Spring 5-5-2020

Quality Improvement Project Evaluating the use of CyraCom Language Translation Application in Two Metro Atlanta Infusion Centers

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Acknowledgments

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I would like to acknowledge the staff in the Infusion Centers who were eager to participate in this quality improvement project in hopes of engaging in new ways in which to engage in tools that can be used to improve patient safety for the Limited English Proficient (LEP) population.

To Curlissa Mapp and Dr. Mary Gullatte on the research committee who guided me on the practices of research and assisted me in navigating through the IRB processes.

To Dr. Deena Gilland VP & CNO of Ambulatory Patient Care Services for taking time out of her schedule to offer guidance and feedback throughout the project, driving me to ask the clinical questions needed to facilitate this project.

To the infusion center nurses Cheryl Billish RN, Molly Cleveland RN, Cristen Hambrick RN, Maudie LaFoe RN, Lisa Landry RN, Ashley Morgan RN, Jessica Ruadap RN, Christina Webb RN, Steven Zanardo RN, Erica Barnes RN and Nina Haley RN who approached and engaged the participants in the conversation of participating in the research study, knowing that this conversation was important to the safety of their LEP patients'.

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Abstract

Use of Cyracom Language Translation Application

Purpose: Evaluate the use of CyraCom video assist language translation application among Korean- and Spanish-speaking patients, seen in two infusion centers located in a southeast metro area, and summarize the patient and staff responses.

Methods: This project used a descriptive study design where participants were recruited via a convenience sample from two infusion centers in the southeast United States. Eligible participants were patients undergoing infusion therapy, RNs, MDs, and PAs. Participants completed a pre and post-survey that was comprised of three-questions. The questions measured ease of use and satisfaction in both infusion centers.

Results: A total of five surveys were collected from participants and seven surveys from the clinical staff. Descriptive statistics were used to analyze the data. Among patients when asked "compared to a live translator would you use this device again?" 80% of participants responded "yes". One-hundred percent of participants responded "yes" to the question "have you ever used a live interpreter to translate for you before?" A total of 7 responses were received from infusion center staff. Approximately 72% of the staff "thought the system was easy to use". However, 29% agreed with the following statement "I felt very confident using the system".

Conclusion: Findings suggest that although technology cannot replace a competent, trained language interpreter, using a language translation application can assist in reducing costs associated with acquiring language interpretation services, reducing the time it takes for the translator to travel to the location, and allows the care team easy access to contacting a translator with three clicks when using the iPad, streamlining an operational process for improving practice

issues. Technology-driven innovations are especially imperative for transformative service organizations like hospitals, where new devices and systems can dramatically enhance patients outcomes.

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Introduction

Background and Significance

Healthcare organizations that receive funding from the government are mandated to provide interpretation services for the Limited English Proficient (LEP) patients seen in their facilities and hospitals. In 2000, President Clinton updated this legislation, signing Executive Order 13166, the goal of which was "Improving Access to Services for Persons with Limited English Proficiency." The Executive Order requires that the Federal agencies work to ensure that recipients of Federal financial assistance provide meaningful access to their LEP applicants and beneficiaries (govinfo.gov).

The importance of having a readily available device with a translation application or phone/video services available for the patient and their care team to use during a clinic visit is seen in the exploration of new technologies implemented to improve communication with patients with limited English proficiency (Masland, Lou, & Snowden, 2010; Pecor, 2011). For the LEP – speaking patient, an interpreter can be requested via a schedule but may not always be available. Using the Cyracom assist language translation application for the patient to use during the times when a live translator is unavailable may prove beneficial. The Cyracom application is accessed via an iPad. The nurse turns on the device and clicks on the Cryacom icon to load the application. Once the application is loaded, the nurse enters the patients' preferred language, and a live interpreter introduces themselves and request permission to proceed with the translation. This new process enhances the use of innovations which will allow new knowledge to be diffused and adopted.

Problem Statement

The limited English proficient (LEP) patients are at increased risk to experience health disparities, due to higher error and readmission rates in the hospital setting, less health education, and less healthcare utilization in the ambulatory setting (Karliner, Kim, Meltzer & Auerbach, 2010; Lindholm, Hargraves, Ferguson & Reed, 2012). Patients who do not have an interpreter available to translate for them when admitted to the hospital or when they are seen in the outpatient clinics are at risk for poor outcomes. Limited English proficient patients have many barriers to learning. Non-English-speaking backgrounds, poor health literacy, and lower education levels are barriers to understanding their diagnoses and medications (Bailey et al., 2012; Fejzic 2004). Patients that have a language barrier tend not to ask additional questions related to their illness; this group of patients has more emergency room visits, and their compliance rates are lower than their English-speaking counterparts. Gerrish et al. (1996) identified that delays in ineffective communication for non-English speaking patients might result in patients feeling isolated, frightened, frustrated, and or angry.

Clinical Question

1. In limited English proficient patients, does the use of CyraCom video assist, during their infusion appointment, enhance patient and staff satisfaction compared to using an ad-hoc translator?
2. Is there a preference among a specific ethnic group who used the CyraCom video assist and those who preferred using the ad-hoc translator?

Project Objectives

The goal of the quality improvement project was to have the Korean and Spanish speaking participants use of the CyraCom language application when communicating with

members of their care team. After using the CyraCom video assist application, the participants and staff completed a survey determining if they found the iPad easy or hard to use and if they would use the iPad at subsequent visits.

Review of Literature

Literature Search

The literature search was conducted using the following databases: CINAHL, PubMed, Cochrane Library, and PsychINFO (Table 1). An additional search was conducted by reviewing reference lists of all selected papers. The search terms used included: Limited English proficiency (LEP), Non-English Speaking (NES), Spanish-speaking (SP), Translator, Interpreting Spanish. Publication dates ranged from 2010 through 2018. Searches were limited to adults between the age of 18 – 64 years old. The search included International sources that addressed proficient language patients. Inclusion criteria included the providers, residents, and nurses, focusing on interaction and difficulties faced taking care of the limited English proficient patient in the inpatient and outpatient setting. (Table 1 represents the key search terms, limits, search engines, databases, and other sources used to search the literature).

Search Results

Initial searches identified 474 studies, of which 391 were discarded, and 83 further reviewed, and 15 studies were retained. A PsychINFO searched resulted in 225 additional articles, of which 149 were reviewed and 17 were considered for review. Twenty-five additional article searches yielded from the additional reference list, 19 were discarded. In the end, 46 studies were examined in detail using the selection criteria (Table 2).

In a qualitative study led by Raynor (2016) performed at Duke Children's Specialty clinics from February 2013 to August 2013 (n=50), LEP patients were approached in order to

identify concerns about their care and find ways in which to improve patient care and enhance communication. A 31-question survey were administered in the patients' native language with the assistance of certified medical interpreters; 2 bilingual medical interpreters independently translated the surveys, and their differences were adjudicated. The surveys that were returned were 38 out of 50, of which 2 had more than four questions unanswered. The remaining 12 surveys were left blank or discarded by the patients. Thirty-six were in Spanish and 2 in Arabic speaking. The average respondent age was 35years. The respondents were 75% female. For the survey that were administered in Spanish translated into English, 94% felt their provider cared for their concerns, and 100% stated their concerns were addressed, 5% indicated they left the appointment with unanswered questions, and 62% stated they did not feel the provider explained everything thoroughly. Unexpectedly, 50% indicated that they did not know why they were seeing that specialty provider, did not understand ordered tests, test results, or the treatment plan.

In a mixed-method study by Lee et. al (2018) that was performed on hospitalized patients (N=214) located on the cardiovascular, general surgery and orthopedic surgery units. The patients were primarily Chinese (Cantonese or Mandarin) or Spanish-speaking. The study assessed the effects of a bedside interpreter-phone intervention on hospital discharge preparedness among patients with limited English proficiency (Lee, J. S., Nápoles, A., Mutha, S., Pérez-Stable, E. J., Gregorich, S. E., Livaudais-Toman, J., & Karliner, L. S. 2018). Recruitment and baseline interviews were conducted during two time periods: 6 months before (June-November 2012) and 6 months after (March-August 2013) system-wide implementation of the bedside interpreter phone intervention, which began in December 2012.

Recruitment for the post-intervention phase began 3 months after interpreter phone implementation to allow for the integration of the bedside interpreter-phones into the clinical

workflow. A validated LEP identification algorithm was used **(**Karliner, L.S., Napoles-Springer, A.M., Schillinger, D., Bibbins-Domingo, K., Perez-Stable, E.J. 2008). Ninety-four (88%) in the pre- and 95 (89%) in the post-study completed follow-up interviews and were included in the sample for these analyses (pre: 8 died, 5 unable to contact; post: 4 died, 2 declined, 6 unable to contact). The mean age of participants was 69.2 years (range 41–95). Among the entire sample, 57.1% were women, 65.1% spoke Chinese, and 34.9% spoke Spanish, and 80% had inadequate health literacy. The study concluded that the implementation of a bedside interpreter-phone systems intervention did not consistently improve patient-reported measures of discharge preparedness and that successful implementation and adoption of phone interpretation at discharge may require more intensive clinician engagement in the implementation process.

A cross-sectional pilot study by Villalobos, O., Lynch, S., DeBlieck, C., & Summers, L. (2017) evaluated whether an app with translation capabilities could be incorporated at an inpatient psychiatric setting to assess the psychiatric symptoms of Spanish-speaking patients with limited English proficiency. The total sample size was 24 (3 Residents, 18 RNs, and 3 psychiatric nursing assistants). Gender distribution was equal, 88% reported having a college degree, 63% identified themselves as Hispanic, 37% identified as three other ethnic groups, 67% reported English as their first language, 29% reported Spanish as their first language, and 75% ages of 35 and 44. The language variable was grouped into Spanish speakers and non-Spanish speakers; ethnicity was grouped by Hispanic and non-Hispanic. The ILR standardized scale tool developed by the U.S. government to assess proficiency with other languages was used (Diamond, L., Tuot, D., & Karliner, L., 2012).

Health care personnel utilized mobile technology, such as the Canopy Translation Application, to assess the psychiatric symptoms of Spanish speaking patients with limited

English proficiency. Participants completed the System Usability Scale (SUS). The SUS scores showed that participants found the Canopy Translation App useful during their interactions with Spanish-speaking patients. Participants reported a higher level of proficiency in speaking and listening to Spanish, while others reported no proficiency. Regarding ILR Speaking and Listening scores, Hispanic participants had higher ILR scores than the non-Hispanic participants, with 33% reporting a listening proficiency of *5*, and 17% reporting a speaking proficiency of *5*.

In the retrospective cohort study using unplanned revisit with 72 hours as a surrogate quality indicator and performed in Mount Sinai Hospital, a tertiary medical center in New York City, between January 1, 2012, and December 31, 2012, limited English proficiency, patients experience different quality of care than English-speaking patients in the ED (Ngai, K. M., Grudzen, C. R., Lee, R., Tong, V. Y., Richardson, L. D., Fernandez, A. 2016). N = 41,772 patients and 56,821 ED visits. 2,943 = LEP, 38,829 English-speaking patients.
Patients with psychiatric complaints, altered mental status, and nonverbal states, and those with more than 4 ED visits in 12 months were excluded from the study. Wilcoxon tests for continuous data and c^2 tests for categorical data, generalized estimating equation models with logit link, and binomial distribution to assess the independent association with limited English proficiency status while incorporating clustering by patients were used. In the review of visits to the ED 62,241 patients out of 100,101 were reviewed; 20,469 patients were excluded per the exclusion criteria, resulting in 41,772 adult patients with 56,821 ED visits. The result includes LEP patients who were more likely than English speakers to be admitted (32.0% versus 27.2%; odds ratio [OR]=1.20; 4.2% of all patients [n=1,380] had at least 1 unplanned revisit. Limited English proficiency patients were more likely than English speakers to have an unplanned revisit (5.0% versus 4.1%; OR=1.19; 95% CI 1.02 to 1.45). Results concluded that limited English proficiency

patients were 24% more likely to have an unplanned ED revisit within 72 hours, with an absolute difference of 0.9%, suggesting challenges in ED quality of care.

In a prospective, pre-post intervention implementation study using propensity analysis study, “Increased Access to Professional Interpreters in the Hospital Improves Informed Consent for Patients with Limited English Proficiency” (Lee, J., Pérez-Stable, E., Gregorich, S., Crawford, M., Green, A., Livaudais- Toman, J., Karliner, L. S. 2017). The bedside interpreter intervention consisted of placement of a dual-handset telephone at the bedside in every room. The phone had programmed buttons enabling 24-hour access to remote professional medical interpreters for more than 100 languages. Chi-squared and t-tests were conducted to compare patient characteristics, and the frequency of patient-reported professional interpreters use during the consent discussion between the pre- and post-implementation. Limitations of this study included that it was a small pre-post non-randomized study. The data are observational and subject to potential confounding, secular trends in informed consent discussions, which affected the results. No other relevant interventions took place during the study period and there were no objective measures of professional interpreter use during informed consent discussions. However, positive outcomes of the study concluded that rapid access to professional interpreters was associated with improvements in patient-reported informed consent for patients with LEP undergoing invasive procedures.

A randomized clinical trial tested the effect of telephone versus video interpretation on communication during pediatric emergency care (Lion, K.C., Brown, J.C., Ebel, B.E., Klein, E.J., Strelitz, D., Kays-Gutman., Hencz, P., Fernandez, J., Mangione-Smith, R. 2015). This study took place in the Seattle Children’s Hospital emergency department, which had 38, 954 patient visits in 2014, in which 20% involved families with LEP. Before the study, professional

interpretation was available in person and via video and telephone modalities, and during peak census hours, a Spanish interpreter was present in the Emergency Department. The patient's contact information were collected at enrollment. A telephone survey was administered by a Spanish-speaking clinical research assistant 1 to 7 days after discharge. The parent asked questions about their characteristics (level of English proficiency using US Census Bureau categories, highest educational level, family income, and previous experience with the child's current condition), the quality of communication and interpretation received, how clinicians communicated during the ED visit and the child's discharge diagnosis. Results showed that parents assigned to video interpretation more often named the child's diagnosis correctly than those assigned to telephone interpretation (74.6% vs. 59.8%; $P = .03$). Video arm was less likely to report frequent lapses in interpreter use (e.g., frequent use of English for medical discussions) compared with the telephone arm (1.7% vs.. 7.7%; $P = .04$).

The John Hopkins Research Evidenced Appraisal tool is a problem-solving approach to clinical decision-making (MGHPCS.org, 2017). The model used a three-step process called PET: practice question, evidence, and translation. This model was created to ensure that the latest research findings and best practices are quickly and appropriately incorporated into patient care. The values were appraised using the research evidence appraisal tool that grades the evidence level based on the type of research.

Quality Rating for Meta-Analysis / Quantitative Studies includes:

A. High quality: Consistent, generalizable results; sufficient sample size for the study design; adequate control; definitive conclusions; consistent recommendations based on a comprehensive literature review that includes thorough reference to scientific evidence.

B. Good quality: Reasonably consistent results; sufficient sample size for the study design; some control, and fairly definitive conclusions; reasonably consistent recommendations based on fairly comprehensive literature review that includes some reference to scientific evidence.

C. Low quality or major flaws: Little evidence with inconsistent results; insufficient sample size for the study design; conclusions cannot be drawn.

Quality Rating for Meta Synthesis / Qualitative Studies

A/B: High/Good quality is used for single studies and meta-syntheses.

The report discusses efforts to enhance or evaluate the quality of the data and the overall inquiry in sufficient detail; it describes the specific techniques used to enhance the quality of the inquiry.

- Evidence of some or all of the following is found in the report:
- Transparency: Describes how information was documented to justify decisions, how data were reviewed by others, and how themes and categories were formulated.
- Diligence: Reads and rereads data to check interpretations; seeks the opportunity to find multiple sources to corroborate evidence.
- Verification: The process of checking, confirming, and ensuring methodologic coherence.
- Self-reflection and self-scrutiny: Being continuously aware of how a researcher's experiences, background, or prejudices might shape and bias analysis and interpretations.
- Participant-driven inquiry: Participants shape the scope and breadth of questions; analysis and interpretation give voice to those who participated.
- Insightful interpretation: Data and knowledge are linked in meaningful ways to relevant literature.

C: Lower-quality studies contribute little to the overall review of findings and have few, if any, of the features listed for High/Good quality.

Quality Rating for Mixed-Methods Studies

A. High quality: Contains high-quality quantitative and qualitative study components; highly relevant study design; relevant integration of data or results; and careful consideration of the limitations of the chosen approach.
B. Good quality: Contains good-quality quantitative and qualitative study components; relevant study design; moderately relevant integration of data or results; and some discussion of limitations of integration.
C. Low quality or major flaws: Contains low quality quantitative and qualitative study components; study design not relevant to research questions or objectives; poorly integrated data or results; and no consideration of limits of integration.

Applicability to Practice

Although most of the studies yielded significant results, the room for additional research is evident. Based on the GRADE criteria, the grade of the literature review suggests a strong recommendation. The results from the various studies, the consensus found that limited English proficiency was a risk factor for unplanned 72-hour ED revisit. Although readily available, one of the studies also observed a low usage of language interpreting services among the LEP population.

The other study discovered that even among trained medical interpreters, there is a high risk of translation errors that can directly affect patient care (Raynor, E. M. 2016). Future studies would be useful to address the known disparities regarding health insurance status or immigration status, in addition to looking for other potential barriers (Raynor, E. M. 2016).

Additional recommendations from one of the studies noted that the study took place at a single center and did not have the data on the patient's preferred language archived, and consideration for multiple sites should be included in future studies. In instances where the implementation of a bedside interpreter-phone systems intervention occurred, results did not consistently improve patient-reported measures of discharge preparedness. (Evidence Matrix, Figure 3).

Theoretical Framework

Frameworks can guide implementation, facilitate the identification of determinants of implementation, guide the selection of implementation strategies, and inform all phases of research by helping to frame study questions and hypotheses, anchor background literature, clarify constructs to be measured, depict relationships to be tested, and contextualize results (Proctor, Powell, Baumann, Hamilton, & Santens, 2012). Frameworks can differ in their degree of theoretical heritage, ranging from emergent, context-specific conceptual frameworks to theoretical frameworks that describe and/or combine explanations derived from multiple evidence-based theories (e.g., the exploration, adoption decision/preparation, active implementation, sustainment framework) (Birken, Powell, Presseau, et al., 2017).

The Fred Davis 1989 Technology Acceptance Model (TAM) was used to facilitate the change of implementing a language translation application for the LEP patient. The Fred Davis Technology Acceptance Model was formulated to explain the effect and behaviors of user-based electronic devices on perceived usefulness and perceived ease of use (Davis, 1989). (Figure 1). It posits that perceived usefulness and perceived ease of use of a technology predict the intention to use technology, which subsequently correlates with its actual use (Turner, M., Kitchenham, B.,

Brereton, P., Charters, S., & Budgen, 2010; Venkatesh, Speier, & Morris, 2002; Morris, & Venkatesh, 2000).

Users' perceptions affect their attitudes toward greater use of technology, and their attitudes have an effect on their intention to use the technology, and finally, their intention determines actual use of the technology (acceptance) (Ehteshami, (2017).

Methodology

The data was collected using a descriptive design during the deployment of iPads with the CyraCom language translation application. The quality improvement project took place from July 2019 through October 2019. Due to the number of LEP patients seen across the health system, the request to have an in-person interpreter to translate between the patient and provider had increased significantly. Medical practices throughout the organization purchased iPads and had the application added by the technical team without any organizational guidance or feedback from patients and staff on the device usage. Infusion centers A and B served as a pilot to use the iPads with the CyraCom application to use with their Korean and Spanish-speaking populations, which were dominant at these locations.

Study Design and Setting

The study took place at infusion centers A and B. The infusion centers are National Cancer Institute (NCI) designated cancer centers, which are recognized for their scientific leadership, resources, and the depth and breadth of their research in basic, clinical, and/or population science (National Cancer Institute, 2018). Center A was located in an urban area in the southeastern United States. The total population of people that live in this area was approximately 84,000 in 2018. In the 2010 census report, the population was 76,000; by race

there were 48,684 white, 17,925 Asian, 7,062 black or African American, 94 American Indian and Alaska Native, 22 native Hawaiian and other Pacific Islander, 4,000 Hispanic or Latino and 1,081 some other race (U.S. Census, 2018).

Center B was located further North of the metro area. The estimated population of people living here was 14,868 based on the 2017 census update. In the report, when broken down by race 10,307 were white, 1,935 were black or African American, 496 Asian, 1,657 some other race, 251 two or more races and 16 American Indian and Alaska Native (U.S. Census, 2018).

Center A's infusion center was easily accessed from two entrances into the building. Valet parking was available for a set fee and free parking was also open to visitors and patients in the many parking lots surrounding the building. Two receptionists staffed the front desk, their roles were to check-in the patients for treatment. There were three lab-draw stations located through the double doors behind the check-in desk, where lab draws were performed on every patient receiving infusion treatment, as well as a fast-track chair for the triage nurse. In the infusion space, there were nineteen infusion chairs and four additional fast-track chairs for injections and 30-minute infusions. Each infusion station had a recliner chair for the patient and a large comfortable chair for the patient's relative or companion who wants to stay during the treatment. Each infusion station had a computer on wheels for timely order entry and patient documentation and a neutral-color designed curtain that can be drawn for privacy and used when the nurses are accessing and de-accessing the patient's port for treatment.

Televisions were located in each bay for patient viewing. There were two nursing stations located on either end of the unit, where the nurse had access to a copy and fax machine, phones to make calls to the provider and pharmacy, and desktop computers to use for documenting between patient visits. The infusion center was staffed with nine infusion nurses daily and one

charge nurse. The consultation room was located at the far end of the infusion center which doubles as the social worker's office. Provider's offices were located in the medical oncology clinic space. A refreshment area was located on the back end of the nurse's station, where a volunteer dispensed water, juice, and snacks to the patients and their families.

Center B's infusion center was located on the second floor of a main building. The radiology and outpatient medical oncology clinic were located on the first floor of the building. Upon entering the infusion center, there was a front desk with one receptionist who checked in patients upon arrival. There was also a lab-draw area located inside the infusion center where all clinic and infusion labs were drawn and processed before administering chemotherapy. Like clinic A's infusion center, there were also nineteen infusion chairs and two additional fast track chairs for injections and 30-minute infusions. Each infusion station had a recliner chair for the patient and a large comfortable chair for the patient's relative or companion. Each infusion station had a computer on wheels for timely order entry and patient documentation, and curtains that could be drawn for privacy during treatment.

A television was located in each bay for patient viewing. The L-shaped nursing station sat in the middle of the unit, where the nurses could see all the infusion chairs. There was also a copy and fax machine, phones, and desktop computers to use for patient documentation. The infusion center was staffed with five infusion nurses daily and one charge nurse. A consultation room was in the middle of the procedure area and the nurse managers' office was adjacent. All providers' offices were located in the medical oncology clinic space.

Staffing for both facilities included the front desk staff that checked the patients in for their appointment; the medical assistants who completed the patient intake, which includes vital signs, height, and weight; and the lab staff who drew blood specimens collected urine specimens

and placed peripheral lines. The registered nurse triaged the patient, obtained blood samples from the patient's tunneled lines and ports, and administered chemotherapy. There were clinical pharmacists on staff who assisted the provider with chemotherapy dose calculations and the pharmacist who mixed and prepared the chemotherapy. There were also providers on-site in the clinic who handled issues and treatment dosage adjustments.

Subjects

Eligibility for participation was determined by the following inclusion criteria; The inclusion criteria included: 1) Korean or Spanish-speaking 2) 18 years and older 3) needed assistance with language translation 4) receiving chemotherapy/biotherapy/immunotherapy regimen. The exclusion criteria included: 1) diagnosed with mental debilitating disease 2) hearing impaired 4) fluent in English 5) Pregnant women 6) less than 18 years of age. Exclusion criteria included patients diagnosed with debilitating mental disease, visually impaired, hearing-impaired, fluent in English, pregnant women, and patients under the age of 18.

Recruitment

The study participants were selected from a non-random convenience sample of patients seen at one of the two Infusion Centers located in metro Atlanta. These locations were selected because they treated Korean and Hispanic patients who needed assistance with language translation. All LEP patients who met the inclusion criteria were approached and recruited.

Protection of Participants

Involvement in the study presented minimal risk to the patients and staff members. The most significant risk was the breach of confidentiality. Personal data collected for the study were each patient's medical record number, age, gender, and their preferred language. To reduce the likelihood of identification, each participant was assigned a study ID number that was used on

the research log, which was kept in a locked cabinet located in the charge nurse office, separate from the study demographic form. The risk was minimized by maintaining all subject-related data (e.g., data collection forms) in a locked area in the ambulatory infusion center where there was restricted access. Data retrieved from the study was transcribed into a password-protected computer, and no patient identifiers were transferred in the database. Research study data will not be reused or disclosed to any other person or entity. IRB approval was received from Georgia State University. Approval was received from the project site by the Chair of the infusion center. Informed consents were translated into Korean and Spanish by a certified language translation company.

Tools

Potential participants who were scheduled to be seen in either infusion center and may meet the eligibility criteria were referred to the Student Investigator by an infusion center nurse. Study eligibility was determined by the study nurse using the inclusion criteria (Korean or Spanish-speaking, 18 years or older, needs assistance with language translation). Upon completing informed consent, a *Participant Demographic Questionnaire* was completed to collect participant demographic information (Appendix A). The information gathered included date, medical record number, age, gender, primary language, and asked if the patient had received services from a live interpreter in the past.

The *Recruitment Script* was translated into Korean and Spanish and was given to the appropriate participant to read. When the patient agreed to participate, a signed *Informed Consent* was obtained by the research assistant. Research assistants signed an *Informed Consent* listing their role in the study. Participants completed a modified three-question *System Usability*

Scale (SUS) pre-survey before using the CyraCom video assist translation application [Appendix B] (Jordan, Thomas, Weerdmeester, & McClelland, 1996).

Closed-ended questions using a nominal scale of *Yes* and *No* were used. A modified three-question *System Usability Scale* (SUS) post-survey was given to the participant to complete after using the CyraCom video assist translation application. The SUS captured responses using binominal scales (Yes/No) and a 5-point Likert scale (1 - Very Easy to 5 - Very Difficult) (Appendix C). Staff completed a modified 10 - question *System Usability Scale* (SUS) survey at the end of the study, with a 5-point Likert scale (1 - Strongly Disagree to 5 - Strongly Agree) (Appendix D). Participants used the iPad that was set up with the CyraCom video assist application pre-loaded on the device for translation at the time of their infusion. The infusion nurse facilitated the use of the device.

Data Collection and Intervention

The ambulatory infusion center patients were screened for their preferred language by the infusion center nurse. The infusion center nurse referred the patient to the study nurse, and participants' eligibility was determined by the research staff using the inclusion criteria (Korean or Spanish-speaking, > 18 years and older, needs assistance with language translation). The research staff gave the patient the translated recruitment script to read. After the patient agreed to participate, a signature was obtained on the informed consent by the research staff. At the time of the consent, the study nurse may or may not have been involved in the prospective participant's use of the CyraCom video assist application.

A *Participant Demographic Questionnaire* was completed to collect the participants' demographic information. Participants were given a modified three-question *System Usability Scale* (SUS) survey before the CyraCom video assist translation application (Lewis, 2018). The

pre-survey was completed in less than 15 minutes. Next the nurse removed the iPad from the case, turned on the power button, selected the CyraCom application icon to launch the program. After selecting the preferred language of Korean or Spanish, a live person appeared on the screen to interpret. After the participant and the staff stopped using the iPad, the participants were given a modified three-question SUS post-survey, which was completed in 15 minutes.

The research and clinical staff completed a 10-question SUS post-survey questionnaire, which took 30 minutes. Total participation took no more than 60 minutes.

Data Analysis

The pre and post questionnaires were entered into the password-protected computer and analyzed using Statistical Package for Social Science (SPSS) for Windows 10 Version 23. Results were calculated with the assistance of a statistician who helped with selecting and running the data. Descriptive statistics and Fisher's Exact test were used to analyze the data.

Results

Demographics

A convenience sample of n=5 participants who were seen in the oncology ambulatory infusion centers was recruited, Korean-speaking (60%), and Spanish-speaking (40%). The age group of the participants ranged from 33 to 72 years of age. The number of pre and post-surveys that were received from the participants were 5 (figure 1 & figure 2). The number of employee surveys that were completed was 7.

All data were reviewed for missing values, outliers, and normality assumptions before analysis. Demographics and clinical variables were reviewed and evaluated as potential covariates. The Fishers Exact Test $P = 0.576$ showed that there was no statistically significant

difference in the result between the patients and nurses that found the Cyracom application easy to use.

All 5 participants answered “yes” to having owned an electronic device, which included a phone, iPad, tablet, or a computer. In response to the question “Do you feel your questions were translated correctly,” 4 out of the 5 participants asked “yes,” the participant who answered “no” had her daughter tell the clinical staff that the interpreter referred to the nurse’s explanation of: “you may experience stomach upset and loss of appetite,” translating the stomach to that of a “cows stomach.” Although the participant and her daughter understood what the nurse meant, the likelihood of them using the iPad with the Cyracom application seemed low.

The results from the question “compared to a live translator would you use this device again?”4 out of 5 of the participants responded “yes,” noting that all 5 participants responded “yes” to the question “have you ever used a live interpreter to translate for you before?” The survey responses received from the clinical staff n=7. The response to the question “I thought the system was easy to use” 71.4% “strongly agree” and 28.6 “agreed,” and when answering the question, “I felt very confident using the system” the response was the same as the previous question.

Discussion

Limited English proficient patients who receive translation services when communicating with their providers and members of their care team tend to have better outcomes. Technology-driven innovations are especially imperative for transformative service organizations like hospitals, where new devices and systems can dramatically enhance patient outcomes (Josleyn and Raviscioni, 2017; Rakotoniaina, 2017; Sharma et al., 2016).

Clinicians have reported that having real-time interpreter services available via telephone

or video improved access to professional interpreters and efficiency when working with LEP patients, as it was sometimes challenging to have, on-site, professional interpreters promptly (Baurer, Yonek, Cohen, Restuccia, & Hasnain-wynia 2014).

Lee et al. (2018) study showed the positive outcomes of providing a bedside interpreter-phone for the LEP population aim at discharge preparedness. In this project, pre-post knowledge of medication purpose increased by 9%.

In a study by Karliner et al. (2010) examining the LEP responses on census questions to how well LEP people understand or read English. The study found that the English proficiency question used in the U.S. Census was able to identify most patients who cannot communicate effectively with their physicians in English. By adding an additional question, they were able to confirm that people who responded with the answer "well," from the initial screening question, was followed up by an additional question about language preference for receipt of medical care. The study outcome stated that although the subset of patients who reported speaking English "well," stated that they could discuss their symptoms effectively with their provider, should be offered an interpreter (Karliner et al., 2010).

Using the Cyracom language application to augment times when an on-site interpreter is not available to translate can be incorporated. In a study completed on Hmong- and Spanish-speaking limited English proficient patients, participants, described having experiences where their interpreter was either late to an appointment or left early for another appointment.

Limitations

The small sample size did not allow for the generalization of the study findings. Sign language interpretation as not addressed in this paper but is an essential topic of language translation (Schwei, Schroeder, Ejebe, Lor, Park, Xiong, & Jacobs, 2018). Screening only

Korean and Hispanic speaking patients may have attributed to the limited number of participants. Performing the project at infusion center locations only limited the type of participants that were recruited.

Although the sample size was small, there may have been contributing factors that had an impact on the study. There was a significant decrease in the number of Spanish-speaking patients who were receiving treatment in the infusion centers at both locations compared to the previous twelve months. The speculation as to the decrease in the number of Hispanic patients may be a result of current immigration policies in the United States (U.S.).

According to PEW Research Center, the number of unauthorized Mexican immigrants in the United States has declined so sharply over the past decade that they no longer are the majority of those living in the country illegally (Passel & Cohn, 2019).

Practice Implications

Findings from this project suggest that based on the Technology Acceptance Model, the Cyracom Language translation application will have a successful implementation. Expanding this translative application to other areas of the interdisciplinary team, which includes dietary and spiritual health, will help to capture those patients that inherently have been excluded due to language barriers. Selecting an approved application that translates the language word for word, not substituting with other words, will require additional research. Rendering competent care continues to be a challenge for limited English speaking patients, and it is biased to avoid consideration for this patient population. Access to both interpretive telephone services and professional VRI services helped to ensure that LEP patients received the assistance they needed when in-person interpreters were unavailable (Burke, Anderson, YaPa, Guerra, Tschida-Reuter & Xiong, 2017).

Health systems should strive to better understand patient preferences in the way they communicate with the LEP population by successfully implementing certified language translation applications for their patients, family members, and staff. Health systems should also find ways of communicating the available resources to the LEP population, making them aware of the various types of language translation services provided by hospitals and facilities in hopes of increasing better patient and clinical staff communications. Lessons learned can be incorporated to look at on-the-go certified medical translation applications that patients can use in the healthcare setting by downloading to their mobile devices.

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Assess Psychiatric Patients with Limited English Proficiency. *Hispanic Journal of Behavioral Sciences, 39*(3), 369–380. https://doi-org.ezproxy.gsu.edu/10.1177/0739986317707490 https://search.proquest.com/docview/1503750915/fulltextPDF/AE4B88B202C24A0FPQ/1?accountid=11226

Tables

Table 1

Search Strategy

Search Criteria	Key Words
Key Search Terms Used	• Limited English proficiency (LMP); Non-English Speaking (NES), Spanish speaking (SP), Translator, Interpreting Spanish. • The following keywords were added during the search process:
Language	English
Age of Subjects	18-64 years
Search Engines	Google
Databases	PubMed, CINAHL, Cochrane Library, PsychINFO
Professional Organizations	• Patient Education and Counseling (https://www.pec-journal.com/) • Health Resource and Service Administration (https://hrsa.gov/publichealth/healthliteracy/)
Government & Regulatory Agencies	• Agency for Healthcare Research and Quality (http://www.ahrq.gov) • Health and Human Services (www.hhs.gov) • Limited English Proficient (https://www.lep.gov/) • American Medical Association (https://www.ama-assn.org) • Evidenced-Based Nursing (https://ebn.bmj.com) • The Health Services/Technology Assessment Text (https://www.ncbi.nlm.nih.gov/books/NBK16710/)

Table 2

Data Search

Database	Search Terms	Results (Number & Type of Studies Located)	Dates Searched
CINHAL	LEP + Non-English speaking + Spanish speaking + translating foreign language +Barriers + readmissions	6 articles accepted Level IV: 2 Level V: 4	2010-2018
PubMed	LEP + Non-English speaking+ Translator, Interpreting Spanish	2 articles accepted Level II: 2	2015-2017
Cochrane Library	LEP + non-English speaking + readmission+ Translator, Interpreting Spanish	2 articles accepted Level IV: 1 Level V: 1	2010-2016
Professional Organizations	LEP + Non-English speaking	No Articles accepted	2010-2018
Government & Regulatory Agencies	LEP + Non-English speaking	No Articles accepted	2010-2018

Table 3

Evidence Matrix Table

<table>
<tr><td colspan="4">Lee, J., Pérez-Stable, E., Gregorich, S., Crawford, M., Green, A., Livaudais-Toman, J., Karliner, L. S. (2017). Increased Access to Professional Interpreters in the Hospital Improves Informed Consent for Patients with Limited English Proficiency. JGIM: Journal of General Internal Medicine, 32(8), 863–870. https://doi-org.ezproxy.gsu.edu/10.1007/s11606-017-3983-4</td><td>Grade Level of Evidence: Evidence from well-designed case-control or cohort studies. V</td></tr>
<tr><th>Hypothesis/ Questions</th><th>Design</th><th>Sample</th><th>Measurement</th><th>Results/Implications</th></tr>
<tr><td>Impact of a bedside interpreter phone system intervention for informed consent for patients with LEP.

Compare outcomes to those of English speakers.</td><td>Prospective, pre-post intervention implementation study using propensity analysis.</td><td>Chinese- and Spanish speaking patients with LEP N=152</td><td>Three central informed consent elements, patient-reported understanding of the (1) reasons for and (2) risks of the procedure and (3) having had all questions answered.</td><td>Rapid access to interpreters alone may not be enough to eliminate disparities related to informed consent comprehension for patients with LEP.

Suggests the need for additional interventions targeting patient comprehension during the informed consent process.

Limitations:
Did not have objective measures of professional interpreter use during informed consent discussions, and we relied on patient-reported comprehension</td></tr>
<tr><td colspan="4">Rojas-Guyler, L., Britigan, D. H., Murnan, J., King, K., & Vaughn, L. M. (2013). Measuring English Linguistic Proficiency and Functional Health Literacy Levels in Two Languages: Implications for Reaching Latino Immigrants. Health Educator, 45(2), 2–12. Retrieved from: http://ezproxy.gsu.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=107849772&site=ehost-live&scope=site</td><td>Grade Level of Evidence: Evidence from well-designed case-control or cohort studies. IV</td></tr>
<tr><th>Hypothesis/ Questions</th><th>Design</th><th>Sample</th><th>Measurement</th><th>Results/Implications</th></tr>
<tr><td>Determine the health literacy levels of Latinos in the Greater Cincinnati.</td><td>Standardized quantitative measure (Semi-structured interviews in English or Spanish included three validated scales)</td><td>Participants male and female age 18-71
N=214 Latinos 71%) agreed to be a part of the study Chose to take the survey in the Spanish language (n = 188, 88.7%).</td><td>Functional Health Literacy in Adults (S-TOFHLA), Rapid Estimate of Adult Literacy in Medicine (REALM),

Chi-square analysis.</td><td>Participants with inadequate health literacy were more likely to fall into a lower reading level than those with adequate health literacy.

Most participants chose to be surveyed in Spanish.

higher than a high school degree (n = 100, 47.8%).

Most participants had low acculturation to US culture and low health literacy and English reading ability.</td></tr>
</table>

				Limitations: Marked lack of frail elders represented in this study.
Kim, E.J., Kim, T., Paasche-Orlow, M.K. et al. (2017) Journal of General Internal Medicine 32: 632. https://doi.org/10.1007/s11606-017-3999-9				**Grade Level of Evidence:** Evidence from well-designed case-control or cohort studies. IV
Hypothesis/ Questions	**Design**	**Sample**	**Measurement**	**Results/Implications**
Examine disparities in hypertension between National Health and Nutrition Examination Survey (NHANES) respondents with LEP versus adequate English proficiency.	Retrospective analysis of multi-year survey data.	Participated in the NHANES survey during the period 2003–2012. N=29,802 adult participants. Categorized age into three groups: 18–39, 40–59, and 60+. (n = 3269) of the sample had LEP. 12.4% (n = 2906) used the Spanish questionnaire. 1.6% (n = 363) used an interpreter for the survey.	Dichotomous indicator of elevated BP on physical examination.	Non-English instrument use was associated with uncontrolled hypertension. Survey data contains self-reported information, and this may result in the underreporting of a prior diagnosis of hypertension or medication use for some participants. Future research: The interaction between health literacy and language proficiency is an excellent target for future research. Limitations: The survey-based method used to identify LEP patients, the findings may not be generalizable to healthcare settings.
Lee, J. S., Nápoles, A., Mutha, S., Pérez-Stable, E. J., Gregorich, S. E., Livaudais-Toman, J., & Karliner, L. S. (2018). Hospital discharge preparedness for patients with limited English proficiency: A mixed methods study of bedside interpreter-phones. *Patient Education & Counseling, 101*(1), 2–32. https://doi-org.ezproxy.gsu.edu/10.1016/j.pec.2017.07.026				**Grade Level of Evidence:** Evidence from systematic reviews of descriptive and qualitative studies (meta-synthesis) V
Hypothesis/ Questions	**Design**	**Sample**	**Measurement**	**Results/Implications**
Effects of a bedside interpreter-phone intervention on hospital discharge preparedness among patients with **limited English proficiency** (LEP)	Mixed-methods study.	N=214 Mean age of 69.2 years. (41–95). 57.1% women. 65.1% spoke Chinese	Bedside interpreter-phone intervention. baseline structured interviews.	Implementation of a bedside interpreter-phone systems intervention did not consistently improve patient-reported measures of discharge preparedness. Post-implementation patients reported continued use of ad-hoc family interpreters (43%).

		34.9% spoke Spanish	Screening questionnaire that included patient age, a validated LEP identification algorithm, and the Mini-Cog cognitive screen. Post-implementation qualitative analysis. Exclusion: Patients with cognitive impairment.	No interpretation at all (22%). Pre-post discharge preparedness (Care Transitions Measure mean 77.2 vs. 78.5; p=0.62) Pre-post knowledge of medication purpose increased in bivariate (88% vs. 97%, p=0.02). Limitations: Small study. Did not objectively assess professional interpreter.
Ngai, Ka Ming; Grudzen, Corita R.; Lee, Roy; Tong, Vicky Y.; Richardson, Lynne D.; Fernandez, Alicia. (2016). The Association Between Limited English Proficiency and Unplanned Emergency Department Revisit Within 72 Hours, Annals of Emergency Medicine Volume 68, Issue 2, Pages 213-221				**Grade Level of Evidence:** Strong recommendation; moderate-quality evidence (IV)
Hypothesis/ Questions	**Design**	**Sample**	**Measurement**	**Results/Implications**
Determine whether limited English proficiency patients experience different quality of care than English-speaking patients in the ED.	Retrospective cohort study	N = 41,772 patients, 56,821 ED visits. 2,943 limited English proficiency patients 38,829 English-speaking patients Exclusions: 20,469 = Patients with psychiatric complaints, altered mental status, and nonverbal states, and those with more than 4 ED visits in 12 months	62,241 patients with 100,101 visits to the ED were reviewed. Instruments: Wilcoxon tests for continuous data and χ_2 tests for categorical data. Generalized estimating equation models with logit link and binomial distribution.	LEP patients were more likely than English speakers to be admitted (32.0% versus 27.2%). LEP patients were 24% more likely to have an unplanned ED revisit within 72 hours. LEP patients were more likely than English speakers to have an unplanned revisit (5.0% versus 4.1%). Limitations: Data were derived from a single center. Study did not assess patients' or physicians' actual language skills.

Rosse, F. F., Bruijne, M., Suurmond, J., Essink-Bot, M.L., Wagner, C. (2016). Language barriers and patient safety risks in hospital care. A mixed method study. International Journal of Nursing Studies. (54), Pg 45-53.				**Grade Level of Evidence:** Evidence from systematic reviews of descriptive and qualitative studies (meta-synthesis).V
Hypothesis/ Questions	**Design**	**Sample**	**Measurement**	**Results/Implications**
Investigates patient safety risks due to language barriers during hospitalization. The way language barriers are detected, reported and bridged in Dutch hospital care.	Mixed Method Case Nursing and medical records of 17 hospital admissions of patients with language barriers were qualitatively analyzed.	N=1339 hospitalized patients N=576 patients chosen for the study. 30 participating wards (10 of which were surgical and 20 non-surgical).	Record review. Patient questionnaire. Qualitative data: interviews and document analysis. Policy data - hospitals' policies regarding bridging of language barriers were verified. Data analysis: Qualitative data – interviews and document analysis. Quantitative data – record review reports and self-assessed language proficiency.	No associations were found between amount of caffeine intake and number of UI episodes. UI episodes decreased most over the 5 weeks for the group that decreased fluid intake and also decreased for the group that increased fluid intake. Increasing fluid intake is helpful in the management of UI. Assessment of fluid intake patterns using a 3-day diary provides information to help the management of UI. Community health nurses need to have the flexibility to follow individuals with UI over time to encourage changes in intake patterns.
Villalobos, O., Lynch, S., DeBlieck, C., & Summers, L. (2017). Utilization of a Mobile App to Assess Psychiatric Patients with Limited English Proficiency. *Hispanic Journal of Behavioral Sciences*, *39*(3), 369–380. https://doi-org.ezproxy.gsu.edu/10.1177/0739986317707490				**Grade Level of Evidence:** Strong recommendation; moderate-quality evidence (IV)
Hypothesis/ Questions	**Design**	**Sample**	**Measurement**	**Results/Implications**
Evaluate whether health care providers who are not proficient in Spanish could assess the psychiatric symptoms of Spanish-speaking patients with	Quantitative and qualitative methods	3 medical residents, 18 RNs, and 3 PNAs, (N = 24). 88% have a college degree	Canopy Translation Application. System Usability Scale (SUS) - test	Hispanic participants had higher ILR scores than the non-Hispanic participants. Hispanic and non-Hispanic participants found the Canopy

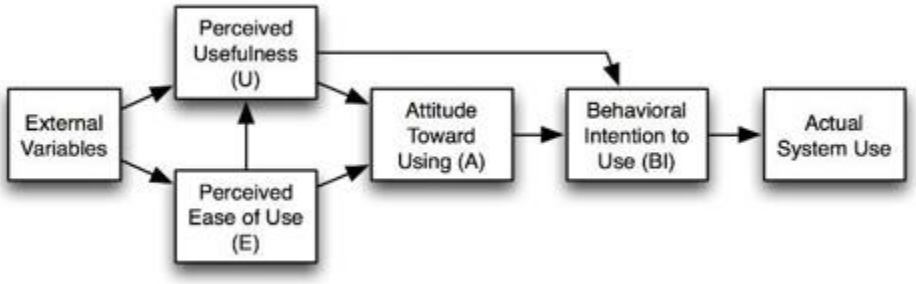
limited English proficiency.		Group 1 18-34 years old Group 2 35-54 years old Group 3 55-64 years old	questionnaire, including the demographics and usage questionnaire Interagency Language Roundtable (ILR) scale - assess their speaking and listening proficiency with Spanish. Correlational analyses.	Translation App useful during their assessments. Participants feedback: Translation app might hinder the therapeutic relationship between patients and health care professionals.
Karliner, L.S., Kim, S.E., Meltzer, D.O., Auerbach, A.D. (2010). Influence of Language Barriers on Outcomes of Hospital Care for General Medicine Inpatients. *Journal of Hospital Medicine*;5;276- 282. doi:10.1002/jhm.658				**Grade Level of Evidence:** Strong recommendation; moderate-quality evidence (IV)
Hypothesis/ Questions	**Design**	**Sample**	**Measurement**	**Results/Implications**
Examine whether patients' primary language influences hospital outcomes.	Quantitative study.	Admitted patients N=7023 84% spoke English 8% spoke Chinese 4% Russian 4% Spanish 18 years old. Hospital data included information on their primary language, specifically English, Russian, Spanish or Chinese.	STATA statistical software. *t*-tests. Chi-square. Hospital costs, length of stay (LOS), and odds for 30-day readmission or 30-day mortality.	Non-English-speaking Latino and Chinese patients have higher risk for readmission. language barriers may contribute to higher readmission rates for non-English speakers.
Lion, K.C., Brown, J.C., Ebel, B.E., Klein, E.J., Strelitz, D., Kays-Gutman., Hencz, P., Fernandez, J., Mangione-Smith, R. (2015). Effect of Telephone vs Video Interpretation on Parent Comprehension, Communication, and Utilization				**Grade Level of Evidence:** Strong recommendation; high-quality evidence (II)

in the Pediatric Emergency Department. A Randomized Clinical Trial. *JAMA Pediatric.*169(12):1117–1125. doi:10.1001/jamapediatrics.2015.2630				
Hypothesis/ Questions	**Design**	**Sample**	**Measurement**	**Results/Implications**
Test the effect of telephone vs. video interpretation on communication during pediatric emergency care.	Randomized clinical trial.	Spanish-speaking parents N=290	Effect of telephone vs. video interpretation on (1) parent comprehension (ability to name the child's diagnosis). (2) parent-reported quality of communication and interpretation. (3) frequency of lapses in the use of professional interpreters.	LEP families who received video interpretation were more likely to correctly name the child's diagnosis and had fewer lapses in interpreter use. The video arm was more likely to name the child's diagnosis correctly than those in the telephone arm (85 of 114 [74.6%] vs. 52 of 87 [59.8%]; $P = .03$.
James, E.G., Conatser, P., Karabulut, M., Leveille, S.G., Hausdorff, J.M., Cote, S., Tucker, K.L., Barton, B., Bean, J.R., Snih, S.A. & Markides, K.S. (2017) Mobility limitations and fear of falling in non-English speaking older Mexican Americans, Ethnicity & Health, 22:5, 480-489, DOI:10.1080/13557858.2016.1244660				**Grade Level of Evidence:** Strong recommendation; high-quality evidence (II)
Hypothesis/ Questions	**Design**	**Sample**	**Measurement**	**Results/Implications**
Mexican Americans who cannot speak and understand spoken English have higher rates of mobility limitations or fear of falling than their English-speaking counterparts.	cross-sectional analysis.	Community-dwelling Mexican Americans N=1169 72–96 years	Participants who were unable to speak and understand spoken English 85.7% had mobility limitations. 61.6% were afraid of falling compared to 77.6% and 57.5%, respectively,	participants aged 80 years and older who were unable to communicate in English had higher rates and were more likely to have mobility limitations and fear of falling than their English-speaking counterparts. Found that for Mexican Americans between the ages of 72 and 79 years the odds for mobility limitations and fear of falling were not elevated in relation to inability to understand and speak English.

			of English speakers. Short Physical Performance Battery.	

Figure 1

Technology Acceptance Model (Davis, 1989)



F. D. Davis, "User acceptance of information technology: system characteristics user perceptions and behavioral impacts", *International Journal Man Machine Studies*, 1993

Appendices

Appendix A

Participant Demographic Questionnaire

Participant Demographic Questionnaire

Study Date _____

Study ID# _____

MR # _____

DOB# _____

Age _____

Gender: □ Male □ Female

Primary Language:

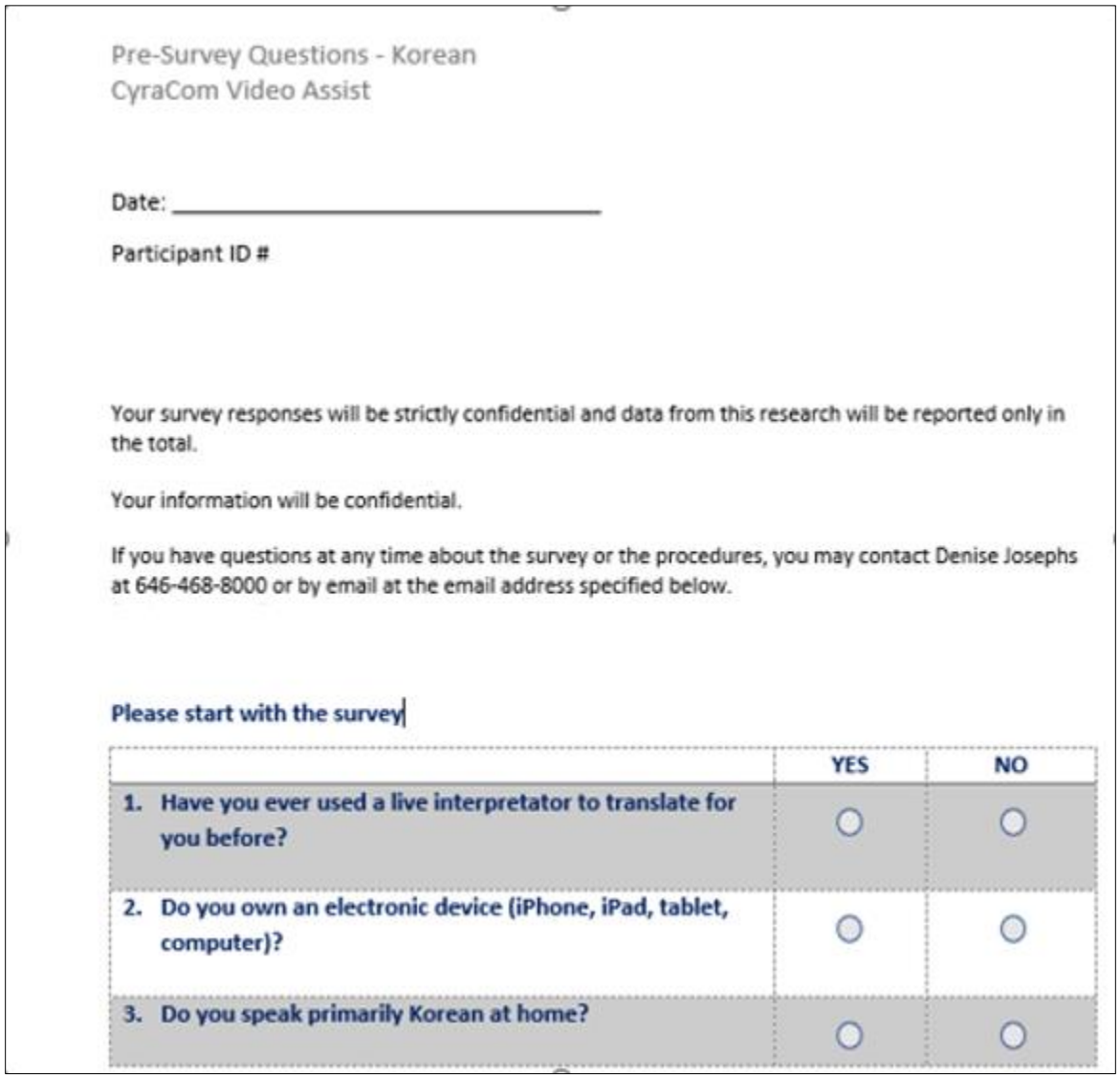
□ Korean

□ Spanish

Has the patient received Live interpreter in the past?
□ YES □ NO

Appendix B

Pre Survey Participant



Pre-Survey Questions - Korean
CyraCom Video Assist

Date: _____

Participant ID #

Your survey responses will be strictly confidential and data from this research will be reported only in the total.

Your information will be confidential.

If you have questions at any time about the survey or the procedures, you may contact Denise Josephs at 646-468-8000 or by email at the email address specified below.

Please start with the survey

	YES	NO
1. Have you ever used a live interpretator to translate for you before?	○	○
2. Do you own an electronic device (iPhone, iPad, tablet, computer)?	○	○
3. Do you speak primarily Korean at home?	○	○

Appendix C

Post Survey Participant

Post-Survey Questions
Cryacom Video Assist

Date: _____

Participant ID # _____

Your survey responses will be strictly confidential and data from this research will be reported only in the total.

Your information will be confidential.

If you have questions at any time about the survey or the procedures, you may contact Denise Josephs at 646-468-8000 or by email at the email address specified below.

Thank you very much for your time and support.

Please start with the survey

	Very Easy 1	Easy 2	Neutral 3	Difficult 4	Very Difficult 5
1. Did you find the translation application easy to use?	○	○	○	○	○

	YES	NO
2. Do you feel your questions was translated correctly?	○	○
3. Compared to a live translator would you use this device again?	○	○

Appendix D

Modified SUS Usability Scale Questionnaire Staff

Modified System Usability Scale

Please complete the survey below. Select the answer that best reflect your experience using the Cryacom Video Assist Application. Your participation will be anonymous in order to protect your identity.

	Strongly Agree 1	Agree 2	Undecided 3	Disagree 4	Strongly Disagree 5
1. I think that I would like to use this system frequently.	○	○	○	○	○
2. I found the system unnecessarily complex.	○	○	○	○	○
3. I thought the system was easy to use.	○	○	○	○	○
4. I think that I would need the support of a technical person to be able to use this system.	○	○	○	○	○
5. I found the various functions in this system were well integrated.	○	○	○	○	○
6. I thought there was too much inconsistency in this system.	○	○	○	○	○
7. I would imagine that most people would learn to use this system very quickly.	○	○	○	○	○
8. I found the system very cumbersome to use.	○	○	○	○	○
9. I felt very confident using the system.	○	○	○	○	○
10. I needed to learn a lot of things before I could get going with this system.	○	○	○	○	○