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Article

Assessing Spanish interpretation in community healthcare: a study of patient satisfaction

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SUMMARY

With the growing population of limited English proficiency individuals in the United States, interpretation services in healthcare settings have become increasingly important to ensure equitable access to quality care. This study investigates which Spanish interpretation model (e.g., in-person, video remote, telephonic, bilingual provider) best enhances adult Spanish-speaking satisfaction in outpatient community healthcare settings. We hypothesized that in-person Spanish interpretation models would best enhance patient satisfaction in community healthcare compared to other methods of interpretation, such as video remote, telephonic, and bilingual provider models. We implemented a triangulated mixed-methods design, utilizing the expectation disconfirmation model, additional variable (trust, clarity, and cultural understanding) Likert scales, and a qualitative free-text option. Through the analysis of 167 complete responses, we found satisfaction did not significantly differ between models, thereby failing to reject the null hypothesis. Alternatively, we found satisfaction to highly correlate with the variables of trust, clarity, and cultural understanding. Additionally, an unexpected theme of patient gratitude—termed the "gratefulness factor"— emerged from the qualitative analysis. These findings suggest that focusing on soft skill training for providers may enhance the patient experience, as perceived kindness and interpersonal care may lead to higher satisfaction.

INTRODUCTION

As of 2021, over 25.7 million people in the United States have limited English proficiency (LEP) (1). We defined LEP as an individual who does not speak English as their first language and who has limited ability to write, speak, and/or understand (2). Roughly 79% of the LEP population in Atlantic County, New Jersey is Hispanic—a figure that continues to rise (3). This language barrier results in many obstacles, such as patients misunderstanding medication instructions or missing follow-up appointments, leading to limited access to vital healthcare. To resolve these challenges, institutions have utilized interpretation services of different varieties (e.g., telephonic, in-person, video remote) to serve as a communication bridge between patients and their providers (4, 5). However, the COVID-19 pandemic disproportionately affected these communication bridges for the often less affluent LEP communities, as the pandemic limited in-person interpreting, undermining care (6). In response, there has been a large increase in remote professional interpretation that continues to dominate the industry today, changing the interpretation landscape (4). Despite this shift, there is limited research on Hispanic LEP individuals' perceptions and responses to this new interpretation environment, especially for less affluent populations who utilize services offered by community clinics such as federally qualified health centers (FQHCs). To explore these perceptions, patient satisfaction can be an appropriate measure, as satisfaction directly affects understanding, adherence, and better outcomes (7). This study aimed to assess patient perceptions and satisfaction with the current climate of different types of interpretation services in FQHCs by addressing gaps in the literature and incorporating both new and established study approaches.

Past studies have unveiled various perspectives on using different interpretation models within healthcare. A study surveyed healthcare providers in Oslo and found that over 50% of these providers relied on family members as interpreters (8). Corroborating this, many providers prioritize the most convenient option when choosing interpretation methods (9). However, this convenience may have drawbacks. Experts discourage using familial interpretation due to the elevated risk of miscommunication that could lead to legal issues (10, 11). Alternatively, benefits of higher levels of trust, time savings, and more complete diagnostic information could offset concerns about confidentiality issues and gatekeeping (12). Despite these known issues, limited availability, time restraints, and regional dialects continue to lead patients to rely on family members for interpretation (13).

In a study analyzing data collected by focus groups made up of 13 Hispanic individuals, patients believed they had increased access to healthcare through telephonic modalities, specifically preferring it over familial interpretation (14). However, nurses often cited concerns about acquiring and maintaining telephonic equipment (11). Indeed, providers and interpreters agree that telephonic modalities were inferior to video remote interpretation (VRI) due to the lack of eye contact, visual communication, and overall diminished rapport associated with telephonic interpretation (15, 16). VRI models were found not only to be superior to telephonic interpretation but also to be the highest-ranking form of interpretation in a study comparing iPads (a VRI model) to Spanish-speaking physicians (17). However, the small sample size (n = 7) and association with innovative technology may have introduced bias in this study's findings. From the interpreter's perspective, in-person and VRI models were equal in terms of straightforward information exchange. Nonetheless, in contrast to earlier studies citing VRI models as the highest ranking, others found in-person to be superior in terms of building rapport, attributed to the visual aspects (15-17).

One study cited in-person modalities promoting complete patient satisfaction with family-centered rounds in a pediatric setting (17). Moreover, providers and interpreters favored in-person over VRI and telephonic interpretation, agreeing with this patient perspective (15). However, the absence of

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in-person availability remains the largest obstacle (5, 18). As highlighted from the nursing perspective, availability and feasibility remain the main obstacles to bilingual provider interpretation as well (10). Despite these challenges, bilingual providers consistently rank as one of the most valuable interpretation methods for patients (11, 13).

The measure of satisfaction concerning Spanish interpretation models in Atlantic County, New Jersey, is imperative due to the large LEP population and often marginalized groups using the observed health facilities. Past research has been conflicting and has neglected to measure patient satisfaction in less-affluent, real-world contexts. Our study is the first to adapt the expectation disconfirmation model (EDM), a measure of the difference between before and after values, with additional proven variables to answer the question: Which Spanish interpretation model in the Atlantic County region best enhances adult satisfaction in outpatient community healthcare?

We chose this novel approach using the EDM as it is a widely used framework for understanding satisfaction by comparing individuals' expectations with their actual experiences. In this model, satisfaction was determined by comparing whether outcomes meet, exceed, or fall short of patient expectations. The EDM offers a structured way to quantify and analyze performance, particularly useful in healthcare settings, as patient expectations can strongly influence satisfaction.

We originally hypothesized that in-person interpretation would yield the highest satisfaction out of the in-person, VRI, telephonic, and bilingual Spanish models within Spanish interpretation in community healthcare. We found no significant differences in satisfaction between models; thus, we failed to reject the null hypothesis that satisfaction does not differ between interpretation models. Additional findings support the value of trust, clarity, and cultural understanding in driving patient satisfaction, as well as the role of the patient-provider relationship, regardless of the interpretation method used.

RESULTS

We collected a total of 180 responses to our survey (translated version found in Appendix A) from patients visiting one of four Southern Jersey Family Medical Centers FQHC health offices in Atlantic County, South Jersey. We analyzed 167 fully completed responses in this study, as we excluded 13 responses from analysis due to previous survey completion, invalid age inputs, and implausible survey responses (e.g., 1000 years old or a rating of zero for all questions). The participant population had a mean age of 34.7 years (*SD* = 10.9) and consisted of 140 females, 26 males, and 1 individual who identified as other or preferred not to say. Reasons for visits consisted of routine checkup (51.5%), sick visit (21.6%), dental (16.2%), vaccination (7.2%), women's health (0.6%), and other (3.0%). Of the respondents, 84.4% had previous experience with interpretation services, while 15.6% stated this was their first time using such services. We calculated the sample sizes for each interpretation model, along with averages for each Likert scale response (**Table 1**). We did not further analyze data collected from bilingual provider visits due to the relatively small sample size (*n* = 3).

To assess patient satisfaction, we employed an exploratory triangulated design, the first component of which was the EDM (**Figure 1**). Using the difference between before-satisfaction (BS) and after-satisfaction (AS) values, we calculated the EDM for each data entry (**Table 1, Figure 2**). Positive calculations indicated an increase in satisfaction, neutral showed no change in satisfaction, and negative calculations indicated worsened satisfaction. The framework used prior expectation as a control, as opposed to a traditional control group, to suit the real-world exploratory design. The average EDM value for in-person interpretation visits was 0 (SD = 0.35). This resulted from minimal variance in BS and AS values, except for respondents 31 and 102, with EDM values of -1 and 1, respectively. The calculated average for VRI was +0.14 (SD = 0.71), representing a slight increase in satisfaction after the visit from expectations before. Likewise, telephonic interpretation had an increase in satisfaction, with an EDM average of +0.11 (SD = 0.38). VRI models had the highest EDM score, with telephonic following, and in-person showed no change.

We performed statistical analysis of our EDM results through the Kruskal-Wallis H test. Telephonic had the highest mean rank (*n* = 38, mean rank = 84.78), followed by the VRI (*n* = 110, mean rank = 82.55) and in-person (*n* = 16, mean rank = 76.78). However, the resulting *p*-value of 0.852 (*H*(2) = *0.32)* was higher than the alpha level of 0.05, indicating

Method (*n*)	Before Satisfaction (Mean/*SD*)	After Satisfaction (Mean/*SD*)	Trust (Mean/*SD*)	Clarity (Mean/*SD*)	Cultural Understanding (Mean/*SD*)
In-Person (16)	6.61/0.48	6.61/0.48	6.44/0.79	6.57/0.78	6.44/1.79
VRI (110)	6.34/1.09	6.54/0.92	6.57/0.79	6.61/0.75	6.64/0.74
Telephonic (38)	6.75/0.43	6.86/0.34	6.42/0.59	6.25/1.04	6.53/0.87
Bilingual Provider (3)	7/0	7/0	7/0	6.65/0.47	7/0

Table 1. Likert scale means and standard deviations. This table presents the mean and standard deviation (*SD*) for satisfaction-related variables measured on a 7-point Likert scale (1 = lowest satisfaction, 7 = highest satisfaction) across different Spanish interpretation methods. "Before Satisfaction" and "After Satisfaction" refer to patient expectations versus actual satisfaction.

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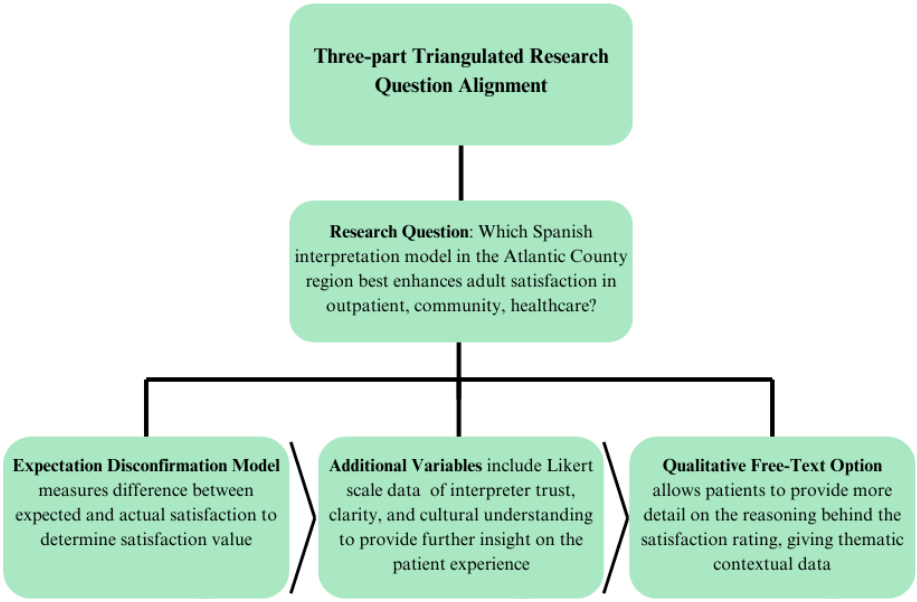

Figure 1. The three-part mixed methods in alignment with the research question. The triangulated relationship between the EDM, additional Likert scale variables, and qualitative free-text options in answering the research question of this study.

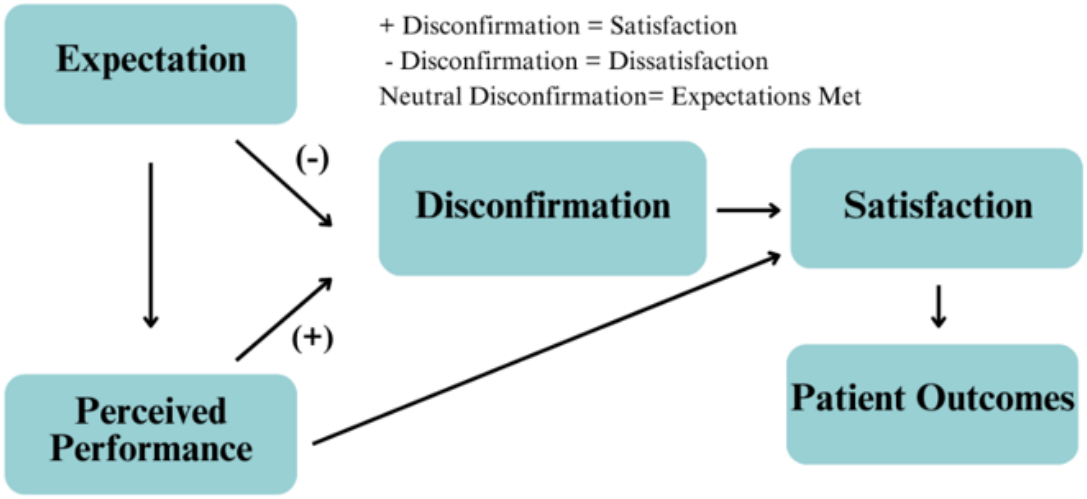

Figure 2. Visualization of the expectation disconfirmation model. The expectation serves as the baseline, which subtracts from perceived performance. Both arrows lead to the calculated disconfirmation, determining satisfaction, which is directly related to patient outcomes. The direct arrow from perceived performance to satisfaction represents the direct effect between the two, especially when there is no prior expectation to be based on.

no significant difference among the EDM values of the three models tested. This suggests that patients rated their change of satisfaction relatively similarly across all models, failing to reject the null hypothesis. Likewise, we conducted the Kruskal-Wallis H test on the response data of trust, clarity, and cultural understanding for in-person, VRI, and telephonic models. Results for each model were also over the alpha level threshold: trust ($H(2) = 5.40$, $p = 0.067$), clarity ($H(2) = 2.16$, $p = 0.340$), and cultural understanding ($H(2) = 1.44$, $p = 0.486$). These results show that the Likert scale responses for these three variables were similar across each model. These findings suggest no evidence of significant differences in participant responses across models, which is consistent with the overall trend of EDM similarity.

To provide context for the homogeneity of satisfaction results and capture nuanced aspects of satisfaction that the EDM may not have been able to consider, we analyzed the three additional variables of trust, clarity, and cultural understanding to assess correlations to AS values. The general correlation for all three variables compared to their respective model's AS value showed an upward trend (**Figure 3**). Upward trends across the AS Likert scale x-axis and variable Likert scale y-axis visually corroborate positive correlations between trust, clarity, and cultural understanding with AS, confirming the link between these variables.

We statistically analyzed this link through Spearman's rank correlation test, where Rhos and corresponding p-values showed highly significant correlations ($p < 0.05$)

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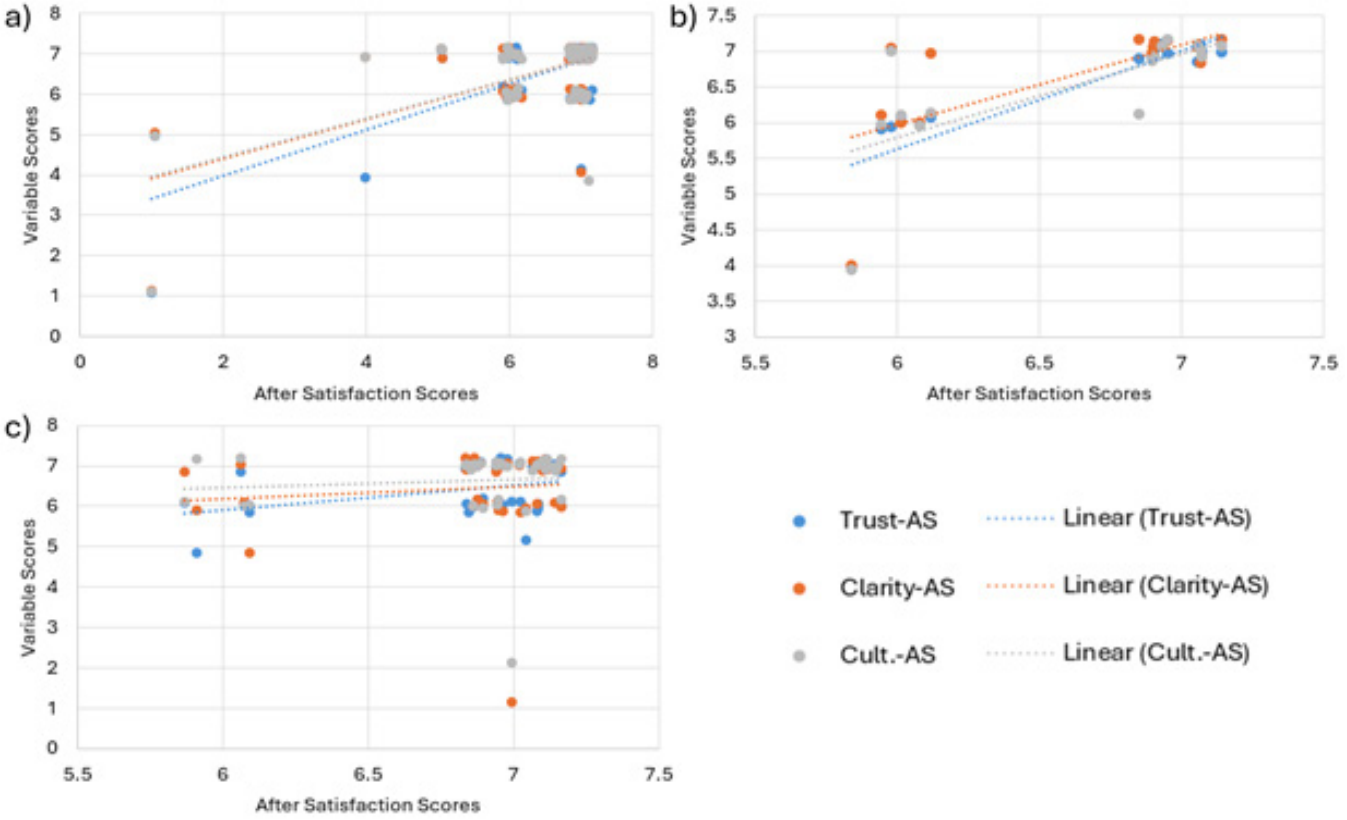

Figure 3. General correlation trends between variables and after satisfaction (AS) by interpretation model. We measured Likert scale scores for trust, clarity, and cultural understanding against AS scores across models. a) In-person model correlation. b) VRI model correlation. c) Telephonic model correlation. Blue, orange, and gray points represent trust, clarity, and cultural understanding, respectively, each measured relative to AS. Simple linear regressions are shown as dotted lines in corresponding colors.

between all variables across all three models (**Table 2**).

To provide additional context for the homogeneous satisfaction results, we used the in vivo thematic coding of the Spanish-to-English translated qualitative free-text options to provide contextual understanding. We analyzed 50 free-text options answering the prompt— "In a short response, describe why you marked your satisfaction level after the visit as it is in Question 8". The bilingual-provider translated thematic coding (Appendix B) categorized free-text responses by interpretation model. Sample sizes followed accordingly: in-person (*n* = 8), VRI (*n* = 34), telephonic (*n* = 7), and bilingual (*n* = 1). Common themes of "very satisfied" and "very good" responses (*n* = 25) appeared in all model groups, corroborating previous data on the homogeneity of high satisfaction scores. "Very clear" (*n* = 10) was also abundant throughout groups, matching high interpreter clarity Likert scale scores and means (**Table 1**).

We found the theme of "in accordance with information", referring to the strictly accurate translation of the service, only in the VRI group, introducing possible associations of a transactional interaction with the VRI model. This theme appears in respondent 117's response, "He gave me all the information I needed," and in respondent 24's response, "He translated well what the doctor wanted to report." In contrast, we notably only identified the theme of "explained well" within the in-person interpretation group. Additionally, we identified only one outlier with audio problems in the VRI group.

The most unexpected result from the thematic coding was the recurring theme of "friendly" (*n* = 8) and "cared for" (*n* = 6) across all patient groups. Responses included respondent 4: "Wonderful attention from the staff", and respondent 50: "I felt understood and trusted. I was able to express my doubts and receive information about my health. Thank you very much." We conceptualized these recurring expressions of gratitude and compliments toward staff as a "gratefulness factor," defined in this study as a patient's expression of appreciation that may positively influence reported satisfaction independent of interpretation modality. We originally did not consider this factor to impact satisfaction scores. However, the prevalence of the "gratefulness factor" throughout the thematic coding may reflect an overall positive perception of care that influences satisfaction ratings independent of interpretation modality. Further research needs to determine the extent of this proposed effect.

DISCUSSION

In attempting to explore which interpretation best enhances patient satisfaction, the results from 167 valid responses indicated that no interpretation model had a significant increase in patient satisfaction. The rank EDM values calculated the highest satisfaction in the order of telephonic, VRI, and in-person, respectively. However, the Kruskal-Wallis H Test found that the difference between these mean ranks was insubstantial. These data corroborate the findings of past research, which found that patients ranked all interpretation methods the same when comparing in-person,

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Comparison - AS	In-Person			VRI			Telephonic		
	n	ρ	*p*	*n*	ρ	*p*	*n*	ρ	*p*
Trust	16	0.82	$<1.0\times10^{-3}$	110	0.66	$<1.0\times10^{-3}$	38	0.99	$<1.0\times10^{-3}$
Clarity	16	0.62	1.0×10^{-2}	110	0.61	$<1.0\times10^{-3}$	38	0.96	$<1.0\times10^{-3}$
Cultural Understanding	16	0.65	6.0×10^{-3}	110	0.61	$<1.0\times10^{-3}$	38	0.99	$<1.0\times10^{-3}$

Table 2. Spearman's rank correlation test of additional variables and after satisfaction. Spearman's correlation coefficient, or ρ (rho), represents the strength of correlation between AS and additional variables. The assessed *p*-values were significant ($p < 0.05$).

VRI, and telephonic services (15). These results suggest no significant differences in satisfaction across models and that interpretation models did not have a strong effect on the satisfaction of patients.

In this study, we found that the three variables of trust, clarity, and cultural understanding each played a significant role in enhancing patient satisfaction. This aligned with the results from the previous methodological section, which found no variance in EDM satisfaction. Values of trust, clarity, and cultural understanding were similarly high for all interpretation models, with no significant variance between the models. We found the correlation between each of these variables and AS values to be significant. From these results, we concluded that patient satisfaction did not change across interpretation models. Additionally, our analysis demonstrated the strong correlation between trust, clarity, and cultural understanding from the interpreter and satisfaction that each model exhibited. Our data remains consistent with current knowledge in the field, especially with other studies indicating trust as the foundation of the patient relationship, directly affecting satisfaction (19). Corroborating this, our results indicated that trust had the highest correlation to AS.

The last part of the triangulated design—the qualitative free-text option—aligned with the two previous sections as well, supporting and adding to previous works. Major themes across methods ranged from general satisfactory comments such as "very satisfied" and "a great help" to comments validating the Likert-scale responses of the three variables, with "Everything is very clear" and "I felt understood and trusted." These results indicated an additional verification that all models promoted patient satisfaction equally. Additionally, unique responses to certain interpretation models provided more insight into why patients indicated their satisfaction in a certain way. Past research can explain the theme of "explained well" only being present in in-person modalities, as in-person communication is more effective when establishing rapport with the patient (16). This established rapport could explain patients feeling more understood and, in turn, having information "explained well" to them. Alternatively, the theme of "in accordance with information" primarily seen with VRI models can be explained in the context of remote modalities interpreted as vessels of straightforward information exchange (16). Additionally, one response indicated "audio was not heard well" only with VRI, representing an outlier.

While all parts of the triangulation correlated with one another, determining similar satisfaction ratings, an unexpected yet recurring theme emerged in the qualitative responses— characteristics of "thankful" and "friendly", summing to a theme of a "gratefulness factor". This is a theme that has not been thoroughly explored in the existing literature; however, the prevalence of the theme throughout models suggests that interpersonal relationships through soft skills such as "respect", "attentive", and "friendly" are major factors in promoting patient satisfaction, no matter which model is being used. This unexpected underlying factor could provide more context for the conclusions of this study's research question: Which interpretation service best enhances patient satisfaction? The context of the population demographic behind this study can explain the high prevalence of the "gratefulness factor" theme. Participants were patients from one of four FQHC office locations in Atlantic County, New Jersey. These offices specialize in underserved populations regardless of immigration status, insurance coverage, or ability to pay. The ability to communicate through interpretation services, which other practices may not offer, may contribute to the gratitude expressed by patients. Patients may have rated all interpretation methods similarly in satisfaction because they were grateful that FQHCs offered these services in the first place, regardless of which service performed best. This new finding could supply providers in the field with valuable knowledge that soft skills and the presence of gratitude may play a larger role in underserved Spanish interpretation in healthcare than previously thought, providing pertinent context to the homogeneity of satisfaction regardless of the model.

We acknowledge several limitations to our study. The unequal sample sizes across interpretation models, especially for bilingual providers, may limit the reliability and strength of comparisons between groups. This study also considered the potential volunteer bias, in which participating subjects may systematically differ from non-participating individuals, and recall bias, where participants may inaccurately report past experiences. Active participation encouragement by the nursing staff at the locations immediately after an interpretation encounter mitigated these effects. Additionally, although the online QR distribution of the survey provided ease of access and efficiency, it may have unintentionally excluded subjects who may not have had access to a mobile device with adequate resources. Lastly, the findings' generalizability to more affluent populations may not be as applicable, as we studied only FQHC healthcare offices, thus possibly introducing gratitude bias from the less affluent survey populations that would not be present in the overall population. While this study acknowledges these limitations, the results remain valid and informative in exploring how different Spanish interpretation models affect patient satisfaction in community healthcare settings.

Future research should focus on determining the validity

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of the proposed "gratefulness factor" in Spanish interpretation models. Comparing the presence of the "gratefulness factor" and patient satisfaction between FQHC and non-FQHC settings could clarify whether this phenomenon is specific to underserved populations and provide insight into how care context influences patient satisfaction. Furthermore, a longitudinal study tracking patient satisfaction before and after healthcare visits over an extended period could offer deeper insights into how interpretation models influence patient satisfaction over time.

The results of this study indicate that, in the new landscape of interpretation post-COVID-19 and amidst federal budget cuts, providers and staff in the medical field could increase patient satisfaction, and therefore patient outcomes, by emphasizing "soft skill" training of healthcare staff. Strengthening trust, communication clarity, and cultural understanding, alongside the provider-patient relationship, may foster more positive patient experiences and gratefulness, leading to improved healthcare outcomes. In the broader context, prioritizing patient-centered communication strategies may be more cost-effective than choosing specific interpretation methods. Healthcare institutions and policymakers should consider incorporating these elements into accreditation standards, interpreter service contracts, and ongoing professional development programs.

MATERIALS AND METHODS

This study employed an explorative triangulated design to assess adult Hispanic patients' satisfaction with Spanish interpretation services in healthcare settings in the Atlantic County region. For this study, the independent variable and dependent variables were the type of Spanish interpretation service and patient satisfaction, respectively. The local high school institutional review board (IRB) and the Southern Jersey Family Medical Center (SJFMC) Medical Director's Office approved this study.

Subjects and procedures

The participants of this study included 180 LEP Spanish-speaking adult patients who received care at one of four FQHC healthcare office locations in Atlantic County, New Jersey. Nursing and provider staff at these locations identified participants, aged 18 to 73 years, as in need of Spanish interpretation services (either in-person, VRI, telephonic, or bilingual provider) during their visits. Staff then asked patients to participate anonymously in this study through a consent form approved by the IRB.

At these FQHC locations, distributors administered surveys in Spanish to patients immediately after a medical encounter in which the patient utilized Spanish interpretation services (either routine check-in, sick visit, vaccination, women's health, dental, or another specialist). A bilingual provider later translated responses into English for further analysis. Over a 64-day data collection period, the nursing staff administered surveys to ensure trust and limited volunteer bias, as they encouraged patients to participate in the survey. Additionally, the immediate distribution of the survey post-visit guaranteed the encounter was fresh in participants' minds, leading to more accurate and reflective responses. Staff distributed surveys through QR codes linking to Microsoft Forms to provide accessibility and efficiency to the data collection process.

Additionally, we chose to distribute the survey once, post-visit, to minimize disruption of care, while maximizing participation and data quality. After participants had access to the survey, distributors asked them to fill out the survey in the primary care room while waiting for their physician. Upon successful completion, a thank-you message appeared on the patient's device. In some cases where the patient did not have access to a device capable of scanning the QR code, we asked physicians to pull the survey up on their devices for the patient to complete.

Study measures

The 10-question survey consisted of four main topics: background information (e.g., age, sex, type of visit, past interpretation experience), the EDM (measuring before and after satisfaction), additional variables (e.g., trust, clarity, and cultural understanding), and a free text option (explaining reasons behind satisfaction rating after visit). We implemented the background questions to provide context for patient responses, identify demographic trends, and assess potential bias and factors influencing satisfaction. A volunteer bilingual provider translated the survey and qualitative responses.

Data analysis

We calculated the EDM values from the complete survey responses. We first analyzed these data ranges through two preliminary tests to determine what assumptions were valid in using further tests to compare which interpretation model best enhanced satisfaction: Levene's test assessed the homogeneity of variance because of the unequal sample sizes of each interpretation model, and a Shapiro-Wilk test assessed normality of the different ranges. Results indicated that the data set was not normally distributed but exhibited equal variance. Based on these results, we determined the Kruskal-Wallis H test to be a suitable measure, based on the non-normal distributions, as a non-parametric test to determine if significant variance existed between EDM satisfaction values of each model. Significant variance would indicate one model enhancing patient satisfaction over the others. We then used Spearman's correlation test, as it is also non-parametric, to analyze the relationships between trust, clarity, and cultural understanding of each model and their respective after-satisfaction Likert scores. To provide context behind the satisfaction ratings, each analysis output a Spearman's rank correlation coefficient (rho or ρ), where the rho indicates the strength of association between two variables. We performed all calculations in Microsoft Excel, using a two-sided alpha level of 0.05 ($p < 0.05$ indicating significance).

We then categorized free-text responses by their interpretation model and analyzed for recurring themes across models using the in vivo coding method. We chose this method for its use of verbatim codes, which are particularly effective for the short responses and multilingual data sets present in this study. We translated data from Spanish to English for analysis, and a bilingual nurse practitioner reviewed it to ensure accuracy. We then sub-categorized responses into shared themes and interpreted them.

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