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Exploring social support, discharge engagement, and post-discharge outcomes in limited English proficiency inpatient settings

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Thesis

EXPLORING SOCIAL SUPPORT, DISCHARGE ENGAGEMENT, AND POST-DISCHARGE OUTCOMES IN LIMITED ENGLISH PROFICIENCY INPATIENT SETTINGS

by

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ABSTRACT

The United States is becoming increasingly linguistically diverse, particularly with an increase in households with Limited English Proficiency (LEP). The experiences of individuals with LEP differ significantly from those of individuals with English Proficiency (EP) as individuals with LEP often encounter barriers to healthcare resources and services, leading to disparities that ultimately impact their health outcomes. Transitions of care are associated with heightened risks for diverse patient population groups, including populations with LEP. Ongoing efforts to support patients during transitions of care include the implementation of structured discharge teaching conversations. Discharge teaching conversations for patients with LEP demand the use of distinct resources and skills, such as translated After Visit Summary (AVS) documentation, interpreters, and effective communication methods. However, current research on how discharge teaching is conducted for populations with LEP is limited. While the influence of social support on health is recognized, its role during transitions of care for LEP individuals remains poorly understood. This study is a mixed methods observational cohort study which examines current practices for discharge teaching among a population with LEP. Through a baseline assessment, observation of discharge teaching, and a post-discharge patient interview, this study will explore the variation in

social support within an inpatient population with LEP at a safety-net hospital in Boston, MA. Furthermore, the influence of social support during the discharge teaching process and post-discharge outcomes will be investigated. Although chi-square analysis did not reveal significant associations between social support, visitor presence, or post-discharge outcomes, the insights gained into the role of social support during transitions of care may serve as a foundation for developing enhanced discharge teaching methods for LEP individuals, addressing a critical gap in current research.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ABP .... Approved Bilingual Provider

AVS .... After Visit Summary

BMC .... Boston Medical Center

BUMC .... Boston University Medical Campus

EDD .... Estimated Discharge Date

EHRS .... Electronic Health Record System

EP .... English Proficiency

IRB .... Institutional Review Board

LEP .... Limited English Proficiency

PIC .... Patient Informed Consent

RA .... Research Assistant

WHO .... Warm Hand Off

INTRODUCTION

Linguistic Landscape in the United States of America

The United States of America is one of the few countries without an official language at the federal level. However, English has historically been the predominant language used in formal settings, including healthcare settings. Individuals with Limited English Proficiency (LEP) are defined by the U.S. Department of Justice as: "Individuals who do not speak English as their primary language and who have a limited ability to read, speak, write, or understand English." According to the most recent 2022 U.S. Census data, around 22% of the American population speaks a language other than English at home (U.S. Census Bureau 2022). This percentage has steadily increased over the last decade. Among these individuals with varying levels of English proficiency, nearly 38.3% reported speaking English less than *very well* (U.S. Census Bureau 2022). This accounts for approximately 8.4% of the population, or close to 26.5 million people.

Health Disparities Faced by Patients with LEP During Hospitalization

The rising number of households with LEP in the United States necessitates an exploration of the linguistic disparities in healthcare. Language barriers can prove to result in disparities in care across multiple disciplines of medicine (Han 2019, Shah 2015, Squires 2023). Patients with LEP often experience challenges with communication during hospitalization that can have profound implications on the quality of care received as well as their health outcomes (Squires 2023, Duronjic 2023, Karliner 2010, Limaye 2024). For instance, Rambachan *et al.* (2023) found that patients with LEP were less likely to receive pain assessments and pain medication, compared to patients with English Proficiency (EP) (Rambachan 2023).

Additionally, many studies have revealed that non-English speaking patients are more likely to experience adverse events during hospitalization compared to English speaking patients (Divi 2007, Hines 2014, Khan 2020). A study by Divi *et al.* (2007) further revealed that the characterization of the adverse events experienced by LEP and EP patients, varies. In this study, incident reports from six hospitals in the USA were collected over the course of 7 months. Researchers found that LEP speakers were more likely to have experienced an adverse event that involved physical harm, ranging from *moderate temporary harm* to *death* (Divi 2007).

A similar study by Duronjic *et al.* (2023) examined in-hospital mortality rates for patients admitted to an intensive care unit. This study revealed higher rates of in-hospital mortality in groups of patients under 'English not preferred' and 'Interpreter required' classifications, compared to those under the 'English preferred' classification (Duronjic 2023). Furthermore, after accounting for differences in the severity of illness, the 'English not preferred' group was found to have a higher mortality rate compared to the 'Interpreter required' group (Duronjic 2023).

On the other hand, a study assessing the impact of language barriers for patients that had experienced a stroke, found that patients with language barriers had better quality of care measures as well as lower 7-day and 30-day mortality rates compared to those without a language barrier (Shah 2015). Given that not all studies come to the same conclusions regarding the impact of language barriers, these findings suggest that factors beyond language proficiency may influence health outcomes. This highlights the need for further research to explore the complex dynamics at play amongst diverse inpatient populations.

While some studies suggest better health outcomes for patients with LEP, it is important to recognize that the relationship between language barriers and health outcomes is complex. Additionally, accurately identifying when a patient needs an interpreter remains crucial. Evidence suggests that access to professional interpreters can significantly impact the health journey and outcomes of patients with LEP. For example, a study by Karliner *et al.* 2010 revealed that having access to professional interpretation was found to reduce hospitalization length. Specifically, patients with LEP were found to have longer admissions when interpreters were not used during their admission (Karliner 2010). Despite this, studies consistently demonstrate the underutilization of professional interpretation services during hospitalization (Schenker 2011, Tang 2014).

Recent studies make it evident that language barriers can have profound negative implications on health outcomes as well as the quality of care received, though few studies explore the firsthand experiences of patients with LEP during hospitalization as clinical trials often exclude non-English speakers (Duronjic 2023, Villanueva 2023, Muthukumar 2021). The existing research primarily collects LEP patient experiences from the perspective of the physician, nurse, interpreter, or other members of the care team (Choe 2019, Villanueva 2023). Additionally, these studies often focus primarily on Spanish-speaking patients, excluding other language groups (Nouri 2020). For example, a qualitative descriptive case study performed by Villanueva 2023 interviewed nurses regarding their experiences with Spanish-speaking patients. In this study, nurses reported that patients often expressed dissatisfaction and frustration due to language-barriers.

On the other hand, a study performed by Benham-Hutchins *et al.* (2018) contradicted these findings. In this study, Spanish-speaking patients with a recent hospitalization were interviewed regarding their experiences during hospitalization. For the most part, patients reported positive experiences during hospitalization, and many felt that language was not a barrier to their care (Benham-Hutchins 2018).

These contradicting results emphasize the need to continue to study the firsthand accounts from patients with LEP as they may provide a nuanced insight into how language contributes to positive or negative experiences during hospitalization. Furthermore, considering a wider array of linguistic groups than what we see in current literature may be valuable in the development of healthcare practices and policies that better accommodate the needs of a linguistically diverse population.

Challenges Faced by Individuals with LEP During Transitions of Care

Patients with LEP experience disparities throughout their hospitalization as well as throughout transitions of care. Hospital discharge, for example, is a transition of care often associated with readmissions within a 30-day period (Lindholm 2012). The rate of these readmissions is often higher for patients with LEP when compared to patients with EP (Chan 2019, Squires 2021). Additionally, patients with LEP often leave the hospital with a poor understanding of their medications and follow-up appointments (Barreto 2021, Okrainec 2019). Patients with LEP have also been found to be more likely to report post-discharge concerns (Barreto 2021). This makes hospital discharge a critical phase in a patient's healthcare journey.

A language-centered study conducted by Barreto *et al.* (2021) explored the experiences of patients with a recent transition from a hospital inpatient setting to the community. Considering racial, ethnic, and linguistic differences it was found that patients that with LEP were more likely to report post-discharge worries regarding their care plan. Specifically, Barreto *et al.* (2021) found that 21.1% of the participants with LEP reported being concerned about understanding their medications post-discharge, compared to 14.4% of the non-LEP participants. Furthermore, more than half of the participants with LEP reported a lack of use of a medical interpreter and translated documentation during their discharge (Barreto 2021).

As previously mentioned, patients with LEP have also been found to have higher rates of 30-day readmission compared to patients with EP in multiple studies (Karliner 2010, Squires 2021). Hospital readmission rates have often been linked to medication understanding and literacy, with multiple studies showing that populations with low medication literacy often have higher readmission rates (Baretto 2021). However, this occurrence may be mediated by the use language appropriate tools. In fact, patients with LEP that had access to professional interpretation during their admission and discharge processes were found to be less likely to be readmitted within 30 days (Lindholm 2012).

During the process of hospital discharge, patients are often provided with documentation detailing essential information they may need to know for their post-discharge care. This document is often referred to as the After Visit Summary, or the

AVS. In addition to documentation, a member of the patient's care team, often a nurse, is expected to review the AVS with the patient prior to discharge. The process of reviewing the AVS with the patient is often referred to as discharge teaching. The purpose of this process is to increase understanding and collection of health-related information that may aid the patient in their self-care process post-discharge (Pathak 2020).

Speakers with LEP and speakers with EP often require different resources when navigating the healthcare system. During discharge, the AVS is considered to be the fundamental transitional care document which aims to ensure that patients comprehend and adhere to their post-discharge care plans (Choe 2019, Sutherland 2022). However, this document is rarely translated for patients with LEP despite research suggesting that language appropriate tools may be beneficial during the discharge teaching process (Barreto 2021, Khoong 2023). This makes the standard post-discharge document inaccessible to patients with LEP.

In addition to inaccessible documentation, other language appropriate tools have also been found to be underutilized during discharge teaching for patients with LEP. A study done by Choe *et al.* (2021), for example, found that non-English speaking patients were less likely to have safe and effective discharge communication compared to English speaking patients. Additionally, a study by Gutman *et al.* (2021) found that 31% of 101 discharge observations were facilitated without the use of an interpreter, despite studies suggesting interpreter use to be beneficial during the discharge teaching process.

The challenges and barriers faced by patients with LEP during transitions of care highlight the importance of further studying the discharge process in these populations.

Considering that language appropriate tools are currently being underutilized during transitions of care for patients with LEP, assessing and exploring other factors which may play a role during discharge teaching may aid in improving patient experiences during transitions of care.

Recognizing the Influence of Social Support

Current literature recognizes social support as a social determinant of health and its role has been explored in various contexts (World Health Organization 2008). Various instruments have been developed in attempt to quantify social support and doing so is an area of interest in research. The OSSS-3 is an example of a validated instrument used to measure perceived social support (Kocalevent 2018). However, despite the recognized importance of social support, little is known about how to effectively address social factors to improve health (Braveman 2011). Understanding the dynamics between the role of social support during care transitions may aid in developing methods and interventions to maximize the benefits associated with social support to improve health outcomes in hospitalized patients.

In the context of hospitalized patients, Hagan *et al.* (2023), explored the role of social support as a mediator between self-rated physical and psychological health. Their findings revealed that social support provided from friends and family had a significantly greater impact on self-rated physical and psychological health, compared to social support provided by nurses. Although language was not a variable of interest for this study, results of this study suggest that the source of social support matters.

For instance, a longitudinal survey-based study conducted by Carter *et al.* (2023) explored the impact of social support on five aspects of mental and physical health during the COVID-19 pandemic. The aspects explored in this study were: depression, anxiety, post-traumatic growth, physical symptoms, and perceived health. The study suggests that increased social support promotes better outcomes in the five aspects considered (Carter 2023). While results of this study are consistent with existing literature that establishes the positive influence of social support on health, it falls short in addressing how the role of social support may vary within diverse linguistic populations.

Chan *et al.* (2019), attempts to explore this aspect through a randomized control trial which included performing baseline and follow-up interviews with participants belonging to an LEP population. In this study, the Multidimensional Scale of Perceived Social Support (MSPSS), a 12-question instrument, was used to measure social support. The study focused on a population of individuals 55 years of age or older in three language categories: English, Spanish, or Chinese. After analyzing data, participants with the highest social support levels were found to have the lowest combined readmission or mortality rates. Additionally, after accounting for race, it was found that social support played a role in reducing readmission or mortality rates in racial minorities, while the opposite was true for White people. Like the study by Carter *et al.* (2023) these results also link social support to positive health outcomes; however, the focus on an LEP population provides a much-needed insight into this population.

While these studies suggest potential benefits associated with the presence of a social support person during discharge, further investigation is warranted. Understanding the varied roles that social support persons may assume or be expected to fulfill is essential for fostering patient comfort and empowerment in their care journey.

Significance of Study

Language plays an important role in an individual's health journey, particularly during critical periods such as hospital discharge. Hospital discharge is a transition of care associated with heightened risks for patients with LEP. While current efforts are being made to understand the importance of effective discharge habits for patients with LEP, many studies lack direct input from LEP individuals. To best address the challenges mentioned above, it is important to center the experiences of patients with LEP in future studies. Exploring direct accounts of LEP participants may provide a nuanced insight into how language contributes to health disparities seen during periods of transition of care.

Few studies explore how social factors may influence effective communication in LEP populations as well. This study seeks to explore the relationship between social support, discharge interactions, and post-discharge outcomes to provide a more comprehensive understanding of the role of social support on the health outcomes of LEP individuals across varied demographics. Since effective interventions often address more than one of the social determinants of health, understanding these dynamics can help with the development of interventions that would enhance the effectiveness of the discharge process for diverse patient populations.

SPECIFIC AIMS

Patients with LEP face a unique set of barriers in the healthcare process compared to patients with EP. Several studies have tied patients with LEP to higher inpatient readmission rates, compared to their counterparts with EP. In addition, multiple studies describe language as a barrier to effective communication for hospitalized patients. Furthermore, language barriers are tied to adverse disparities during care transitions. While several studies emphasize the importance of language proficiency in healthcare settings, few studies focus on the relationship between social support, engagement during discharge, and post-discharge attitudes in populations with LEP.

This paper seeks to address the following aims:

1. Measure the level of social support amongst a population with LEP.
2. Assess the relationship between social support and visitor presence during the discharge teaching process.
3. Analyze the relationship between social support and patient/visitor engagement during the discharge teaching process in a population with LEP.
4. Assess the overall impact of social support and patient/visitor engagement on post-discharge attitudes regarding patient readiness for discharge and the presence of questions in a population with LEP.

METHODS

Study Design

This study served as a preparatory study for a clinical trial, aiming to understand current practices in discharge teaching. The study was conducted with a mixed-methods approach that incorporated both quantitative and qualitative methods. Data sources consisted of an initial baseline interview, direct observation of discharge encounters, and a post-discharge phone interview. The baseline interview was conducted during participant hospitalization. The results presented in this analysis are a secondary analysis of the quantitative data drawn from the three structured data sources. The study was approved by the Boston Medical Center (BMC)/Boston University Medical Campus (BUMC) Institutional Review Board (IRB) as well as nursing leadership and nurse managers at BMC.

Study Population and Eligibility

Patients admitted to medicine teams at Boston Medical Center (Boston, MA) were screened for study inclusion criteria. Identifying eligible participants consisted of three screening rounds. The initial screening round included the use of BMC's Electronic Health Record System (EHRS), Epic (Epic Systems Corporation, Madison, WI). Patients who: 1) were 18 years of age or older, 2) had a preferred language listed as Spanish, Haitian Creole, Cape Verdean, or Vietnamese in their EHRS, and 3) were not under infectious airborne or suicide precautions moved on to the second screening round. The second screening round required research assistants to enter patient charts to look for a phone number in the patients' contact information. Patients who did not have a phone number were not eligible and patients who had a phone number moved on to the third and final round of screening. Data from Qventus (Qventus, Inc., Mountain View, CA) was used as the final determinator of eligibility in the screening process. Patients who were expected to be discharged to the community, not a sub-acute rehabilitation facility or other care center and had an Estimated Discharge Date (EDD) within 72 hours of the screening date were determined to be eligible to participate. Unique study IDs were assigned to all screened subjects.

Warm Hand Off

An initial warm hand off (WHO) facilitated by the patient's nurse was requested by the research assistants prior to any direct patient contact, as required by the hospital's Institutional Review Board (IRB). Research assistants contacted the patient's nurse in person or via a secure chat messaging system in order of sequential room number. Patients that agreed to the nurse facilitated WHO were eligible to be approached by the research assistants for study recruitment.

Recruitment and Enrollment

Research assistants approached patients in the order in which nurses communicated completion of the WHO requirement as well as patient availability. Eligible participants were approached with a copy of a language-appropriate consent form approved by the IRB. Potential participants underwent a Patient Informed Consent (PIC) process which included a comprehensive overview of the study consent form as well as use of the teach-back method to gauge patient understanding of the study. Communication between research assistants and participants was facilitated via a professional phone interpreter or a language-concordant research assistant with Approved Bilingual Provider (ABP) certification. Participants that agreed to participate were asked to sign, name, and date the informed consent form, along with the research assistant facilitating the PIC process. The original signed consent forms were collected and retained by the study team for records and participants were provided with a copy of the signed form.

Baseline Interview

A baseline interview was conducted on site after participant enrollment, before discharge teaching. The baseline interview was administered by the research assistant via a professional phone interpreter or via a language concordant research assistant and documented directly into REDCap. The baseline interview consisted of questions regarding the participants' general demographics, social support, medical history, as well as medication adherence habits. Participants were asked to state their preferred language at this time which may conflict with that was reported in the EHRS at time of screeing. Baseline interview questions relevant to this study can be found in Table 1.

Measuring Social Support

The level of self-reported social support was determined using a three-item instrument known as the Oslo Social Support Scale (OSSS-3). The OSSS-3 was developed and validated in German adult population (Kocalevent 2018). Responses to each question correspond to a value which are summed up to produce a score ranging from 3 to 14. The final score was then interpreted under one of three categories: *Poor*

Social Support, *Moderate Social Support*, or *Strong Social Support*. Appendix A displays the OSSS-3 questions and the scale used to measure social support.

Observation of Discharge Encounter

Research assistants communicated with the participants' nurses to determine when discharge could be expected for each enrolled participant. On the date of discharge, prior to the observation of the discharge encounter, research assistants confirmed that a signed participant informed consent form was on file for the participant being discharged. Additionally, research assistants verbally consented parties including nurses, family members, professional phone interpreters, and other visitors present that may have been present during discharge teaching. Audio recording of the discharge teaching was optional and could be declined by the participant or anyone present during discharge teaching. In addition to the audio recording, research assistants filled out a structured observation form in REDCap that documented aspects such as nurse-patient communication, teaching strategies, and the presence of family members. Specific questions on the REDCap form used to collect data relevant to this study can be found in Table 1. Recordings of the discharge observations were directly uploaded to a secure cloud storage site known as Box (Box, Inc., Redwood City, CA). Recordings were then deleted from the device used to record at time of discharge.

Post-Discharge Phone Interview

Scheduling of the follow-up phone call took place after the observation of the discharge teaching. Follow-up phone calls were conducted 1-2 weeks after discharge and were completed using a professional phone interpreter or with a language concordant

ABP research assistant. The post-discharge phone interview consisted of questions of which some addressed participants' level of understanding and satisfaction of discharge teaching instructions as well as post-discharge outcomes related to the participants' health. Each phone interview lasted approximately 20 minutes. Five attempts were made to contact the participant if they could not be reached. A sample of the post-discharge phone interview questions relevant to this study can be found in Table 1.

Data Collection

Data for this study was collected between September 2023 and November 2023. REDCap was used as the central data collection platform. Study completion was defined as having completed the Baseline Interview, Observation of Encounter, and the Follow-Up Phone Interview. The sample size for this study was determined based on feasibility and available study resources and the minimum sample size was set by a qualitative analysis.

Statistical Analysis

R studio version 2023.06.2+561 was used to perform the statistical analysis for the data. Characteristic statistics for both groups were compiled using the *summary()* and *describe()* functions within R studio. When determining the appropriate statistical methods to analyze the data, factors such as the sample size and variable classification were considered. Pearson's Chi-Squared Test and Contingency Coefficients (C) were used to analyze the data. R studio was also used to create contingency tables, pie charts, and bar graphs of the data for visualization of the study results. Questions related to the variables of interest were identified prior to any statistical analysis (Table 1).

Additionally, categorical variables were simplified to binary variables in some instances (Table 2). Demographic information was summarized using means and standard deviations. Categorical variables were summarized using frequency and percentages. For purposes of this study there were two groups defined. The first group included all enrolled participants (n = 32). The second group included all enrolled participants with full study completion (n = 15). Reasons for the lack of study completion included loss of eligibility, discharge outside of study hours, and non-response to the post-discharge phone call.

Table 1. Interview and Observation Instruments.
An overview of the relevant data collection questions of interest for this study.

Baseline Interview
Language of Encounter o Spanish o Haitian Creole o Cape Verdean Creole o Vietnamese o English
How many people are so close to you that you can count on them if you have great personal problems? (OSSS-3) o None o 1-2 o 3-5 o 5+
How much interest and concern do people show in what you do? (OSSS-3) o None o Little o Uncertain o Some o A lot
How easy is it to get practical help from your neighbors should you need it? (OSSS-3) o Very difficult o Difficult o Possible o Easy o Very Easy
Observation of Encounter
Caregiver, family, or other visitor present? o Yes, in person o Yes, via phone o No
Did the patient or visitor ask any questions? o Yes, at least one o Yes, 2 or 3 o More than 3 o No

Table 1 continued. Interview and Observation Instruments.
An overview of the relevant data collection questions of interest for this study.

Post-Discharge Phone Interview
How prepared did you feel for discharge? o Very unprepared o Unprepared o Somewhat prepared o Prepared o Very prepared
When you left the hospital, did you feel you understood the things you need to do to manage your health? o Strongly disagree o Disagree o Agree o Strongly agree
Since discharge, have you tried to contact the hospital with any questions? o Yes o No
Do you have any questions about your hospital stay that were not answered? o Yes o No

Table 2. Simplification of Categorical Questions.
An overview of the data collection questions made during the data cleaning process.

Caregiver, family, or other visitor present? o Yes, in person o Yes, via phone o No	→	Caregiver, family, or other visitor present? o Yes o No
Did the patient or visitor ask any questions? o Yes, at least one o Yes, 2 or 3 o More than 3 o No	→	Did the patient or visitor ask any questions? o Yes o No

RESULTS

Patient Characteristics

32 participants were enrolled in this study. Enrollment included participants from all 4 of our languages of interest as well as English. 78.1% of the enrolled participants were Spanish speaking, 9.4% were Haitian Creole speaking, 6.2% were Cape Verdean Creole speaking, 3.1% were Vietnamese speaking, and 3.1% were English speaking (Table 3). The mean age for this group was 50.81 years (SD = 15.84). 46.9% were Female and 53.1% were Male. 78.1% were of Hispanic or Latino origin.

15 of the enrolled 32 participants reached study completion. Data for participants with full study completion included Spanish (80%), Cape Verdean Creole (13.3%), and Haitian Creole (6.7%). The mean age was 46.6 years (SD = 13.6). 53.3% were Female and 46.7% were Male. 80% were of Hispanic or Latino origin.

Table 3. Descriptive Statistics for the Study Population.
A summary the categorical and continuous variables collected for all enrolled participants and for all enrolled participants with full study completion. Categorical variables are described using frequency and percentage. Continuous variables are described using the mean and standard deviation values.

		All Enrolled Participants (n = 32)	**Enrolled Participants with Full Study Completion (n = 15)**
Age (years)			
	Mean	50.81	46.6
	Standard Deviation	15.84	13.6
Gender			
	Male	17 (53.1%)	7 (46.7%)
	Female	15 (46.9%)	8 (53.3%)
Race			
	Black or African American	7 (21.9%)	3 (20%)
	White or Caucasian	8 (25%)	4 (26.7%)
	Asian	1 (3.1%)	0 (0%)
	Native Hawaiian or Pacific Islander	0 (0%)	0 (0%)
	American Indian or Alaska Native	1 (3.1%)	0 (0%)
	Some other race	17 (53.1%)	8 (53.3%)
Ethnicity			
	Hispanic/Latino	25 (78.1%)	12 (80%)

Table 3 continued. Descriptive Statistics for the Study Population.
A summary the categorical and continuous variables collected for all enrolled participants and for all enrolled participants with full study completion. Categorical variables are described using frequency and percentage. Continuous variables are described using the mean and standard deviation values.

		All Enrolled Participants (n = 32)	**Enrolled Participants with Full Study Completion (n = 15)**
Language			
	English	1 (3.1%)	0 (0%)
	Spanish	25 (78.1%)	12 (80%)
	Haitian Creole	3 (9.4%)	1 (6.7%)
	Cape Verdean Creole	2 (6.2%)	2 (13.3%)
	Vietnamese	1 (3.1%)	0 (0%)
OSSS-3 Score			
	Mean	10.22	9.80
	Standard Deviation	2.61	3.08
OSSS-3 Interpretation			
	Poor Social Support	8 (25%)	4 (26.7%)
	Moderate Social Support	12 (37.5%)	6 (40%)
	Strong Social Support	12 (37.5%)	5 (33.3%)

Specific Aim 1: Social Support Amongst the LEP Population

When analyzing the level of social support amongst the enrolled participants, 38% were found to have *Strong Social Support*, 38% were found to have *Moderate Social Support*, and 25% were found to have *Poor Social Support* (Figure 1). In the participants with full study completion, 33% had *Strong Social Support*, 40% had *Moderate Social Support*, and 27% had *Poor Social Support* (Figure 1).

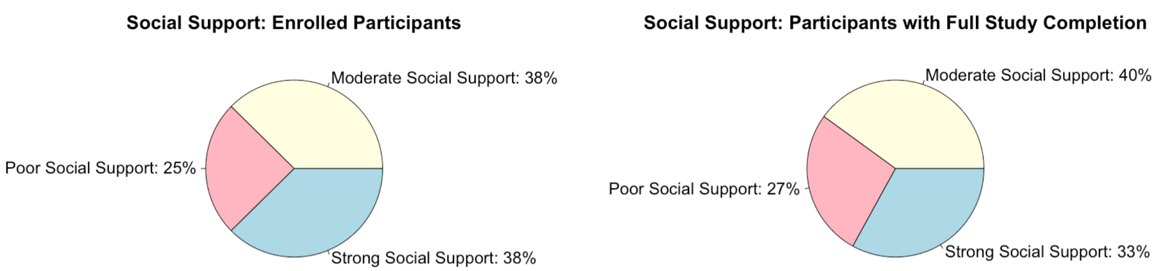

Figure 1. Study Population Social Support.
Level of social support for all enrolled participants (n=32) and for those with study completion (n=15).

Table 4 presents the frequency distribution of observations that fall in categories defined by the *Language of Encounter* and *Social Support* variables in our enrolled study population. The table reveals that a total of 2 Cape Verdean Creole speakers, 1 English speaker, 3 Haitian Creole speakers, 15 Spanish speakers, and 1 Vietnamese speaker were included in the analysis (Table 4).

Among Cape Verdean Creole speakers, all were found to have *Strong Social Support* (Table 4). Among English speakers, all were found to have *Poor Social Support* (Table 4). Among Haitian Creole speakers, 1 was found to have *Poor Social Support*, 1 was found to have *Moderate Social Support*, and 1 was found to have *Strong Social Support* (Table 4). Among Spanish speakers, 6 were found to have *Poor Social Support*, 10 were found to have *Moderate Social Support*, and 9 were found to have *Strong Social Support* (Table 4). Among Vietnamese speakers, all were found to have *Moderate Social Support* (Table 4).

A Pearson's Chi-squared test was conducted to assess the association between language and social support. The test yielded an X-squared value of 8.1778 with 8 degrees of freedom (DF), resulting in a P-value of 0.4163 (Table 4). The contingency coefficient, measuring the strength of association, was found to be 0.4512 (Table 4).

Table 4. Enrolled: Social Support vs. Language.
An overview of the relationship and association between social support and language of encounter for all enrolled participants (n=32). Includes the use of a contingency table, Chi-Square analysis, and the contingency coefficient.

	Poor Social Support	Moderate Social Support	Strong Social Support	Total
Spanish	6	10	9	25
Haitian Creole	1	1	1	3
Cape Verdean Creole	0	0	2	2
Vietnamese	0	1	0	1
English	1	0	0	1
Total	8	12	12	32

Pearson’s Chi-Squared Test

χ^2	DF	P-value
8.1778	8	0.4163

Effect Size Measure:
Contingency Coefficient (C)

0.4512

Table 5 presents the frequency distribution of observations that fall in categories defined by *Language of Encounter* and *Social Support* variables in our population of enrolled participants with study completion. The table reveals that a total of 2 Cape Verdean Creole speakers, 1 Haitian Creole speaker, and 12 Spanish speakers were included in the analysis (Table 5). Among Cape Verdean Creole speakers, 2 were found to have *Strong Social Support* (Table 5). Among Haitian Creole speakers, 1 was found to have *Poor Social Support* (Table 5). Among Spanish speakers, 3 were found to have *Poor Social Support*, 6 were found to have *Moderate Social Support*, and 3 were found to have *Strong Social Support* (Table 5).

The Pearson's Chi-squared test for this comparison resulted in an X-squared value of 7.3125 with 4 DF and a P-value of 0.1203 (Table 5). The contingency coefficient for this group was 0.5725 (Table 5).

Table 5. Participants with Study Completion: Social Support vs. Language.
An overview of the relationship and association between social support and language of encounter for participants with study completion (n=15). Includes the use of a contingency table, Chi-Square analysis, and the contingency coefficient.

	Poor Social Support	Moderate Social Support	Strong Social Support	Total
Spanish	3	6	3	12
Haitian Creole	1	0	0	1
Cape Verdean Creole	0	0	2	2
Total	4	6	5	15

Pearson's Chi-Squared Test		
χ^2	DF	P-value
7.3125	4	0.1203

Effect Size Measure: Contingency Coefficient (C)
0.5725

Specific Aim 2: Social Support and Visitor Presence During Discharge

Only 20% of our participants with full study completion had a visitor present during their discharge teaching (Figure 2).

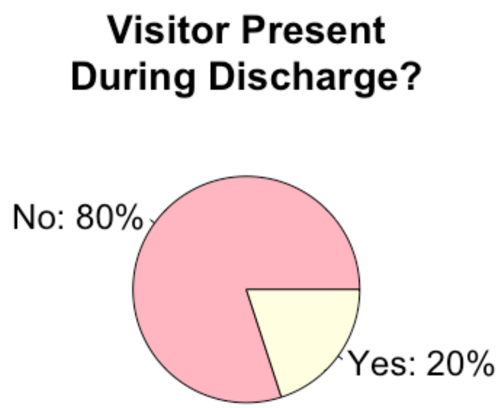

Figure 2. Visitor Presence During Discharge.
Pie chart displaying percentage of visitors present or absent during the observed discharges for the participants with study completion (n=15).

When looking at visitor presence during the discharge process for our participants with study completion, 0 of the 4 participants with *Poor Social Support* had a visitor present, 2 out of the 6 participants with *Moderate Social Support* had a visitor present, and 1 out of 5 of the participants with *Strong Social Support* had a visitor present (Table 6). The Pearson's Chi-squared test for this comparison resulted in an X-squared value of 1.6667 with 2 DF and a P-value of 0.4346 (Table 6). The contingency coefficient for this group was 0.3162 (Table 6).

Table 6. Social Support vs. Visitor Presence.
An overview of the relationship and association between social support and visitor presence during discharge for participants with study completion (n=15). Includes the use of a contingency table, Chi-Square analysis, and the contingency coefficient.

	Poor Social Support	Moderate Social Support	Strong Social Support	Total
Visitor Present	0	2	1	3
Visitor Absent	4	4	4	12
Total	4	6	5	15

Pearson's Chi-Squared Test		
χ^2	DF	P-value
1.6667	2	0.4346

Effect Size Measure: Contingency Coefficient (C)
0.3162

Specific Aim 3: Social Support and Engagement During Discharge

60% of the participants with study completion asked questions during the discharge teaching process or had a visitor present that asked questions (Figure 2). Out of those that asked questions, 27% asked at least one question, 13% asked 2 or 3 questions, and 20% asked more than 3 questions (Figure 2).

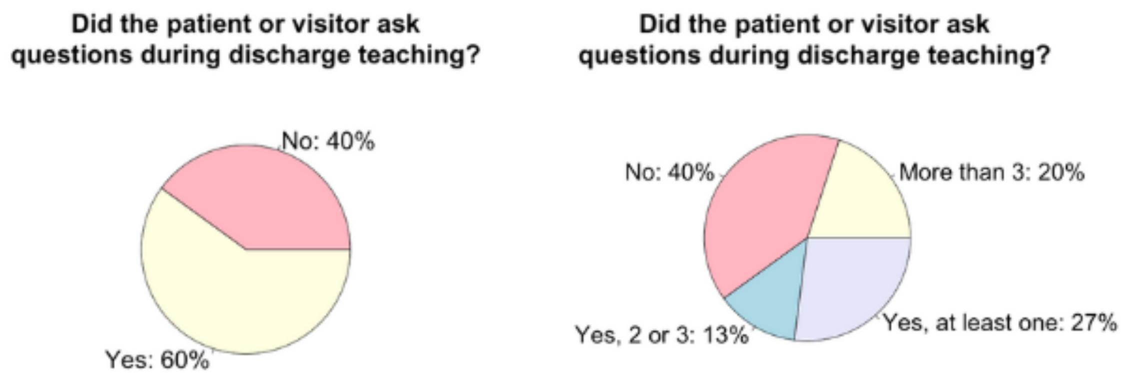

Figure 3. Discharge Engagement.
Pie chart displaying percentage of questions asked during the observed discharges for the participants with study completion (n=15).

Table 7 and Table 8 present the contingency tables showing the frequency distribution of observations that fall in categories defined by the *Questions Asked* and *Social Support* variables. 9 total participants asked questions during discharge (Table 7). In those that did not ask questions during discharge, 1 had *Poor Social Support*, 2 had *Moderate Social Support*, and 3 had *Strong Social Support* (Table 8). In those that asked at least one question, 1 had *Poor Social Support*, 2 had *Moderate Social Support*, and 1 had *Strong Social Support* (Table 8). In those that asked 2 or 3 questions, 1 had *Moderate Social Support*, and 1 had *Strong Social Support* (Table 8). In those that asked more than 3 questions, 2 had *Poor Social Support*, 1 had *Moderate Social Support* (Table 8). The

Pearson's Chi-squared test for this comparison resulted in a X-squared value of 4.5625 with 6 DF and a P-value of 0.6010 (Table 8). The contingency coefficient was 0.4829 (Table 8).

Table 7. Social Support vs. Questions Asked During Discharge.
An overview of the relationship and association between social support and visitor presence during discharge for participants with study completion (n=15). Includes the use of a contingency table, Chi-Square analysis, and the contingency coefficient.

	Poor Social Support	Moderate Social Support	Strong Social Support	Total
Did ask questions	3	4	2	9
Did not ask questions	1	2	3	6
Total	4	6	5	15
Pearson's Chi-Squared Test				
χ^2	DF	P-value		
1.3194	2	0.5170		
Effect Size Measure: Contingency Coefficient (C)				
0.2843				

Table 8. Social Support vs. Number of Questions Asked During Discharge.
An overview of the relationship and association between social support and visitor presence during discharge for participants with study completion (n=15). Includes the use of a contingency table, Chi-Square analysis, and the contingency coefficient.

	Poor Social Support	Moderate Social Support	Strong Social Support	Total
None	1	2	3	6
At least one	1	2	1	4
2 or 3	0	1	1	2
More than 3	2	1	0	3
Total	4	6	5	15

Pearson's Chi-Squared Test		
χ^2	DF	P-value
4.5625	6	0.6010

Effect Size Measure: Contingency Coefficient (C)
0.4829

Specific Aim 4: Post-Discharge Outcomes

When asked the question, “How prepared did you feel for discharge?” 7% of the participants responded *Somewhat prepared*, 47% responded *Prepared*, and 47% responded *Very Prepared* (Figure 3). When asked the question, “When you left the hospital did you feel you understood the things you needed to do to manage your health?” 40% of participants responded *Strongly agree*, 47% responded *Agree*, and 13% responded *Disagree* (Figure 3). Lastly, 13% of the participants reposted having unanswered questions regarding their hospital stay, yet only 7% of the participants reported contacting the hospital with questions post-discharge (Figure 3).

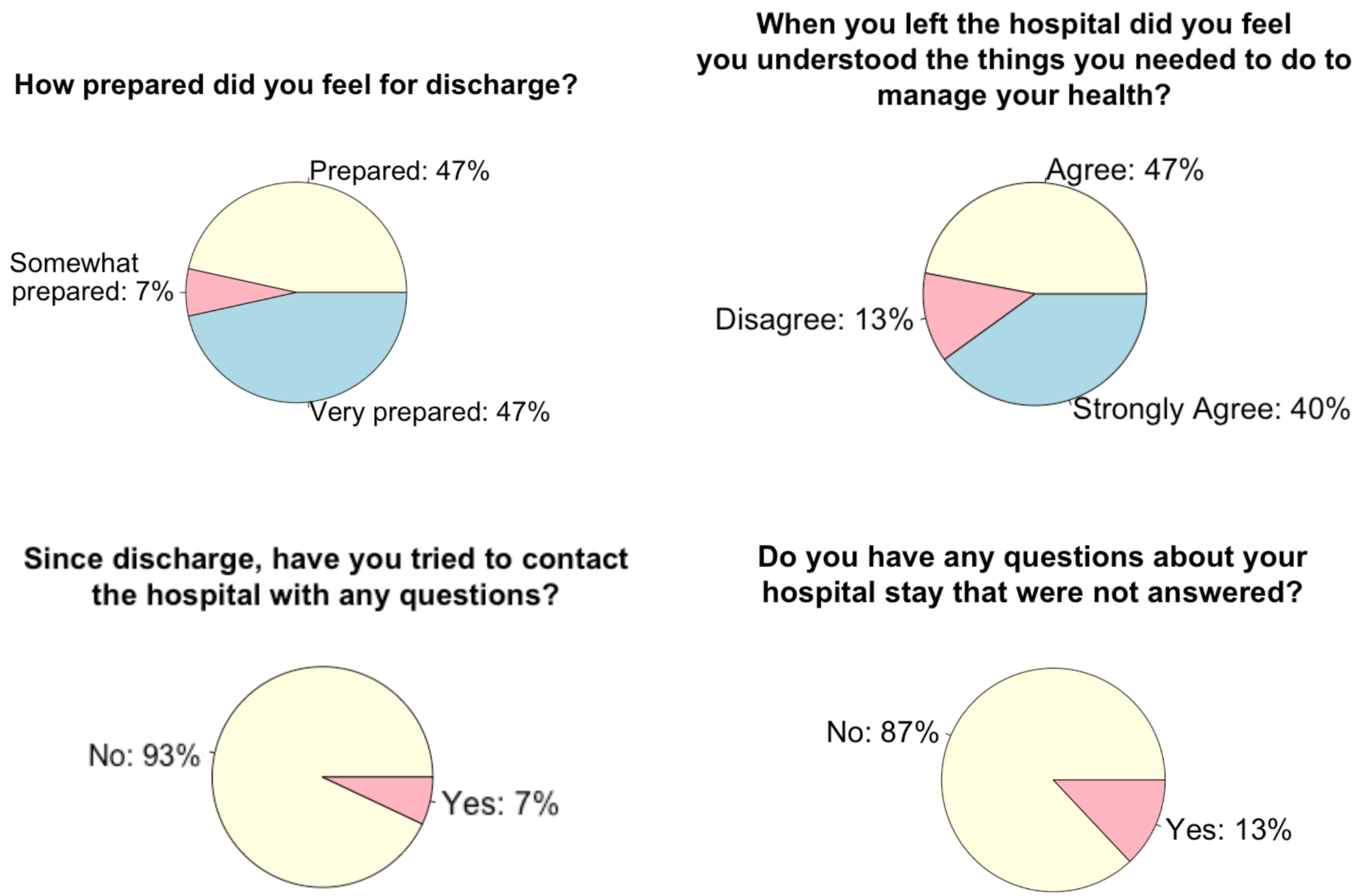

Figure 4. Post-Discharge Outcomes.
Displays the percentage of responses received for the post-discharge outcomes of interest for participants with study completion (n=15).

Post-Discharge Outcomes in the Context of Social Support

Those who answered *Somewhat prepared*, 1 had *Strong Social Support* (Table 9). Those who answered *Prepared*, 3 had *Poor Social Support*, 2 had *Moderate Social Support*, and 2 had *Strong Social Support* (Table 9). Those who answered *Very Prepared*, 1 had *Poor Social Support*, 4 had *Moderate Social Support*, and 2 had *Strong Social Support* (Table 9). Pearson's Chi-squared test performed between social support and self-reported feeling of understanding resulted in a X-squared value of 3.9286 with 4 DF and a P-value of 0.4158 (Table 9). The contingency coefficient was 0.4556 (Table 9).

Table 9. Social Support vs. Patient Preparedness.
An overview of the relationship and association between social support and visitor presence during discharge for participants with study completion (n=15). Includes the use of a contingency table, Chi-Square analysis, and the contingency coefficient.

	Poor Social Support	Moderate Social Support	Strong Social Support	Total
Somewhat prepared	0	0	1	1
Prepared	3	2	2	7
Very prepared	1	4	2	7
Total	4	6	5	15

Pearson's Chi-Squared Test		
χ^2	DF	P-value
3.9286	4	0.4158

Effect Size Measure: Contingency Coefficient (C)
0.4556

Additionally, 13% of participants reported that they had unanswered questions about their hospital stay (Figure 3). Those that had questions had either *Poor* or *Strong Social Support* (Table 10). For those that did not have questions, 3 had *Poor Social Support*, 6 had *Moderate Social Support*, and 4 had *Strong Social Support* (Table 10). Pearson's Chi-squared test performed between social support and reporting of unanswered questions resulted in a X-squared value of 1.5865 with 2 DF and a P-value of 0.4524 (Table 10). The contingency coefficient was 0.3093 (Table 10).

Table 10. Social Support vs. Unanswered Questions Post-Discharge.
An overview of the relationship and association between social support and unanswered questions reported post-discharge for participants with study completion (n=15). Includes the use of a contingency table, Chi-Square analysis, and the contingency coefficient.

	Poor Social Support	Moderate Social Support	Strong Social Support	Total
Unanswered questions	1	0	1	2
No unanswered questions	3	6	4	13
Total	4	6	5	15

Pearson's Chi-Squared Test		
χ^2	DF	P-value
1.5865	2	0.4524

Effect Size Measure: Contingency Coefficient (C)
0.3093

Post-Discharge Outcomes in the Context of Visitor Presence During Discharge

All the participants that had a visitor present during their discharge reported feeling *very prepared* for discharge during their post-discharge interview (Table 11). For those that did not have a visitor present, 1 reported feeling *somewhat prepared*, 7 reported feeling *prepared*, and 4 reported feeling *very prepared* (Table 11). Pearson's Chi-squared test performed between visitor presence and patient feeling of preparedness resulted in a X-squared value of 4.2857 with 2 DF and a P-value of 0.1173 (Table 11). The contingency coefficient was 0.4714 (Table 11).

Table 11. Visitor Presence vs. Patient Preparedness.
An overview of the relationship and association between visitor presence and patient preparedness during discharge for participants with study completion (n=15). Includes the use of a contingency table, Chi-Square analysis, and the contingency coefficient.

	Visitor Present	Visitor Absent	Total
Somewhat prepared	0	1	1
Prepared	0	7	7
Very prepared	3	4	7
Total	3	12	15
Pearson's Chi-Squared Test			
	χ^2	DF	P-value
	4.2857	2	0.1173
Effect Size Measure: Contingency Coefficient (C)			
0.4714			

All the participants that had a visitor present during their discharge reported to not have any unanswered questions during their post-discharge interview (Table 12). Pearson's Chi-squared test performed between visitor presence and patient feeling of preparedness resulted in a X-squared value of 4.9778e-32 with 1 DF and a P-value of 1 (Table 8). The contingency coefficient was 5.7607e-17 (Table 12).

Table 12. Visitor Presence vs. Unanswered Questions Post-Discharge.
An overview of the relationship and association between visitor presence during discharge and unanswered questions post-discharge for participants with study completion (n=15). Includes the use of a contingency table, Chi-Square analysis, and the contingency coefficient.

	Visitor Present	Visitor Absent	Total
Unanswered questions	0	2	2
No unanswered questions	3	10	13
Total	3	12	15
Pearson's Chi-Squared Test			
χ^2	DF	P-value	
4.9778e-32	1	1	
Effect Size Measure: Contingency Coefficient (C)			
5.7607e-17			

DISCUSSION

The impact of social support on health is well-established, and several studies have explored the role of social support in various contexts. However, few studies have explored the role of social support during transitions of care in populations with LEP. We report here a secondary analysis of a mixed methods study which aimed to understand current practices around discharge teaching for patients with LEP from an urban safety-net hospital. Specifically, we aimed to quantify the level of social support in the observational cohort as well as investigate the relationship between social support, visitor presence during discharge, patient or visitor engagement during discharge, and patient attitudes regarding their readiness for discharge and unanswered questions. In this paper we observe no evidence that social support may be associated with visitor presence, engagement during discharge, or post-discharge attitudes. Although the results of this study suggest either no association, or a statistically insignificant association, our results may be explained by limitations in the enrollment and study process, mainly the small sample size.

Overall, we found that most participants had a moderate level of social support as measured by the OSSS-3. The study population was predominantly Spanish speaking, and most participants did not have a visitor present during discharge. Additionally, participants with *Poor Social Support* were found to ask questions at a higher frequency than those with *Moderate* or *Poor Social Support*. Regarding post-discharge outcomes, all participants with a visitor present reported feeling *Very prepared* for discharge. Furthermore, all these participants reported to have no unanswered questions regarding their discharge during the post-discharge interview. On the other hand, most participants without a visitor present reported feeling *Prepared*, though most also reported having no unanswered questions regarding their discharge. Despite these observations, we did not find a statistically significant relationship between social support and preferred language, visitor presence at time of discharge teaching, discharge engagement of participants or visitors, or post-discharge attitudes regarding readiness of discharge and unanswered questions.

It is important to note that the absence of statistically significant findings does not necessarily indicate the absence of a relationship. Our lack of statistically significant findings was likely due to our small sample size, given that it was powered for the qualitative outcomes which we do not report on here. Our study's limited sample size may have restricted our ability to detect significant associations. Therefore, while our data is unable to comment on certain relationships, further research is warranted to explore these relationships more comprehensively.

Furthermore, continuing to explore the role that social support plays during care transitions remains necessary as similar studies exploring the role of social support during transitions of care in populations with LEP are scarce. Studies have found that social support may have a positive influence on the health of hospitalized patients and that caregiver presence during transitions of care may increase patient adherence and understanding of discharge instructions (Backman 2019, Carter 2023, Hagan 2023, Zhang 2021). Though few studies have successfully explored the overlap of these dynamics in populations with LEP in the United States.

For example, a study in Israel found a positive relationship between caregiver presence and patient experiences during transitions (Rayan-Gharra 2018). In this study, researchers conducted a prospective cohort study on a population of hospitalized internal medicine patients at a medical center in Israel. In this study, the Care Transitions Measure (CTM)-15 was used to gain insight into the experiences of patients being transitioned from the hospital back to the community. Information regarding caregiver presence at the time of discharge was also gathered. High CTM scores indicated a high quality of preparation for care transition. The researchers found there to be a positive relationship between caregiver presence and CTM scores. This was especially true for patients with low health literacy and minority patients. Furthermore, CTM-15 scores were found to be highest when both a caregiver was present, and the discharge teaching occurred via language concordance.

Though there remains to be a gap in the literature surrounding this topic, these findings support the belief that social support and caregiver presence may be paired with existing tools, such as with the use of a language concordant discharge nurse, to further maximize the benefit and experiences of patients with LEP during transitions of care following a hospitalization. However, it is important to remember that this study protocol was adjusted to fit the cultural needs of patients in Israel meaning that it may be difficult to generalize these findings to our study population.

Similarly, Okraunic *et al.* (2019) performed a study in Canada aiming to understand the factors that contribute to adherence of discharge instructions. In this study, qualitative interviews were performed on 27 participants which included patients and their family members. In their analysis they identified various themes that appear to influence understanding and adherence of discharge instructions. Among those identified were the role of the caregiver as well as the accommodation of language barriers.

Researchers deemed the role of the caregiver as a theme large enough for its own exploration. The subthemes within this category were explored by Hahn-Goldberg *et al.* (2018). Caregivers were found to undertake multiple roles when they were present during discharge teaching, including "providing care and assistance, advocating, enacting vigilance, being a source of comfort, and acting as a translator" (Hahn-Goldberg 2018). These findings emphasize the complex role that caregivers may play during care transitions prompting us to question whether the methods used in this analysis, specifically the OSSS-3, accurately align with the specific goals of our study. For one, it is worth noting that the OSSS-3 was not designed to assess social support during discharge or for populations with LEP. Additionally, caregivers may encounter similar barriers to understanding and engagement as the patients themselves. Therefore, these findings lead to a necessary evaluation of the effectiveness of the OSSS-3 in assessing the role of social support within populations with LEP during healthcare transitions.

Secondly, although language was not a primary focus of this study, participants reported language barriers to be an important factor which they believe to influence patient understanding and adherence of discharge instructions (Okraunic 2019). Additionally, because professional interpretation was often not provided, caregivers often had to act as translators. While this study mentions that participants express being more comfortable with a family member acting as a translator, than a professional interpreter, studies suggest that the use of professional interpreters provides benefits that may not be received when family is used (Rosenberg 2008). As mentioned previously, the role of social support was not explicitly assessed in these studies. Though, these findings are of interest when considering the importance of properly exploring the complexity of care transitions for LEP populations.

Limitations

This study has several limitations that should be considered when interpreting the results. First, is the small sample size. Research suggests that traditionally underserved patients are often skeptical of research, potentially influencing enrollment (Scharff 2010). The limited number of participants placed constraints on the statistical analysis methods used, impacting the statistical power of the study. Additionally, the small sample size, paired with the disproportionate enrollment of Spanish speakers, poses challenges to the generalizability of findings to diverse language groups. The restriction to data collection at a single safety-net hospital further limits the generalization of findings to broader inpatient populations. Moreover, given that the data analyzed was pulled from a qualitative study with a primary focus beyond social support, the qualitative data captured is unlikely to help illuminate the quantitative findings explored in this analysis. Additionally, the social support scale used in this study was standardized in a German population (Kocalevent 2018). The lack of translation and validation of the scale into the languages of interest in this study may have introduced cultural differences which impacted its relevance to our study population.

Future Directions

While this study did not produce statistically significant findings, the limitations identified offer valuable insights for refining future iterations of this study. First, expanding study enrollment beyond a single site may capture a more diverse range of experiences, enhancing the statistical significance and generalizability of findings. Additionally, conducting a study focused solely on social support, with the use of measures such as the CTM-15 or MSPSS used in similar studies, could provide a more nuanced understanding of the role of social support during transitions of care. Lastly, given the predominant enrollment of Spanish speakers in this study, an effort to achieve a more balanced representation across diverse language groups is essential. This may involve efforts to onboard research assistants fluent in the languages that the study struggled to represent. Understanding the dynamics of social support during critical periods, such as transitions of care, is crucial for enhancing patient outcomes and well-being, especially in linguistically diverse populations. Addressing the identified limitations and implementing the suggested refinements will be an important next step for future exploration of the experiences of individuals with LEP during transitions in care.

APPENDIX

Appendix A. Oslo Social Support Scale (OSSS-3)

Oslo 1. How many people are so close to you that you can count on them if you have great personal problems?
[1] ‘none’
[2] ‘1–2’
[3] ‘3–5’
[4] ‘5+’

Oslo 2. How much interest and concern do people show in what you do?
[1] ‘none’
[2] ‘little’
[3] ‘uncertain’
[4] ‘some’
[5] ‘a lot’

Oslo 3. How easy is it to get practical help from neighbors if you should need it?
[1] ‘very difficult’
[2] ‘difficult’
[3] ‘possible’
[4] ‘easy’
[5] ‘very easy’

Interpretation of OSSS-3 sum scores:
[3–8]: poor social support
[9–11]: moderate social support
[12–14]: strong social support

(Kocalevent 2018)

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