differences in treatment decision are detailed in Table 4.

Table 2: Subject characteristics for English Proficient and LEP groups

Characteristic	Total (n=173) N (%)	English Proficient (n=103) N (%)	LEP (n=70) N (%)	P Value
Race				<0.0001[1]
White, Not Hispanic	108 (62.4)	94 (91.2)	14 (20.0)	
Not White, Not Hispanic	39 (22.5)	2 (2.0)	37 (52.9)	
Not White, Hispanic	18 (10.5)	1 (1.0)	17 (24.3)	
Unknown/Patient Refused	8 (4.6)	6 (5.8)	2 (2.8)	
Age, yrs, mean (SD)	61.6 (12.4)	61.2 (12.8)	62.5 (11.9)	0.650
Sex				0.382
Female	91 (52.6)	57 (55.3)	34 (48.6)	
Male	82 (47.4)	46 (44.7)	36 (51.4)	
Age at Diag. yrs, mean (SD)	58.4 (16.3)	58.6 (12.9)	58.1 (20.4)	0.777
Stage at Diagnosis, mean (SD)	3.1 (1.9)	3.3 (2.2)	2.8 (1.5)	0.224
Stage 0 -in situ, n (%)	2 (1.2)	1 (1.0)	1 (1.4)	
Stage I, n (%)	27 (15.6)	17 (16.5)	10 (14.3)	
Stage II, n (%)	45 (26.0)	24 (23.3)	21 (30.0)	
Stage III, n (%)	38 (22.0)	20 (19.4)	18 (25.7)	
Stage IV, n (%)	49 (28.3)	31 (30.1)	18 (25.7)	
Unknown, n (%)	12 (6.9)	10 (9.7)	2 (2.9)	
Primary Insurance Type				<0.0001[1]
Private	58 (33.5)	48 (46.6)	10 (14.3)	
Medicare	36 (20.8)	6 (5.8)	30 (42.9)	
Medicaid	69 (39.9)	49 (47.6)	20 (28.6)	
Not Insured	9 (5.2)	0	9 (12.9)	
Unknown	1 (1.4)	0	1 (1.3)	
ECOG, mean (SD)	2.9 (3.6)	2.7 (3.6)	3.2 (3.7)	0.254
ECOG 0, n (%)	61 (35.3)	39 (37.8)	22 (31.4)	
ECOG 1, n (%)	38 (22.0)	24 (23.3)	14 (20.0)	
ECOG 2, n (%)	24 (13.8)	14 (13.6)	10 (14.3)	
ECOG 3, n (%)	5 (2.9)	1 (1.0)	4 (5.7)	
ECOG 4, n (%)	2 (1.2)	1 (1.0)	1 (1.4)	
Unknown, n (%)	43 (24.8)	24 (23.3)	19 (27.1)	

[1]Exact P-value

Differences in time to treatment and treatment delays are described in Table 5. While there were not statistically significant differences between EP and LEP patients when assessing for time to treatment and for treatment delay, an ad-hoc analysis revealed that when LEP patients were categorized by Spanish speaking vs other non-English languages, a significant difference was discovered within the LEP cohort. Non-Spanish speaking LEP patients were 5.8 times more likely to experience a delay in treatment (52.6% vs 9.0%, P=0.010 (Table 6). There were not any statistically significant differences between the Spanish and non-Spanish speaking LEP patients in stage at diagnosis, treatment decision or survival status (data not shown).

Differences in overall and progression free survival were assessed using chi-square testing and are described in Table 7. There was not a significant difference in overall survival between the cohorts (P=0.295), or a difference in progression-free survival (P=0.22).

Discussion

In this study comparing time to treatment from diagnosis, treatment decision and survival between English proficient and Limited English Proficient patients the key finding was that English proficient patients are significantly more likely to participate in clinical trials. Additionally, although this study did not demonstrate a link between time to treatment and English proficiency, among the LEP patient cohort, a significant difference was discovered by language spoken in risk for experiencing a treatment delay. More study is needed to determine the contributing factors to why Spanish speaking LEP patients were less likely to experience a delay in initial treatment. Potential factors may include cultural norms regarding treatment seeking behaviors and greater availability of providers who speak Spanish.

Table 3: Language and Racial Characteristics, LEP Patients

Characteristic	(n=70) N (%)
Race	
White	16 (22.9)
Asian	34 (48.6)
Native Hawaiian/Other Pacific Islander	1 (1.4)
Other	17 (24.3)
Patient Refused/Unknown	2 (2.8)
Ethnicity	
Hispanic	17 (24.3)
Non-Hispanic	52 (74.3)
Patient Refused/Unknown	1 (1.4)
Language	
Vietnamese	19 (27.1)
Spanish	17 (24.3)
Russian	13 (18.6)
Chinese	10 (14.3)
Other	11 (15.7)
Mein	*2 (2.8)*
Romanian	*2 (2.8)*
Cambodian	*1 (1.4)*
Ukrainian	*1 (1.4)*
Laotian	*1 (1.4)*
Bosnian	*1 (1.4)*
Burmese	*1 (1.4)*
Farsi	*1 (1.4)*
Chuukese	*1 (1.4)*

While this study demonstrated some interesting and novel findings, there were several limitations in the design that need to be considered. First, the sample was restricted to just one clinic in Portland, Oregon, a city with limited cultural and racial diversity. Additionally, some

potentially confounding factors were not collected, including educational level, smoking status, and household income.

Table 4: Treatment Decision for English Proficient and LEP Patients

Treatment Decision	Total (n=173) N (%)	English Proficient (n=103) N (%)	LEP (n=70) N (%)	P Value
Standard of Care	134 (77.5)	76 (73.8)	58 (82.9)	0.008[1]
Clinical Trial	32 (18.5)	25 (27.2)	7 (10.0)	
Palliative Alone	6 (3.5)	1 (1.0)	5 (7.1)	
Unknown	1 (0.5)	1 (1.0)	0	

[1]Exact P-value

The correlation demonstrated between English proficiency and treatment decision should be considered by investigators in clinic-based oncology practices when treating LEP patients. Providers may want to ensure LEP patients have the support and education needed to feel comfortable participating in oncologic clinical trials. Providers may also want to consider internal biases in enrolling LEP patients in clinical trials, as literature establishes that inclusion in these research studies is critical in reducing disparities in outcomes.

Table 5: Time to Treatment from Diagnosis, by English Proficiency[2]

Treatment Time	Total (n=138) N (%)	English Proficient (n=89) N (%)	LEP (n=49) N (%)	P-Value
Time to Treatment				0.636
< 30 days	86 (62.3)	58 (65.1)	28 (57.1)	
30 – 45 days	19 (13.8)	11 (12.4)	8 (16.3)	
> 45 days	33 (23.9)	20 (22.5)	13 (26.5)	
Treatment Delay				0.352
No Delay (≤ 30 days)	86 (62.3)	58 (65.2)	28 (57.1)	
Delay (≥ 31 days)	52 (37.7)	31 (34.8)	21 (42.9)	

[2]patients diagnosed at time of treatment (surgery) not included

Future studies should use a larger sample size with a larger geographical representation. Areas for future study focus are evaluation of the impact of language spoken on survival status and treatment delay. Future studies should also focus on discovering effective strategies for increasing enrollment of LEP patient in clinical trials and decreasing delays to treatment for non-Spanish speaking LEP patients.

Table 6: Time to Treatment Spanish vs Other, non-English Languages

Treatment Time	Total (n=49) N (%)	Spanish Speaking (n=11) N (%)	Other, non-English (n=38) N (%)	P-Value
Time to Treatment				0.023[1]
< 30 days	28 (57.1)	10 (91.0)	18 (47.4)	
30 – 45 days	8 (16.3)	1 (9.0)	7 (18.4)	
> 45 days	13 (26.6)	0	13 (34.2)	
Treatment Delay				0.014[1]
No Delay (≤ 30 days)	28 (57.1)	10 (91.0)	18 (47.4)	
Delay (≥ 31 days)	21 (42.9)	1 (9.0)	20 (52.6)	

[1]Exact P-value

Table 7: Overall and Progression-Free Survival

Survival Status	Total (n=173) N (%)	English Proficient (n=103) N (%)	LEP (n=70) N (%)	P-Value
Overall Survival				0.295
Alive	102 (60)	65 (63.1)	37 (52.8)	
Deceased	51 (29.5)	27 (26.2)	24 (34.3)	
Alive on Hospice	4 (2.3)	1 (1.0)	3 (4.3)	
Unknown	16 (9.2)	10 (9.7)	6 (8.6)	
Progression-Free Survival	68 (41.2)[3]	43 (45.2)[3]	25 (35.7)[3]	0.220

[3]total patients evaluated for progression-free survival n=131, English Proficient n=95, LEP=70

Conclusion

In conclusion, Limited English Proficient patients are significantly less likely to participate in oncologic clinical trials compared to English proficient patients. This study provides evidence of the critical need of effective strategies in clinical oncologic settings for ensuring LEP patients are represented in clinical trials. Further research is needed to identify if differences in times to treatment exist in a larger sample size and in different geographical settings.

References

Chen MS., Jr. Cancer health disparities among Asian Americans: what we do and what we need to do. Cancer. 2005;104(12 Suppl):2895–902. [PubMed]

Freeman HP, Wingrove BK. National Cancer Institute, Center to Reduce Cancer Health Disparities (NIH, US Department of Health and Human Services); Rockville (MD): 2005. Excess cervical cancer mortality: A marker for low access to health care in poor communities.

Jung SY, Sereika S, Lindov F, Brufsky A, Weissfeld JL, and Rosenzweig M. The effect of delays in treatment for breast cancer metastasis on survival. Breast Cancer Research and Treatment. Jul 2011;103(3):953-64.

IBM Corp. Released 2010. IBM SPSS Statistics for Windows, Version 19.0. Armonk, NY: IBM Corp.

Karliner LS, Jacobs EA, Chen AH, and Mutha S. Do Professional Interpreters Improve Clinical Care for Patients with Limited English Proficiency? A systematic Review of the Literature. Health Serv Res. Apr 2007;42(2) 727-754.

NCI 2008 http://www.cancer.gov/about-nci/organization/crchd/cancer-health-disparities-fact-sheet

Nguyen GT, Leader AE, and Hung WL. Awareness of anti-cancer vaccines among Asian American women with limited English proficiency: An opportunity for improved public health communication. J Cancer Educ. 2009;24(4): 280-283

Oken M, Creech R, Tormey D, et al. Toxicity and response criteria of the Eastern Cooperative Oncology Group. Am J Clin Oncol. 1982;5:649-655.

Ryan C. Language Use in the United States: 2011 American Community Servey Reports. US Census Bureau. Aug 2013

Real et al http://www.nature.com/bjc/journal/v112/n1s/full/bjc201548a.html

Siegel, R. L., Miller, K. D. and Jemal, A. (2018), Cancer statistics, 2018. CA: A Cancer Journal for Clinicians, 68: 7–30. doi:10.3322/caac.21442