Health Literacy is an Independent Predictor of Cancer Patients' Hospitalizations

Laura A. Cartwright, PhD; Levent Dumenci, PhD; J. Brian Cassel, PhD; Maria D. Thomson, PhD; and Robin K. Matsuyama, PhD

ABSTRACT

Background: Lower levels of health literacy predict higher hospitalization rates. Hospitalization is expensive and many admissions are potentially avoidable. Research examining the relationship between health literacy and health outcomes for cancer patients is limited, and no published studies to date have focused on hospitalization and health literacy in cancer patients. **Objective:** This study examined the ability of health literacy to predict hospitalization of cancer patients. **Methods:** This secondary data analysis investigated the relationship between health literacy and hospitalization rates of adult cancer patients in the first 5 years after their diagnosis. The sample included a diverse selection of cancer diagnoses and all stages of cancer were represented. Health literacy was assessed using the Cancer Health Literacy Test 30 (CHLT-30), a psychometrically sound measure of health literacy validated in a cancer patient population. Health literacy's ability to predict the number of times hospitalized, total days spent hospitalized, and number of 30-day readmissions was examined using multivariate negative binomial multiple regression to control for the outcomes and potentially confounding variables. **Key Results:** When controlling for potentially confounding variables, a negative relationship was found between health literacy and the number of inpatient hospitalizations (β = -0.041, p = .009) and the total number of days spent hospitalized (β = -0.028, p = .023) independently, whereas the relationship between health literacy and the number of 30-day readmissions failed to reach significance (β = -0.002, p = .903). **Conclusions:** Patients with lower health literacy need additional assistance to avoid unplanned hospitalizations. **[*Health Literacy Research and Practice*. 2017;1(4):e153-e162.]**

Plain Language Summary: Results from this study found that as cancer patients' health literacy scores decreased, the number of times hospitalized and the total number of days spent in the hospital increased. This relationship was significant when controlling for diagnosis, stage at diagnosis, receipt of chemotherapy, number of comorbidities, death, education, and race. Cancer patients with low health literacy are at a higher risk of being hospitalized.

Health literacy, "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions" (Ratzan & Parker, 2000), predicts health outcomes in a variety of patient populations, with lower levels of health literacy being associated with poorer health outcomes (Berkman, Sheridan, Donahue, Halpern, & Crotty, 2011; McNaughton et al., 2014; Mitchell, Sadikova, Jack, & Paasche-Orlow, 2012; Omachi, Sarkar, Yelin, Blanc, & Katz, 2013). However, there has been limited research examining the relationship between health literacy and health outcomes in cancer patient populations (Koay, Schofield, & Jefford, 2012). The majority of existing research involving health literacy of cancer patients has focused on screening behaviors (Bennett, Chen,

Soroui, & White, 2009; Ojinnaka et al., 2015; Pagan et al., 2012; Scott, Gazmararian, Williams, & Baker, 2002; White, Chen, & Atchison, 2008), cancer knowledge (Davis et al., 2001; Miller, Brownlee, McCoy, & Pignone, 2007; Peterson, Dwyer, Mulvaney, Dietrich, & Rothman, 2007; Peterson et al., 2011; Wilson et al., 2010), and communication or decision-making (Amalraj, Starkweather, Nguyen, & Naeim, 2009; Friedman, Corwin, Dominick, & Rose, 2009; Kim et al., 2001; Seo, Goodman, Politi, Blanchard, & Kaphingst, 2016; Smith, Dixon, Trevena, Nutbeam, & McCaffery, 2009; Sparks & Nussbaum, 2008) as outcomes.

Empirical research suggests that a relationship exists between health literacy and hospitalization rates. Past research found adults presenting to a walk-in clinic with inadequate health literacy were twice as likely to be hospitalized at least once when compared to those with adequate health literacy (Williams, Baker, Parker, & Nurss, 1998). Lower health literacy has been found to predict increased hospital and emergency department use among patients with chronic obstructive pulmonary disease (Omachi et al., 2013), and increased hospitalization rates among heart failure patients (Wu et al., 2013). A study of general medicine patients identified inadequate health literacy as a risk factor for higher 30-day readmission rates (Mitchell et al., 2012).

Although a significant relationship between health literacy and hospitalization rates appears to exist in several patient populations, no studies to date have examined this relationship exclusively in cancer patient populations. Unplanned hospitalizations are expensive and can be distressing for patients. Brooks et al. (2014) found that 19% of hospitalizations were potentially avoidable in a sample of gastrointestinal cancer patients. Cancer patients are at risk of hospitalization due to their disease or treatment side effects. People with lower health literacy may struggle with following complicated medication regimens or identifying symptoms that require medical attention (Berkman et al., 2011; Kalichman et al., 2008; Evangelista et al., 2010). Understanding the relationship between a cancer patient's health literacy and a subsequent hospitalization would inform routine clinical practice and allow for the development of interventions to decrease potentially avoidable hospitalizations.

This study was guided by the Causal Pathways of Health Literacy framework (Paasche-Orlow & Wolf, 2007). This conceptual model identifies three areas of impact—access and utilization of health care, provider-patient interaction, and self-care—as mediators between health literacy and health outcomes. All three areas of impact likely affect hospitalization rates, but without the existence of a direct effect between health literacy and hospitalization they cannot be evaluated. These mediating variables are outside the scope of this study, so the focus was on the direct effects of health literacy and hospitalization. Using a measure of health literacy developed specifically for use among cancer patients, the Cancer Health Literacy Test 30 (CHLT-30) (Dumenci et al. 2014), this retrospective study described here examined whether health literacy predicted hospitalization rates in a patient population comprised exclusively of cancer patients. This is the first published study to examine this relationship for cancer patients.

METHODS

Data Sources

This study was completed as part of a larger R01 study, the Cancer Health Literacy Study (CHLS) (Dumenci et al. 2014), to develop a psychometrically sound measure of health literacy, and it was approved by the Virginia Common-

Laura A. Cartwright, PhD, is a Research Scientist, Department of Health Behavior and Policy, Virginia Commonwealth University. Levent Dumenci, PhD, is a Professor, Department of Epidemiology and Biostatistics, Temple University College of Public Health. J. Brian Cassel, PhD, is an Assistant Professor, Department of Internal Medicine, Division of Hematology/Oncology & Palliative Care, School of Medicine, Virginia Commonwealth University. Maria D. Thomson, PhD, is an Assistant Professor, Department of Health Behavior and Policy, Virginia Commonwealth University. Robin K. Matsuyama, PhD, is an Associate Professor, Department of Health Behavior and Policy, Virginia Commonwealth University.

Address correspondence to Laura A. Cartwright, PhD, Department of Health Behavior and Policy, Virginia Commonwealth University, 830 E. Main Street, Richmond, VA 23219; email: Laura.Cartwright@vcuhealth.org.

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wealth University Institutional Review Board. The CHLS produced the Cancer Health Literacy Test 30 (CHLT-30), a valid and reliable measure of health literacy with broad content coverage (Dumenci et al., 2014). The CHLT-30 is administered on a touch-screen device with the multiple-choice items being read to participants. Participants in the CHLS were adults with a history of a cancer diagnosis considered healthy enough by their oncologists to participate in a 1 hour interview. Participants in the CHLS were recruited from an academic, National Cancer Institute-designated, safety net, urban cancer center, and were at varying stages along the cancer care continuum. Participants in the CHLS signed informed consent documents granting researchers permission to collect data from their electronic medical records. Recruitment methods and study design for the CHLS have been described previously (Dumenci et al., 2014).

Data regarding CHLS participants' cancer diagnoses, cancer stage at diagnosis, date of diagnoses, dates of hospitalizations, comorbidities, date of death, and cancer treatments received were provided by the Analytic Services office at Virginia Commonwealth University from the Massey Data Analysis System (MDAS). The MDAS integrates 12 internal and external data sources to provide data on patients.

Eligibility Criteria

Given the goal of this data analysis to examine the relationship between health literacy and hospitalization rates, additional eligibility criteria were applied to create a dataset in which all patients shared similar likelihood of experiencing hospitalization. Participants eligible for inclusion were those interviewed for the CHLS during the 5 years after their first cancer diagnosis, had valid data for their medical record number (MRN), were seen at the cancer center at least once, and did not receive a bone marrow transplant (BMT) or stem cell transplant (SCT) during the first 5 years after their diagnosis. A valid MRN was required to link CHLS data to the electronic medical data from the cancer center. Standards of care surrounding BMT and SCT require extensive hospital stays and incidents of hospitalization are expected. Participants who received such treatment represented a very small percentage of the CHLS sample, so those who received either transplant (n = 26) were excluded.

Sample

Of the 1,306 participants in the CHLS, 752 (57.5%) met all inclusion criteria. Demographic and clinical information, including comorbidities and cancer diagnostic information for the final dataset, can be seen in **Table 1**.

Variables Included in Model Building

Variables in analyses include health literacy, demographic variables, cancer-related variables, and a number of comorbidities for each participant. Also included in the modeling are two variables intended to address limitations in the study: (1) distance from participants home to the cancer center and (2) time period of data analysis. Death was included in model building for participants who died within the time period of analysis.

CHLT-30 score. The ability of health literacy, as measured by the CHLT-30, to predict hospitalization is the primary predictor of interest in these analyses. The CHLT-30 produces continuous health literacy scores ranging from 0 to 30, with a higher score indicating a higher level of health literacy (Dumenci et al., 2014).

Demographics. Education and race are the demographic variables included in models. Education level was accounted for in model building by including a dichotomous variable that categorized participants as having a high school diploma, general education diploma, or less education, or having more than a high school diploma. Race was accounted for by indicating if participants identified as non-Hispanic minority or non-Hispanic White.

Cancer-related covariates. A participant's cancer diagnosis, cancer stage at diagnosis, and receipt of chemotherapy were included in model building. Participants represented a wide variety of cancer diagnoses. Including diagnosis as a categorical variable to indicate each unique diagnosis would have introduced undue complexity to the models. Given that standards of care often require patients with hematologic cancers to have long, planned hospitalizations for treatment, a flag variable was created to indicate if a person had a hematologic cancer or a nonhematologic cancer.

A flag variable indicating if a patient had a stage IV disease at diagnosis was created and included in model building. Stage IV is the final stage of cancer and represents the most severe disease progression. Identifying those with stage IV disease at diagnosis was designed to help account for varying severity of disease across patients.

Given that chemotherapy can affect a patient's likelihood of hospitalization, a flag variable was created to indicate if a person received chemotherapy at any point during the time period of data analysis.

Comorbidities. The number of comorbidities a person was diagnosed with during the time period of analysis was included in model building. Comorbidities included are

TABLE 1

Demographic Variables

Variable	*n* (%)
Education	
High school diploma/GED or less	267 (35.6)
More than a high school diploma	484 (64.4)
Insurance	
Public[a]	395 (52.6)
Private	331 (44)
Uninsured	25 (3.4)
Race	
Non-Hispanic White	458 (61)
Non-Hispanic minority	293 (39)
Sex	
Female	377 (49.9)
Male	375 (50.1)
Cancer diagnosis	
Hematologic	198 (26.3)
Lung	90 (12)
Head/neck	90 (12)
Genitourinary	81 (10.8)
Gynecologic	76 (10.1)
Breast	76 (10.1)
Colon/rectal/anal	56 (7.4)
Gastrointestinal	34 (4.5)
Skin	19 (2.5)
Endocrine	10 (1.3)
Other or unknown	22 (2.9)

TABLE 1 (*continued*)

Demographic Variables

Variable	*n* (%)
Comorbidity diagnosis	
Metastatic carcinoma	257 (34.2)
Chronic pulmonary disease	178 (23.7)
Mild liver disease	161 (21.4)
Diabetes without complications	161 (21.4)
Congestive heart failure	72 (9.6)
Renal disease	65 (8.6)
Peptic ulcer disease	58 (7.7)
Cerebrovascular disease	42 (5.6)
Peripheral vascular disease	41 (5.5)
Myocardial infarction	34 (4.5)
Diabetes with complications	29 (3.9)
AIDS/HIV	24 (3.2)
Rheumatic disease	22 (2.9)
Paraplegia or hemiplegia	17 (2.3)
Moderate or severe liver disease	10 (1.3)
Dementia	1 (0.1)

Note. GED = general education degree.
[a]Medicare/Medicaid/hospital assistance.

those identified in the Charlson Comorbidity Index (CCI), a commonly used and validated comorbidity measure (Charlson, Pompei, Ales, & MacKenzie, 1987). The diseases used when calculating the CCI include myocardial infarction, congestive heart failure, peripheral vascular disease, cerebrovascular disease, dementia, chronic pulmonary disease, rheumatic disease, peptic ulcer disease, mild liver disease, diabetes without complications, diabetes with complications, cancer, paraplegia or hemiplegia, renal disease, moderate or severe liver disease, metastatic carcinoma, and AIDS/HIV (Quan et al., 2005). Metastatic cancer was included in the comorbidity count as it indicates a change in disease progression and mortality, regardless of what the stage of cancer may have been at diagnosis. Comorbidities were identified using the International Statistical Classification of Diseases and Related Health Problems, 9th Rev. (1979) codes developed by Quan et al. (2005).

Time period of data collection. The focus of data analysis for each participant is the period of 5 years after diagnosis. However, not all participants have a full 5 years of data due to death or timing of interview. The variable time period was calculated to represent the number of years of data available for each participant.

Distance from home to cancer center. How far away a person lived from the cancer center was thought to potentially affect their likelihood of hospitalization at the cancer center versus another hospital. To account for this and to address the limitation of using institutional data that does not document hospitalizations outside of the institution, travel time in minutes from the participants' home zip code to the cancer center was calculated.

Outcome variables. The outcomes of interest in these analyses are hospitalization rates. Hospitalization rates were operationalized as the total number of inpatient hospital admissions, the total number of days spent hospitalized, and the total number of times a participant was readmitted to the hospital within 30 days of discharge during the time period of

TABLE 2

M1 CHLT-30 Multivariate Model Outcomes

Outcome Variable	Range	Mean (*SD*)	Beta	*p* Value
Number of inpatient hospital admissions	0-18	1.95 (2.55)	-0.074	< .001
Total days hospitalized	0-145	10.81 (18.36)	-0.024	.015
Number of 30-day readmissions	0-13	0.61 (1.56)	-0.020	.213

Note. CHLT-30 = Cancer Health Literacy Test 30; M1 = model 1; *SD* = standard deviation.

analysis. All-cause hospitalizations were included to capture participants' experiences during the time period of analysis. The ranges, means, and standard deviations for the outcome variables appear in **Table 2.** Histograms for each outcome can be seen in **Figures 1-3**.

Analysis

The outcome variables of interest, total number of times admitted to the hospital, total number of days spent hospitalized, and number of 30-day readmissions are positively skewed count data demonstrating overdispersion (**Figure 1**), such that the variance and means are not equal ($p < .001$). Given the characteristics of the outcome variables, multivariate negative binomial multiple regression was used in model testing. Multivariate modeling allows for including more than one outcome variable, so all three hospitalization outcomes are included in each model iteration. Multivariate multiple regressions were completed using MPlus software, version 7.4 (Muthen & Muthen, 2010). The Type-I error rate was set to .05. Model building involved three iterations. The first model (M1) included only the CHLT-30 score and the three outcomes variables. The second model (M2) involved using all the covariates of interest to predict both the CHLT-30 and the outcome variables. The CHLT-30 was a predictor of the outcome variables in this model. The second model informed the structure of the third model (M3), in which the CHLT-30 and the outcome variables were regressed only on significant predictors identified in M2. Given that the CHLT-30 score is the primary predictor of interest, it was regressed on to the hospitalization outcomes in M3 regardless of the significance found in M2. The log of the time period was used in analyses to accommodate negative binomial regression computations done on the log scale (Lawless, 1987).

RESULTS

CHLT-30 scores of this sample ranged from 6 to 30, with a mean of 23.68 (standard deviation [*SD*] = 5.52). The majority of participants were non-Hispanic White (61%), had beyond a high school education (64.5%), had a nonhematologic cancer (73.7%), and received chemotherapy as treatment for their cancer (63%). Approximately one-half of the participants were women (49.9%). The total number of comorbidities any one participant had ranged from 0 to 9 diagnoses, with a mean of 1.38 diagnoses (*SD* = 1.49). The number of participants with each individual diagnosis can be seen in **Table 1**. Time period ranged from 0.31 years to 5 years with a mean of 3.6 years (*SD* = 1.27). Travel time in minutes ranged from 6 minutes to 299 minutes, with a mean of 34.74 minutes (*SD* = 30.03).

In the first model, M1, there was a significant relationship between CHLT-30 score and the outcome variables number of admissions ($\beta = -0.074$, $p < .001$) and total number of days hospitalized ($\beta = -0.024$, $p = .015$) seen in **Table 2**.

Table 3 gives the model parameters for M2, in which all covariates described previously and the CHLT-30 scores are included. The covariates stage IV, race, chemotherapy, hematology flag, deceased, and comorbidity count were found to significantly predict at least one of the hospitalization outcomes. Education, race, and comorbidity count were found to significantly predict CHLT-30 score. The covariates log of time period and travel time did not reach significance in predicting any of the hospitalization outcomes and were therefore not included in M3.

In the final multivariate multiple negative binomial model (M3), the CHLT-30 score and the covariates chemotherapy, stage IV, hematology flag, deceased, comorbidity count, and race significantly predicted at least one of the outcome variables. CHLT-30 scores were significantly predicted by comorbidity count, race, and education. Parameters for M3 are given in **Table 4**.

The direct relationship between CHLT-30 score and number of inpatient hospital admissions ($\beta = -0.041$, $p = 0.009$) and total number of days spent hospitalized ($\beta = -0.028$, $p = .023$) were statistically significant. This model shows that for every 1-point increase in CHLT-30 score, participants

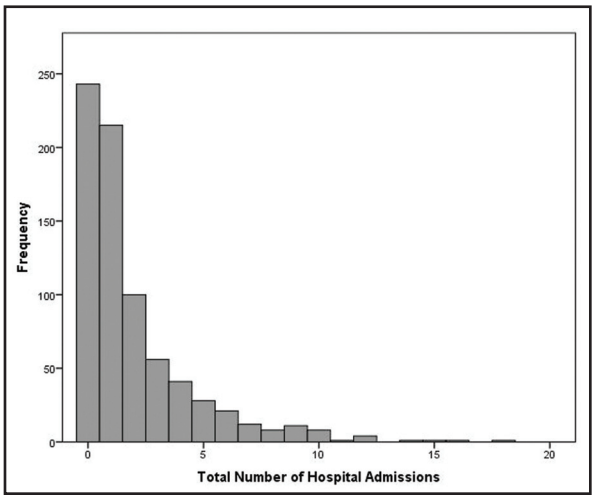

Figure 1. Total number of hospital admissions.

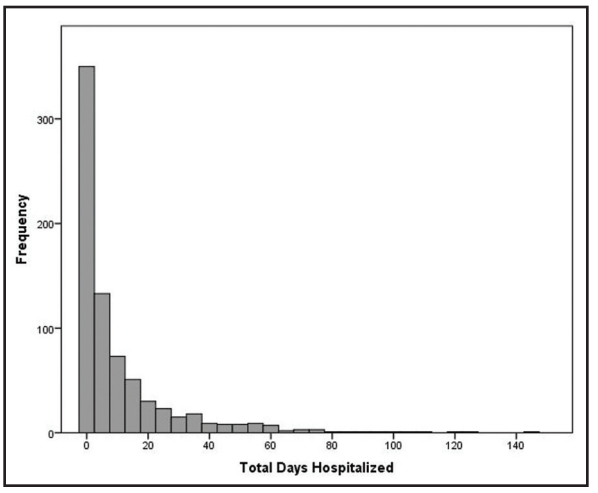

Figure 2. Total number of days hospitalized.

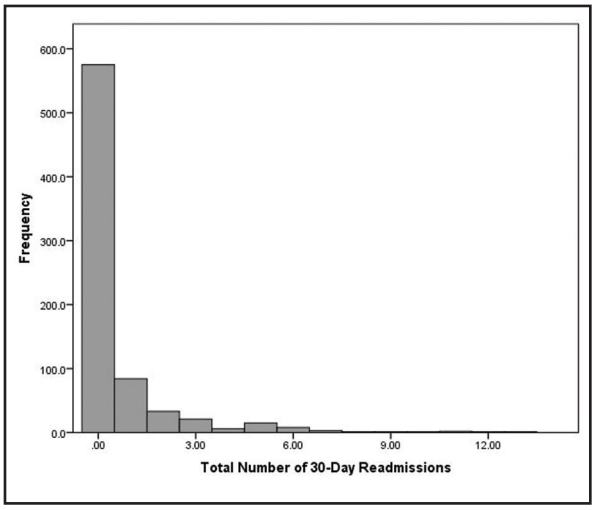

Figure 3. Total number of 30-day readmissions.

experienced a 4% decrease in number of inpatient hospital admissions and a 2.8% decrease in total number of days spent hospitalized, when controlling for covariates and the two other outcomes. Direct effects between CHLT-30 and number of 30-day readmissions (β = -0.002, p = .903) did not reach significance.

In M3, the number of inpatient hospitalization admissions was significantly predicted by receiving chemotherapy (β = 0.630, p < .001), having a hematologic cancer (β = 0.696, p < .001), dying (β = 0.571, p = .001), and number of comorbidities (β = 0.354, p < .001). Total number of days spent hospitalized was significantly predicted by receiving chemotherapy (β = 0.823, p < .001), having a stage 4 cancer (β = -0.365, p = .017), having a hematologic cancer (β = 0.646, p < .001), dying (β = 0.740, p < 0.001), number of comorbidities (β = 0.325, p < .001), and race (β = 0.233, p = .024). The number of 30-day readmissions was significantly predicted by receiving chemotherapy (β = 0.913, p < .001), having a hematologic cancer (β = 1.242, p < .001), dying in the time period (β = 0.601, p = .003), and number of comorbidities (β = 0.310, p < .001).

DISCUSSION

Findings from this study indicate that lower health literacy, as measured by the CHLT-30, is associated with a higher number of inpatient hospitalizations and total number of days spent hospitalized for cancer patients in the first 5 years postdiagnosis. This relationship remains significant after potentially confounding variables are included in the model. The use of multivariate modeling allows us to examine the unique contribution of health literacy score to number of inpatient hospitalizations and total number of days hospitalized by estimating parameters simultaneously. This means even when controlling for the number of times a person is hospitalized, lower CHLT-30 score predicts a higher number of days spent hospitalized. Number of 30-day readmissions did not reach significance in any of the model iterations.

Our study contributes to the mixed findings regarding the relationship between health literacy and hospitalization. A significant inverse relationship between health literacy and the number of inpatient admissions has been found in a number of other patient populations using varying measures of health literacy (Baker, Parker, & Williams, 1998; Omachi et al., 2013; Wu et al., 2013), although Apter et al. (2013) did not find health literacy significantly predicting hospitalization among patients with moderate to severe asthma. Our study did not replicate a past study finding health literacy signifi-

TABLE 3

M2 CHLT-30 Multivariate Model Outcomes

Predictors	Number of Admissions		Days Hospitalized		Number of Readmissions		CHLT-30	
	β	*p* Value	β	*p* Value	β	*p* Value	β	*p* Value
CHLT-30	-0.029	.054	-0.021	.109	0.003	.871	-	-
Stage IV	-0.009	.962	-0.359	.023	-0.053	.826	0.055	.876
Education	-0.284	.085	-0.197	.194	-0.162	.499	5.218	<.001
Race	0.202	.187	0.308	.041	0.143	.507	5.447	<.001
Chemotherapy	0.631	< .001	0.836	< .001	0.910	< .001	-0.345	.266
Hematology flag	0.743	< .001	0.665	< .001	1.227	< .001	-0.013	.969
Deceased	0.672	< .001	0.757	<. 001	0.542	.037	0.139	.755
Comorbidity count	0.337	< .001	0.325	<. 001	0.307	< .001	-0.281	.007
Log of time period	0.078	.553	0.004	.979	-0.091	.635	0.010	.976
Travel time	0.002	.124	0.003	.061	0.001	.826	-0.002	.750

Note. CHLT-30 = Cancer Health Literacy Test; M2 = model 2.

TABLE 4

M3 CHLT-30 Multivariate Model Outcomes

Predictors	Number of Admissions		Days Hospitalized		Number of Readmissions		CHLT-30	
	β	*p* Value	β	*p* Value	β	*p* Value	β	*p* Value
CHLT-30	-0.041	.009	-0.028	.023	-0.002	.903	-	-
Stage IV	-0.011	.953	-0.365	.017	-0.056	.812	-	-
Education	-	-	-	-	-	-	5.250	< .001
Race	0.254	.132	0.2331	.024	0.140	.532	5.426	< .001
Chemotherapy	0.630	< .001	0.823	< .001	0.913	< .001	-	-
Hematology flag	0.696	< .001	0.646	< .001	1.242	< .001	-	-
Deceased	0.571	.001	0.740	< .001	0.601	.003	-	-
Comorbidity count	0.354	< .001	0.325	< .001	0.310	< .001	-0.283	.006

Note. CHLT-30 = Cancer Health Literacy Test; M3 = model 3.

cantly predicting a 30-day readmission (Mitchell et al., 2012). As is frequently the case in health literacy research, the varying patient populations, types of health literacy measures, and scoring techniques used make comparing findings regarding hospitalization across studies difficult. However, it does seem clear that health literacy plays a role as an independent risk factor for hospitalization for some patient populations.

Cancer diagnosis and treatment is a complicated process for anyone. Patients with lower health literacy may particularly struggle to understand their disease, treatment and medication regimens, and symptom management and identification during an already challenging time. Given that much of cancer treatment is administered in a clinic by a clinician, our findings indicate patients may be expe-

riencing difficulties managing their self-care. Short of not showing up for appointments, individual patients have minimal participation in their chemotherapy, radiation, or surgical treatments. However, cancer patients are potentially responsible for taking medication, performing wound care, maintaining a healthy weight via proper nutrition, and protecting themselves from illness when immunocompromised. All of these self-care tasks are difficult for people with lower health literacy and may result in hospitalization if improperly managed.

Health literacy level was identified as an independent predictor of hospitalization even when controlling for education. Physicians can't assume based on education level that a person has the skills necessary to fully understand the care plan or be able to communicate questions or concerns effectively. Knowing a patient's health literacy level would help care providers identify people who may need additional assistance understanding information and who may struggle in accessing information they need later.

Given that all-cause hospitalizations were included in these analyses, these findings may reflect difficulties people with low health literacy experience navigating the health care system. People with limited health literacy receive less preventive care (Scott et al., 2002) and are more likely to struggle with access to care (Berkman et al., 2011), which could lead to increased hospitalization. Future research should examine the specific causes of hospitalizations to fully understand what is causing those with lower health literacy to be hospitalized longer and more frequently.

An interesting finding in this study was that non-Hispanic White participants had significantly more total days spent in the hospital, but not significantly more hospital admissions, as compared to non-Hispanic minority participants. This finding means that even though non-Hispanic White patients are not hospitalized more often, they do have longer hospital stays. Holding other covariates and outcome variables in the model constant, non-Hispanic White participants are expected to have 26% more days spent in the hospital as compared to non-Hispanic minority participants. Although health disparities research has identified racial differences in cancer treatment recommendations (Li, Malone, & Daling, 2003; Shavers & Brown, 2002) and choices (Hurwitz et al., 2016; Ross et al., 2016), research examining hospital length of stay has found non-White cancer patients have longer stays as compared to their White counterparts (Parsons, Habermann, Stain, Vickers, & Al-Refaie, 2012; Ravi et al., 2015). A potential explanation for our conflicting finding may be due to the heterogeneity of the cancer diagnoses of participants in this study. Although analysis accounted for hematologic cancers, which may have characteristically longer planned hospital stays for treatment, it is possible that racial distribution across the cancer diagnoses could further explain this surprising finding. Future work should be done to examine the potential role diagnosis could play between race and number of days spent in the hospital.

Study Limitations

Participants in the CHLS were people with a history of a cancer diagnosis deemed healthy enough to participate by their oncologist. It is possible that patients who responded well to treatment, were overall healthier, or who had less severe disease were more likely to participate in the CHLS. This could create a sample of people less likely to be hospitalized. Although this is a possibility, the sample of participants in these analyses represented a variety of diagnoses, represented the four stages of cancer roughly equally, and had a number of comorbidities.

These analyses were retrospective in nature and were limited in that only data collected and stored by the MDAS was available. If a person were hospitalized at an outside hospital, that hospitalization would not be represented in these analyses. Despite including travel time to the cancer center to address this limitation, and the finding that travel time was not a significant predictor of hospitalization, it is possible that this potentially missing hospitalization data could result in different findings.

Although conducted at a single academic, safety net, cancer center, which may limit generalization, this study benefitted from the large and diverse sample of cancer patient participants. The diversity across socioeconomic status, cancer diagnosis and stage, and race allow for greater generalizability of findings. Findings from this study also fill a gap in the current health literacy literature, as it is the first to examine the relationship between health literacy and hospitalization in a cancer patient population.

CONCLUSION

Using the CHLT-30, a psychometrically valid and reliable measure of cancer health literacy, this study identified a negative relationship between health literacy and number of inpatient admissions and total number of days hospitalized in a sample of cancer patients. This robust finding persisted after controlling for potentially confounding variables. This study considered only counts of hospitalization, and future work should focus on the causes of hospitalizations and extended hospital stays to gain a better understanding of the role of health literacy.

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