Abstract

Introduction: While many medical schools provide opportunities in medical Spanish for medical students, schools often struggle with identifying a structured curriculum. The purpose of this module was to provide a flexible, organ system-based approach to teaching and learning musculoskeletal and dermatologic Spanish terminology, patient-centered communication skills, and sociocultural health contexts.

Methods: An 8-hour educational module for medical students was created to teach musculoskeletal and dermatologic medical communication skills in Spanish within the Hispanic/Latinx cultural context. Participants included 47 fourth-year medical students at an urban medical school with a starting minimum Spanish proficiency at the intermediate level. Faculty provided individualized feedback on speaking, listening, and writing performance of medical Spanish skills, and learners completed a written pre- and postassessment testing skills pertaining to communication domains of vocabulary, grammar, and comprehension as well as self-reported confidence levels.

Results: Students demonstrated improvement in vocabulary, grammar, comprehension, and self-confidence of musculoskeletal and dermatologic medical Spanish topics. While students with overall lower starting proficiency levels (intermediate) scored lower on the premodule assessment compared to higher proficiency students (advanced/native), the postmodule assessment did not show significant differences in skills performance among these groups. Discussion: An intermediate Spanish level prerequisite for this musculoskeletal and dermatologic module can result in skills improvement for all learners despite starting proficiency variability. Future study should evaluate learner clinical performance and integration of this module into other educational settings such as graduate medical education (e.g., orthopedic, rehabilitation, and dermatology residency programs) and other health professions (e.g., physical therapy and nursing).

Keywords
Medical Spanish, Musculoskeletal Health, Dermatologic Health, Health Disparities, Language Concordance, Cultural Competency, Hispanic/Latinx Health, Limited English Proficiency, Communication Skills, Diversity, Inclusion, Health Equity, Minority Recruitment

Educational Objectives

By the end of the session learners will be able to:

1. Demonstrate medical Spanish knowledge regarding musculoskeletal and dermatologic organ systems, medical interviewing, and disease entities.
2. Provide a patient-centered explanation of diagnosis and plan for Spanish-speaking patients presenting with musculoskeletal and dermatologic problems.
3. Integrate knowledge of Hispanic/Latinx cultural beliefs and social circumstances in respectful conversations with patients regarding musculoskeletal and dermatologic health.
4. Self-assess confidence and limitations in medical Spanish as related to the care of patients regarding topics covered in this module.

Introduction

In the United States, more than 20% of the population speaks a language other than English at home, the majority of whom are Spanish speakers with limited English proficiency.\(^1\) Individuals with non-English language preference may have additional difficulties with health communication in English due to the complexities and high stakes of medical conversations, even if they have some English skills. Language discordance between patients and their health providers has been associated with worse clinical outcomes.\(^5\) Conversely, patient-physician language concordance improves patients' process of care including explanation of condition, problems and concerns, and patient empowerment.\(^5\)

Medical schools are tasked by the Liaison Committee on Medical Education with the responsibility of teaching students...
communication skills and cultural competency, and student demand has led many schools to offer medical Spanish educational opportunities. However, content, educator training, course structure, and use of assessments of the medical Spanish courses offered are variable.\textsuperscript{5} Despite the increasing number of Spanish speakers in the US population and increasing demand for medical Spanish in US medical schools, most medical school medical Spanish programs do not meet best practice criteria.\textsuperscript{7,8} According to best practice recommendations, medical Spanish education should not only teach medical terminology, but should also include patient-centered communication skills and progressive assessment of proficiencies and limitations.

Past approaches to providing medical Spanish curricular guidance\textsuperscript{9-13} have fallen short because they provided curricular information that may be difficult to replicate or insufficient instruction for potential educators. Several medical Spanish programs ranging from medical Spanish curricula to supplemental material have been previously published on MedEdPORTAL.\textsuperscript{9-13} Curricular guides that take on a full medical Spanish curriculum at once may be unable to provide sufficient detail on language activities, sociocultural context, case examples, and teaching techniques. Longitudinal programs, such as the 24-week SABES program,\textsuperscript{5} addressed the comprehensive and progressive nature of language acquisition, but may be difficult to replicate at other institutions that cannot commit this quantity of time to medical Spanish course implementation. Additionally, several prior publications focused on beginner Spanish students, rather than on students with a pre-existing Spanish level at the intermediate range or higher, as recommended by expert consensus.\textsuperscript{14}

The lack of medical Spanish educator training is one of the most significant barriers to medical Spanish courses, since individuals who may be able to practice medicine in Spanish may not necessarily have the skills for language assessment of learners, and language educators may lack the clinical knowledge to effectively teach physician language skills. Many schools also rely on students to peer-teach medical Spanish with little to no faculty support. Further, some of the published curricula address medical terminology only, without focusing on patient-centered communication or the sociocultural context of the patient. Medical school leadership may feel they do not have enough time to dedicate to a language course within an already tight medical education curriculum if it is disconnected from other clinical skills (e.g., organ system learning), communication skills (e.g., medical interviewing), or institutional health equity educational efforts (e.g., teaching about health disparities or cultural competence core content standards).

A recent expert consensus statement highlighted the need for standardization in medical Spanish education and provided guidelines on curricular structure for medical Spanish courses.\textsuperscript{14} One of the recommended structures for medical school Spanish curricula is by organ system. Additionally, language experts recommend medical Spanish educational activities that expand beyond terminology alone and focus on authentic communication as a primary pedagogical tool.\textsuperscript{8} Strategies such as flipped classrooms allow learners to learn terminology or concepts prior to class time and to focus on authentic communication activities (e.g., role-plays and active small-discussion groups) during class time. There is a need to provide standalone structured modules specific to organ systems in order to provide medical educators’ flexibility in integrating the modules as desired. This targeted module can be taught to interested medical students in conjunction with clinical skills courses, system-based curricula, and/or within specialty or subspecialty courses or clerkships.

Specifically, a standalone medical Spanish module specific to the musculoskeletal and dermatologic systems can address medical student education on health disparities specific to these organ systems. For instance, Hispanic/Latinx patients with osteoporotic fractures have been found to have longer hospital stays,\textsuperscript{15} those with diabetes have increased risk of major fractures,\textsuperscript{16} and Hispanic/Latinx patients with rheumatoid arthritis have an over 15-month delay in presentation to care compared to their white counterparts.\textsuperscript{17} In addition, Hispanic/Latinx patients have a greater incidence of atopic dermatitis, hidradenitis suppurativa, and melasma\textsuperscript{18} and worse outcomes for melanoma and nonmelanoma skin cancers.\textsuperscript{19} Compared to Hispanic/Latinx patients that speak English, those with Spanish-language preference are three times less likely to report having had a skin examination by a physician.\textsuperscript{20}

Hispanic/Latinx cultural beliefs or health practices may affect whether a patient seeks care for a particular musculoskeletal or dermatologic condition or ailment, and may even influence the quality of care they receive if clinicians misinterpret or do not recognize the cultural or social circumstances due to bias or lack of knowledge. For instance, culturally normative expressions of pain may differ between Hispanic/Latinx communities and other groups\textsuperscript{21} and may influence how they are perceived by clinicians when presenting with severe pain. Data demonstrate delay in pain management of Hispanic/Latinx patients with bone fractures compared to white patients.\textsuperscript{22} Cultural or religious beliefs may also be influential in patients’ health-related decision-making; for example, beliefs about family structure or concerns about immigration status may determine whether a patient...
seeks care for musculoskeletal injuries resulting from a domestic violence incident. Sociocultural topics that influence health such as asking patients about delays in care or about the cause of suspicious injuries may involve highly sensitive discussions that require building respect and trust in the patient-physician relationship and should be integrated within patient-centered medical Spanish educational curricula.

The purpose of this medical Spanish musculoskeletal and dermatologic module was to provide a focused systems-based, flexible approach to teaching and learning medical Spanish musculoskeletal and dermatologic topics by integrating terminology, patient-centered communication skills, and sociocultural health contexts within existing medical school educational curricula.

Methods

Context
This module focused on providing a flexible educational program that can be used to teach a musculoskeletal and dermatologic curriculum in medical school. The context in which we implemented our work was a fourth-year medical Spanish elective at the University of Illinois College of Medicine. We implemented this standalone module as a segment of a multimodular medical Spanish educational program, but it can also be taught as a single 8-hour course.

Inclusion criteria for participants included medical school enrollment and self-reported Spanish language proficiency at an intermediate level or above. We used the Interagency Language Roundtable modified scale for physicians, a single-item proficiency rating scale that has been validated for self-assessment of physician language proficiency, as the self-report scale for student enrollment purposes, consistent with expert consensus.

Instructional Methods
The module required a total of 8 student hours, including 2 hours of class time, 2 hours of self-study prior to class time, 2 hours of role-play/interviewing practice after class time, and 2 hours of case/cultural activity assignments after class time. Class time instructional methods included guided new material presented by the faculty member (30 minutes), large-group role-play/cultural discussion (30 minutes), small-group practice exercises (20 minutes), and rapid-fire case stem learning activities (35 minutes). Please see Appendix A for the facilitator guide and rapid-fire case stem answer key, Appendix B for a key vocabulary handout, and Appendix C for the rapid-fire case stem student handout.

The guided new material segment focused on applying medical Spanish vocabulary and interview questions to musculoskeletal and dermatological patient scenarios. For example, topics included relevant anatomy and regional variants as applicable, questions to ask a patient with a common musculoskeletal/dermatologic chief complaint, and instructions to give a patient when performing relevant parts of the physical examination. Class time was conducted in Spanish-immersion style; the faculty member generated case-based questions for which students must apply medical Spanish terminology and, more importantly, to incite group discussion and practice of clinical interview questions (e.g., a man was mowing the lawn and got injured with the lawn mower. What might his chief complaint be? What kinds of injuries could occur to the nearest joint? What would you ask him next? How would you rephrase if the patient does not understand your question?).

During the 30-minute role-play and cultural class segment, the faculty member or a selected student was assigned to play the role of patient and another to play the role of the clinician. As part of the case discussion, the students were tasked with leading a cultural study activity. The students had to choose a sociocultural topic of relevance to musculoskeletal or dermatologic health or illness on which to investigate existing literature. Instructions for facilitating the cultural assignment were included in Appendix A, the facilitator guide, including several examples of relevant sociocultural topics (e.g., domestic violence, Spanish expressions of pain and how these are perceived by clinicians, and delayed presentation to medical care) that could be examined in more depth. In order to cover more sociocultural material, the facilitator can divide the class into small groups and assign each group a different cultural topic, the students can work together in Spanish to answer the guiding questions for their respective topic. A representative from each group can then present a summary of each group’s findings and recommendations to the full class at the conclusion of the segment.

Following the cultural discussion, we separated the students into small groups to discuss complex health concepts related to the class topic. Each small group was assigned a discussion prompt and had to come to a group consensus before presenting in Spanish to the large group (e.g., discussing a strategy for asking patient relatives/companions to leave the room when needing to interview a patient alone). Finally, the last class time segment was dedicated to a rapid-fire case study approach in which students were given a handout with a brief case stem and initial testing results and the students orally explained the results of the testing, the diagnosis, and the plan for treatment in
Spanish patient-centered language (Appendix C). Throughout in-class activities, the faculty facilitator provided real-time feedback regarding individual learner speaking and listening skills to support the progressive mastery of the targeted medical Spanish communication skills.

After class time, the students self-scheduled time to interview Spanish-speaking patients at medical school clinics or rotation sites and/or role-play cases with peers. They were expected to choose one of these cases to write as a history and physical case note in Spanish for additional reinforcement of vocabulary and grammar and to include instructions for the patient (in patient-centered language) as part of the assessment and plan. Appendix D provided the case note instructions and template. Importantly, the case note assignment also included a guided reflection activity for the learner to reflect upon his/her own strengths and opportunities for improvement on his/her medical Spanish musculoskeletal and dermatologic skills. Finally, the faculty facilitator provided individual learner feedback on performance on written and verbal assignments, including: (1) written musculoskeletal/dermatologic case note assignment, (2) written postcase reflection, (3) sociocultural study oral presentation, and (4) class participation in verbal discussions and clinical role-plays (including speaking and listening skills). Appendix E provided a grading rubric for faculty to use when providing feedback on the above four key module assignments.

Resources
To implement the module, a minimum of one medical Spanish educator, a classroom, and a white/blackboard or drawing board are recommended. Student course materials included a vocabulary review handout and a rapid-fire activity handout provided by the instructor. The instructor may also suggest additional prereading or previewing material that students can review before the class session with the instructor, in order to allow the class session to be highly focused on interactive role-plays and discussions in Spanish and to reduce the need for class didactics. Some potential resources that were suggested for student prereview before class included: Español Conversacional Para Profesiones Médicas or Spanish and the Medical Interview: A Textbook for Clinically Relevant Medical Spanish.

Additional medical Spanish student prereading resource suggestions can be found in a 2012 review of textbooks by language professor Hardin.

The documents needed to carry out the teaching activity for the musculoskeletal and dermatological medical Spanish module were: facilitator guide (Appendix A); key vocabulary review handout (Appendix B); rapid-fire case stem handouts (Appendix C); case note, reflection instructions, and template (Appendix D); and the faculty grading rubric (Appendix E).

Survey
We assessed the effectiveness of the module by having students complete a pre- and postcourse assessment to evaluate whether course objectives of increasing student confidence level and knowledge with musculoskeletal and dermatologic medical communication skills were met (Appendix F). Medical Spanish educators (authors Pilar Ortega and Jorge A. Girotti) developed the written assessment and made revisions after piloting it with two medical Spanish students of intermediate and advanced proficiencies. The knowledge assessment was designed to test skills pertaining to domains of vocabulary, grammar, and comprehension relating to musculoskeletal and dermatologic health. The vocabulary domain referred to medical or health terminology including accurate use of specific terms. The grammar domain referred to verb conjugation, gender/number agreement, and sentence structure. All grammar questions were presented in the context of health-related conversations in which a grammar issue would potentially impact meaning. Finally, the comprehension domain referred to a learner’s comprehension of a doctor-patient dialogue or ability to provide patient-centered instructions or information appropriate for patient comprehension.

We classified knowledge questions by principal domain being evaluated and included a total of 20 multiple choice, free response, and fill-in-the-blank items. We matched assessment items with learning objectives for the module and tabulated items to yield a vocabulary, grammar, and comprehension score. Two raters independently evaluated free response items using a predetermined scoring rubric for vocabulary, grammar, and comprehension. We compared each rater’s scores per item, and discussed and resolved any differences between raters to generate a final score for each item. Confidence questions asked students to rate their level of confidence with performing certain medical communication or clinical skills in Spanish-speaking patient settings. Confidence level response choices were rated on a 5-point Likert scale.

Statistical Analysis
We analyzed the assessments using a two-part analysis. We used descriptive statistics to examine trends in data and compared pre- and postassessment values using paired t-tests to evaluate differences between the scores and values of the assessments. We then conducted a regression analysis to examine pre- and postcourse performance differences, controlling for factors in ethnicity (Hispanic/Latinx vs. non-Hispanic/Latinx), Spanish
spoken at home, prior experience with advanced Spanish courses, and gender. Data compilation and analyses were conducted using Stata 16 (College Station). The institutional review board of the University of Illinois at Chicago approved this study (protocol number # 2017-0482) on August 15, 2017.

Results

We implemented this medical Spanish musculoskeletal and dermatologic module at a medical school with a total of 47 medical student participants over 2 years, from 2016-2018. All students had a Spanish proficiency level of intermediate or above based on precourse self-assessment, and the professor was a medical Spanish instructor in the department of medical education. All students who started the course also completed it. Participants included 18 male students (38%), 11 Hispanic/Latinx students (23%), 9 heritage Spanish speakers (19%, defined as students who were brought up speaking Spanish at home), 21 students with prior exposure to advanced Spanish curricula (45%), and 25 students with advanced precourse general Spanish proficiency (53%).

Assessments evaluated participants’ vocabulary, grammar, and comprehension using fill-in-the-blank, multiple choice, and free response, and the survey asked participants to self-assess confidence levels with different parts of the interview and exam in Spanish. All 47 students (100%) fully completed the knowledge portion of the pre- and postassessment and 44 students (94%) fully completed the confidence portion. Student scores pertaining to domains of vocabulary, grammar, and comprehension significantly increased during the course, \( p < .001 \) (Table 1). Moreover, student confidence levels increased, specifically with respect to performing the musculoskeletal and dermatologic systems both teaches new knowledge and builds upon learners’ previous Spanish skills. Regardless of starting level of general Spanish proficiency, all students improved individually and ended the module with similar levels of medical Spanish focused skills on musculoskeletal and dermatologic health with Spanish-speaking patients (Table 1).

Controlling for gender, ethnicity, heritage Spanish experience, and prior experience with advanced Spanish courses, there was no difference in the proficiency and confidence level scores in the postassessment. Hispanic/Latinx ethnicity (defined as Hispanic, Latino, Latina, Latinx, or Spanish ethnicity of any race, nationality, or ancestry) was associated with increased confidence with obtaining informed consent compared to non-Hispanic/Latinx students. No other statistically significant relationship was found between the potentially confounding variables and the change in outcomes or confidence between the pre- and postassessments (Table 2). Despite varying levels of general Spanish proficiency upon entering the course (ranging from intermediate to advanced), all students improved their individual precourse musculoskeletal and dermatologic skills. Further, all students, regardless of starting proficiency, ended with similar levels of medical Spanish focused skills on musculoskeletal and dermatologic topics.

Discussion

We designed, implemented, and evaluated a medical Spanish musculoskeletal and dermatologic curriculum intended to teach medical students a focused set of terminology, patient-centered communication skills, and relevant sociocultural context. Our evaluation results suggested that the medical Spanish musculoskeletal and dermatologic module was effective at improving medical Spanish skills, in target domains of vocabulary, grammar, and comprehension for medical student learners with starting Spanish proficiency in the intermediate through advanced levels. Specific confidence levels with performing the musculoskeletal and dermatologic-focused interview and exam in Spanish and obtaining informed consent increased for all learners. Regardless of starting level of general Spanish proficiency, all students improved individually and ended the module with similar levels of medical Spanish proficiency on the focused topics taught and tested. This strategy suggested that a standalone module on the musculoskeletal and dermatologic systems both teaches new knowledge and builds upon learners’ previous Spanish skills. By focusing on a digestible portion of medical interviewing and examination, learners were able to reach target proficiencies in the given subject matter.

Table 1. Change in Performance and Confidence Level on Pre- and Postassessment for Specific Medical Spanish Musculoskeletal and Dermatologic Skills

| Course Skills                              | N  | Pretest Score M (SD) | Posttest Score M (SD) | \( p \)  |
|-------------------------------------------|----|---------------------|-----------------------|--------|
| Total vocabulary score                    | 47 | 9.3 (2.0)           | 15.5 (2.3)            | < .001a|
| Total grammar score                       | 47 | 6.6 (1.4)           | 11.4 (2.0)            | < .001a|
| Total comprehension score                 | 47 | 5.8 (1.4)           | 11.8 (2.2)            | < .001a|
| Confidence in performing musculoskeletal  | 44 | 4.5 (0.6)           | 4.8 (0.7)             | .018   |
| component of physical exam                |    |                     |                       |        |
| Confidence in obtaining informed consent  | 44 | 2.1 (1.0)           | 3.1 (1.2)             | < .001a|
| Confidence in discussing sociocultural    | 44 | 3.4 (1.1)           | 4.3 (0.7)             | < .001a|

*Significant at \( p < .001 \).
We have found that implementing a focused musculoskeletal and dermatologic modular curriculum facilitated student engagement through specific learning objectives and structured activities that can be achieved in a discrete 8-hour period. In a prior class setting that included learners of multiple proficiency levels, it had been challenging to ensure that the course appropriately addresses the language needs of all learners. Our curriculum addressed this challenge by incorporating frequent small-group activities, formalizing assignments that integrated language and sociocultural context, and asking the faculty facilitator to provide individualized feedback to each learner on each assignment.

Heritage Spanish speakers, individuals who grew up with Spanish exposure in childhood, students who identify with Hispanic/Latinx ethnicity regardless of early Spanish exposure, or students who previously have taken advanced Spanish may have different educational needs and assessment outcomes when participating in medical Spanish courses. Our data showed that these potentially confounding variables had little impact on performance or confidence levels in the module’s learner assessment. Discussing informed consent with patients was the only item in which individuals of Hispanic/Latinx ethnicity demonstrated higher confidence than their non-Hispanic/Latinx counterparts. Obtaining informed consent is a high-stakes and complex medical communication skill, and a provider’s confidence in completing this skill successfully may be enhanced by their perception of cultural concordance with Hispanic/Latinx patients. The interaction between cultural and language concordance, and the relationship between reported self-confidence with a medical Spanish communication skill and corresponding speaking and listening skill performance in clinical scenarios require further study.

This study was limited by a small student size and implementation in a single type of medical Spanish setting as part of one medical school’s comprehensive medical Spanish course. Future study should include evaluation of student performance before and after the musculoskeletal and dermatologic module in other settings such as embedded within clinical clerkships, in graduate medical education such as orthopedic residency programs, or in other health care settings. Additionally, the type of assessment that was included before and after this module was conducted in written format. A written pre- and postassessment presented practical benefits due to ease of implementation, and the written assessment used for this module focused on patient-centered vocabulary, grammar, and comprehension. It is worth noting, however, that written assessments alone were insufficient to assess or certify full readiness to practice in Spanish, nor was this the purpose of the module’s assessment. In our module’s implementation, learners received individualized performance feedback from the faculty facilitator on listening and speaking demonstrated during in-class activities. Depending on the context in which it is used, the written assessment and individualized class time feedback should be paired with a learner clinical performance evaluation, such as an observed patient encounter or a standardized patient (SP) interview. For example, in a multimodal medical Spanish course, SP interviews that involve comprehensive topics in medical Spanish could be conducted as summative assessment exam at the end of the course.

Reflecting upon our curricular design and implementation, we recommend that other medical schools consider how they may sustainably integrate this module within existing areas of their unique medical school curricula. For example, the focused module can be taught to qualified or interested students during a musculoskeletal or dermatologic block in the preclinical years of medical school and can therefore teach medical Spanish skills while reinforcing material learned in related clinical skills or physiology courses. Alternatively, the module could be paired with orthopedic or rehabilitation clerkships during medical school clinical years or during residency or fellowship training for relevant fields (e.g., orthopedics, general surgery, rheumatology, sports medicine, dermatology, and physical rehabilitation medicine, among others). If used as a standalone module for clinicians that exclusively evaluates patients with musculoskeletal or dermatologic complaints, an SP interview involving a
Spanish-speaking patient with a musculoskeletal or dermatologic chief complaint would be an ideal summative assessment in this limited scope of medical Spanish practice. All learners would also benefit from practicing accurate self-assessment to appropriately judge personal limitations and learning how to obtain and work with medical interpreters when needed.

Medical schools and other educational programs may find that a focused module to address medical Spanish musculoskeletal and dermatologic topics is easier to implement in a time-scarce curriculum than making space for a multimodule medical Spanish course in which all organ systems are covered consecutively. In addition to physician training, a medical Spanish musculoskeletal and dermatologic module could be adapted and applied to other health professions programs such as physical and occupational therapy or nursing. Future work should also focus on other areas of medical Spanish education in order to generate additional modules that can be flexibly applied in medical education settings.

Appendices

A. Facilitator Guide.docx
B. Key Vocabulary Handout.docx
C. Rapid Fire Handout.docx
D. Case Note and Reflection Templates.docx
E. Faculty Grading Rubric.docx
F. Pre- and Postassessment.docx

All appendices are peer reviewed as integral parts of the Original Publication.

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Prior Presentations
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López-Hinojosa I. Musculoskeletal medical Spanish module. Presented at: Building Next Generation Academic Physicians; January 30, 2020; Phoenix, AZ.

Ethical Approval
The University of Illinois at Chicago Institutional Review Board approved this study.

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