

A MULTIDISCIPLINARY APPROACH: TEACHING MEDICAL SPANISH TO MEDICAL STUDENTS USING ROLE-PLAY

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Abstract: *The Hispanic community is the most rapidly growing minority group in the United States, making up 18.3% of the population, with 40% reporting limited English proficiency. To address this need, many health sciences institutions have implemented medical Spanish courses to increase Spanish proficiency among future health care providers. Although interactive courses have shown efficacy in teaching field-related terminology, barriers to medical Spanish curriculum implementation persist. Our non-randomized experimental pilot study aims to investigate the benefit of role-play in a medical Spanish course. Nineteen second-year medical students were recruited to participate. Based on their placement test performance, students were assigned to a beginner or intermediate group, and met weekly for one-hour sessions over five consecutive weeks. Students assumed the roles of Spanish-speaking patient, English-speaking provider, and interpreter to practice various medical scenarios. Students completed pre- and post-course examinations to assess Spanish proficiency improvement. A p-value <0.05 was considered statistically significant. Seven students, all members of the intermediate group, completed the course. Class attendance among this group was 77.4%. When comparing examination scores, there was statistically significant improvement in oral translation of phrases from Spanish to English (p=0.03). Statistically significant improvement in oral translation of phrases from Spanish to English was accomplished through a minimal time requirement of one hour per week utilizing role-play. Given that limited time poses a barrier to implementing medical Spanish curricula, our findings highlight the potential benefit of this teaching methodology with a special emphasis on the under-utilized yet promising modality of role-play and call for its further evaluation. Furthermore, our study demonstrates the necessity of implementing medical Spanish course as an accredited class in medical schools to encourage student participation, which would provide legitimacy to the curriculum as the need for Spanish-speaking doctors increases with the rising Hispanic population in the US.*

Key words: medical Spanish; medical education; role-play; medical school curriculum; medical student

1. Introduction

There are 59.9 million Hispanics in the United States (Cortez, 2018). This number makes up 18.3% of the nation's total population and is expected to increase to 24.5% by 2050 (ibid). Hispanics are the most rapidly growing minority group in the country, and nearly 40% of Hispanic patients are categorized as having limited proficiency in English (Morales et al., 2015). Language concordance is a pivotal component of physician-patient relationship and its positive impact has been demonstrated in various aspects of patient care including receiving health education, better understanding of diagnoses, and improved management of chronic conditions such as diabetes (Diamond et al., 2019; Ortega et al., 2019; Wilson et al. 2005). Such findings highlight the benefits of language concordance as it leads to higher patient satisfaction and possibly contributes to lowering health care costs (Ngo-Metzger, 2007; Diamond 2019).

With the aim of training future health care providers with adequate proficiency in Spanish, many health sciences institutions in the United States have implemented medical Spanish courses (ibid). Although interactive classes have shown to be effective in teaching medical terminology to students, there are still significant barriers to implementing a medical Spanish curriculum (Morales et al., 2015; Mueller, 2017; Ortega, 2019). According to a national survey of medical schools in the United States, lack of time is the most frequently reported barrier to implementing a medical Spanish course (Morales et al., 2015). In addition, there is a sparsity of well-established assessment methods to evaluate the effectiveness of such courses (Ortega et. al, 2019; Reuland, 2008; Diamond, 2009). To improve the quality of the class, collaboration with language instructors can provide a more comprehensive course (Ortega et al., 2019; 2020). This can also add an emphasis on cultural competency to the objectives of the class, as language instructors help integrate such aspects to the course. Being culturally competent in addition to having conversational Spanish skills leads to more satisfactory patient outcomes (Lopez, 2008; Haskard, 2009; Ghaddar, 2013).

Role-play has been recognized as an effective teaching modality as it offers an interactive form of simulating real-life scenarios (Hardin, 2013). Its utility in teaching foreign languages has been established (Neupane, 2019; Krebt, 2017), including the Spanish language and medical Spanish specifically (Ortega, 2021; Félix-Brasdefer, 2008). In a study of 47 medical students, Ortega et al. (2021) noted an improvement in students' comprehension and vocabulary of medical Spanish topics. Similarly, Félix-Brasdefer (2008) noted a superior pragmatic ability in students when utilizing role-play.

Although the aforementioned studies demonstrate the utility of role-play in teaching foreign languages, only two thirds of medical education programs surveyed nationally reported using student-to-student role-play in their medical Spanish curricula (Morales et al., 2015).

The goal of this pilot study was to evaluate the potential of role-play interaction as a time efficient method of improving comprehension of Spanish language in beginner to intermediate proficiency students.

2. Methods

2.1. Study population:

Upon receiving approval from the institutional review board (IRB# NCR191414), incoming second-year medical students were recruited to participate via class-wide emails, verbal announcements, and word-of-mouth referral. Snowball sampling and convenience sampling were employed to recruit interested participants prior to screening for eligibility. Inclusion criteria were second-year medical students at our institution who expressed interest in learning medical Spanish. Criterion for exclusion was enrollment in a concurrent Spanish language course. 19 second-year medical students were recruited, informed about the goals of the non-randomized experimental pilot study, and reminded that their participation was voluntary. Students and faculty were not compensated or incentivized for their study participation. All participants provided their written informed consent. No official institutional credits were offered to students for their participation in this course. Study variables were age, sex, years of prior Spanish course completion, pre- and post-course examination scores, and attrition rate.

2.2. Course Design:

The course material was designed by a Spanish-fluent medical student with experience working as a certified medical interpreter, and a Spanish professor in the language department of the university. The medical student designed the preliminary content for each session, including the vocabulary and grammar lessons, along with the clinical scenarios. The medical student and the supervising Spanish professor then met and revised the content to best accommodate the course objectives. The purpose of this was to refine the medical content and incorporate the cultural components that were integral to the cultural competency objectives of the course. Transparent Reporting of Evaluations with Nonrandomized Designs (TREND) was used to evaluate this non-randomized experimental pilot study. On the first day of the course, students were given a placement exam containing 46 questions composed of oral and multiple-choice components. The exam was designed by the course instructor and approved by the Spanish department faculty. The multiple-choice portion aimed to test the students' knowledge of the terminology with questions such as (* indicates right answers):

1. *Mi hermano tuvo una piedra cuando tenía treinta años.*
 - a) *My father had an infection when he was forty years old*
 - b) *My brother had a stone when he was thirty **
 - c) *My cousin had cancer when he was fifty*
 - d) *My uncle had an infection when he was sixty*
2. *The results have arrived, and the CT scan showed us that you have a stone*
 - a) *Los resultados han llegado y la tomografía computarizada enseñó que usted tiene una piedra **
 - b) *Los resultados han llegado y la tomografía computarizada enseñó que usted tiene una masa*
 - c) *Los datos dicen que la piedra está en la tomografía computarizada*
 - d) *Los rayos-X enseñan que hay una piedra con infección*

3. *Me duele mucho la espalda, este dolor es insoportable. Hace dos horas que empezó y ya no lo puedo aguantar.*
- a) *My back hurts very much, this pain is unbearable. It started yesterday and I can't tolerate it.*
 - b) *My shoulder hurts very much, this pain is bad. It started today and I can't tolerate it.*
 - c) *My back hurts very much, this pain is unbearable. It started two hours ago, and I can't tolerate it **
 - d) *I have a bad headache and I can't take it anymore.*

The oral portion tested the same concepts in addition to evaluating the students' ability to verbally translate phrases from English to Spanish with a dialogue such as:

Student: Can you please confirm your date of birth and your phone number?

Patient: Hola, 22 de octubre de 1939. Mi número es: 205-981-1366. Student: Thank you for the information. I am going to speak to the doctor and come back shortly

Patient: Me parece bien, gracias a usted.

Student: Have you taken any medications to help with the pain?

Patient: Sí, tomé dos pastillas, pero no se me ha quitado este dolor.

The exam was proctored and later graded by the course instructor.

Based on their performances, students were assigned to either a beginner or intermediate group. Determined by the Spanish department faculty, a minimum score of 75% was chosen as the cutoff value for placement in the intermediate group. Although it has been suggested that such courses are most effective for intermediate and advanced levels students, given the higher likelihood of false fluency in beginner students and risk of a compromise in care (Morales, 2015; Fernández 2015), we included beginner students in our pilot study to see whether we could detect any notable results that could contribute to the existing literature. Additionally, it was emphasized throughout the course that the purpose of this class was not to train students for interpreter positions, rather it was to help them improve their knowledge of Spanish language. The classes were one-hour weekly sessions for five consecutive weeks. Students received a copy of the upcoming session's vocabulary lesson and practice scenario a few days before class via email and were encouraged to review them prior to coming to class. The vocabulary lesson contained medical-related terminology including names of body organs such as the liver, lungs, heart, kidneys, etc., and health care related words such as physician, student, social worker, etc. The first twenty minutes of the session were dedicated to learning relevant vocabulary and grammar pertinent to that session. The objective was to introduce the words that students would encounter in the session's role-play scenario. Subsequently, the instructor introduced a role-play scenario to students with settings including inpatient hospital, outpatient clinic, and the emergency department. An example scenario for the intermediate group was as follows:

Student: Good afternoon, what brings you here?

Patient: Buenas tardes. Me duele mucho la espalda, este dolor es insoportable. Hace dos horas que empezó y ya no lo puedo aguantar.

Student: Tell me more please!

Patient: Fui a mi trabajo esta mañana y estaba bien. Llegué a mi casa a las cuatro de la tarde y tomé una siesta. Me desperté a las 4:30 porque sentía algo raro en el estómago y en la espalda. De repente, sentí un dolor muy fuerte en mi lado izquierdo. El dolor no se me quitaba y también vomité 2 veces. Cuando mis hijos llegaron, les dije lo que pasó y me trajeron al hospital.

Student: Have you taken any medications to help with the pain?

Patient: Sí, tomé dos pastillas, pero no se me ha quitado este dolor. ¡Por favor, ayúdeme señora, ya no lo aguanto!

Student: Soon we are going to do some studies to find out the cause of your pain. Tell me more, have you had kidney stones?

Patient: No, solo he tenido una cirugía en toda mi vida. Me sacaron la vesícula hace casi 5 años.

Student: Anyone in your family has had kidney stones: parents, brothers, cousins?

Patient: Sí, mi hermano tuvo una piedra cuando tenía treinta años. Mi tía también, pero no sé cuántos años tenía.

Student: Thank you for the information. We are now going to take a CT scan to see if you have a stone in your left kidney. We are also going to get a urine sample. Patient: Está bien, gracias.

The scenarios focused on material that students learn during their pre-clinical years such as chief complaint, present illness and past medical history. For the remainder of the session, approximately thirty minutes, students were divided into groups of three, taking the roles of a Spanish-speaking patient, an English-speaking provider, and an interpreter to practice real-life scenarios that one may encounter when providing health care. All students, including those assigned the role of a Spanish-speaking patient, read from partial, untranslated written scripts. However, it is important to note that students did not simply read or memorize the translation of phrases. Rather, they were given a phrase in one language by the “patient” or “provider” during role-play and were then asked to translate the phrase to the other language, English or Spanish, using strategies such as circumlocution to generate their own speech to convey the message. The purpose of this practice was so that students would not simply memorize the meaning of certain phrases, rather, they had to translate the phrases independently, thus urging them to utilize a foundational knowledge of the grammar and vocabulary that was adaptable and implementable in different scenarios. This format was implemented in the pre-course and post-course assessments as the students were given phrases that they had not encountered previously in English or Spanish and asked to independently translate them. Their accuracy when doing so was then evaluated by the course instructor and subsequently scored.

The scenarios contained not only the relevant medical vocabulary, but also emphasized culturally appropriate use of language when speaking to patients. Examples include using respectful phrases such as “¿Qué le trae por aquí?” which translates to “*what brings you here today?*” rather than a literal translation of “*why are you here?*” to “¿Por qué estás aquí?”, and always referring to patients as “usted”, a formal form of “you”, rather than “tù”, the informal form. All sessions for both the beginner and intermediate group followed this agenda, however the vocabulary lessons and scenarios were more advanced for the intermediate group.

2.3. Statistical Analysis:

At the end of the five-week course, students completed a post-course examination, with a format identical to the pre-course exam, to determine if there had been an improvement in Spanish language proficiency, and the degree to which participants acquired Spanish language knowledge. All statistical analysis was performed using SAS Version 9.4 (SAS Institute Inc., Cary, NC). A p-value < 0.05 was considered statistically significant. Trends were reported if p-value was < 0.1 but > 0.05.

3. Results

Nineteen incoming second-year medical students, divided into beginner (n=5) and intermediate (n=14) groups, initially started the course. There were 13 (68%) females and 6 (32%) males. Average age of the cohort was 24.6 years (range 22-26 years). Average number of years of prior Spanish courses (high school and undergraduate education) for the intermediate participants was 6.5 years (range 3-8 years), while this number for the beginner students was 2.1 years (range 0-4 years).

The attrition rate among the entire cohort was 63% (12/19). Within the beginner cohort, all five students dropped out. Two of those students identified lack of time as their reason for withdrawal, and three students felt that their baseline Spanish language skills were insufficient. Within the intermediate cohort, seven students left the course. Four of those students identified lack of time as their reason for withdrawing from the course, and three students did not provide a specific reason. Seven students, all members of the intermediate group, completed the course.

Class attendance among students who completed the course was 77.4%. In the self-assessment survey, all students reported that the style of role-play was beneficial to their learning and believed that the course helped improve their conversational Spanish skills. The majority of students, 85.6% (6/7), said this course helped improve their knowledge of medical Spanish, while 71.4% (5/7) of students believed the course helped them become more culturally competent when providing care to Spanish-speaking patients.

Due to the non-normal distribution of data and small sample size, Wilcoxon signed-rank test was used for statistical analysis to compare repeated measurements before and after course completion on the same sample. When comparing pre-course to post-course examination scores, there was improvement of scores in all categories, which is demonstrated in Table 1. We found statistically significant improvement in oral translation of phrases from Spanish to English, as there was an improvement of 14.3 percentage points in the median score (95.7% vs 81.4%, p=0.03).

Table 1: Comparison of Pre-course and Post-course Examination Scores in the Intermediate Group

Exam Category	Pre-course median Standard Deviation	Post-course median Standard Deviation	p-value
Multiple-Choice	95.24 ± 2.32	99.21 ± 0.39	0.10
Oral Translation: English to Spanish	80.00 ± 5.85	93.57 ± 3.22	0.08
Oral Translation: Spanish to English	81.43 ± 3.88	95.71 ± 2.76	0.03 *
* indicates statistical significance			

4. Discussion

According to the US Census Bureau, Spanish is the most widely spoken non-English language in the United States (2020). As the number of Hispanic patients rises, the health care system faces the need for adequately skilled Spanish-speaking providers to deliver care to patients. For many years, health institutions have implemented medical Spanish classes in the attempt to bring forth such providers (Morales, 2015; Reuland, 2008). However, many barriers to introducing effective courses have been identified, including lack of time, heterogenous student skill levels, and financial costs (ibid). In this study, we evaluated the effectiveness of role-play in teaching medical Spanish to medical students.

In our pilot study, we introduced a course that included components that Ortega et al. (2019) deemed important with respect to developing a comprehensive course. These included involving other departments of the institution in designing the course, and creating pre-course and post-course assessments to evaluate it. The pre-course assessment also served the purpose of dividing the students into two groups to ensure a more homogenous breadth of knowledge amongst them, as too much heterogeneity in students' language skills has shown to be a barrier in implementing medical Spanish courses (Morales et al., 2015). We also incorporated important cultural nuances that one should take into account when providing care to Spanish-speaking patients, as these are equally as important as having the knowledge of medical terminology and conversational skills (Lopez, 2008; Harkard, 2009; Ghaddar, 2013). Our objective assessment of the students' knowledge during the pre-course and post-course examinations offered unique benefits as creating an objective assessment has been a barrier to designing effective curricula (Reuland et al., 2008; Ortega, 2008). Additionally, given the objective nature of our assessments, there was no margin for students to misinterpret, particularly overestimate their knowledge, as this has been a concerning issue among health care providers serving patients with limited English proficiency (Burbano, 2003). In addition, the majority of the sessions' time was

focused on improving oral conversational skills, as oral proficiency is deemed most important when considering medical Spanish courses (Hardin, 2013).

Achieving statistically significant improvement of Spanish comprehension was accomplished through a very minimal time requirement of one hour per week. This can be promising, as lack of time was the most commonly reported barrier by medical schools in a national survey (Morales et al., 2015). Our findings align with previous studies examining role-play, as Nestel et al. (2007) reported that 96.5% (n=274) of their students believed role-play was helpful for learning. Such results are closely mirrored by our finding that 100% (7/7) of participants reported role-play was beneficial to their learning. We see this as an opportunity for increased uptake of role-play as a teaching modality.

The quest for a well-established, unified protocol to teach medical Spanish across the US medical schools continues. Despite the small sample size, this study offers unique findings that contribute to developing effective medical Spanish courses. Aligned with prior reports in the literature, our findings support the utility of role-play in teaching Spanish (Ortega, 2021; Félix-Brasdefer 2008). Given that approximately only 2/3 of US medical schools with medical Spanish courses utilize role-play (Morales et al., 2015), we hope that our results can encourage the remaining programs to diversify their approach and incorporate this teaching modality. Additionally, given the demanding nature of medical school curricula, limited time is a considerable barrier to implementing medical Spanish courses (ibid). This course was unique in that we reached statistically significant improvement with only five one-hour sessions, suggesting that role-play would be a suitable teaching modality for medical students as it can improve students' knowledge with such a minimal time requirement. Lastly, we designed the course through collaboration with faculty in the language department of our institution, enabling us to incorporate the cultural nuances that one must consider when providing care to Spanish speaking patients. This adds to the growing body of literature that emphasizes the importance of incorporating such components into the medical Spanish courses to compose a comprehensive curriculum (Ghaddar, 2013; Hardin, 2013; Neupane, 2019).

5. Limitations and Future Directions

Although the findings in our pilot study provided promising results, it has its own limitations. The attrition rate among participants was 63% (12/19). Six of those students identified lack of time as the reason for withdrawing from the course. This highlights the recurring theme of lack of time as a notable obstacle to carrying out such courses. In addition, all five students in the beginner class withdrew from the course. Two of those students identified time as the reason while the other three stated to have felt that their baseline Spanish language skills were insufficient. Such contrast of background knowledge amongst the beginner and intermediate group is evident as the average number of years of completion of Spanish courses (high school and undergraduate education) for the intermediate participants was 6.5 years, while this number for the beginner students was 2.1 years. Our findings further support the established concept that foundational knowledge of the language is essential in order for students to gain the most benefit from medical Spanish courses, as Morales et al. (2015) advised medical schools to focus on intermediate and advanced-level Spanish proficiency medical students when

designing their curriculum. Although we noted improvement in all three categories of the examinations in Table 1, we reached statistical significance in only one category. This may have been due to our considerably small sample size (n=7), which limited our statistical power, as we noted an objective trend with respect to oral translation of phrases from English to Spanish ($p=0.08$). Although the assessments were objective and the content had been designed by faculty of the Spanish department, we did not utilize Spanish-speaking standardized patients for the assessments, as this has been the primary standard assessment of language skills across United States medical schools (Karkowsky, 2013). Lastly, we evaluated the students' knowledge only one week after completion of the course; therefore, our results do not provide insight on students' ability to retain this knowledge long-term.

As previously mentioned, a major limitation of this study was the considerably small sample size, which was a consequence of the high attrition rate. Although not explicitly stated by any of the participants, the lack of institutional credits offered by our course may have contributed to the students' withdrawal from the course. As demonstrated by both Ortega et al. (2021) and Morales et al. (2015), offering the medical Spanish course as an accredited class can both encourage participation, and provide legitimacy to the curriculum. Following such recommendations will enable programs to evaluate larger cohorts, and thus report their results with greater statistical significance.

6. Conclusion

In summary, we investigated the potential benefit of a multidisciplinary approach with an emphasis on utilizing role-play as the central teaching method in a medical Spanish course. Intermediate level students demonstrated significant improvement with oral translation of phrases from Spanish to English. More importantly, this was accomplished through a minimal time requirement of one hour per week, as limited time poses a notable barrier to implementing a medical Spanish curriculum. Such findings call for further evaluation of the role-play teaching approach in a larger sample population, and perhaps formally evaluating the students in a setting of standardized patient interaction. We believe our results provide unique insight to the growing body of literature in developing effective courses to teach medical Spanish, with a special emphasis on the under-utilized yet promising modality of role-play.

7. Acknowledgements

The authors would like to thank Victor Valdivia Ruiz, at the George Washington University Department of Romance, German and Slavic Languages and Literatures, for their contribution to this paper.

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