

Assessing Medical Students' Knowledge of the Deaf Culture and Community in Puerto Rico: A Descriptive Study.

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Abstract

Background: Effective communication between health care professionals and Deaf and Hard of Hearing (D&HH) patients remains a challenge. Literature regarding health professionals' knowledge of the D&HH community and their barriers towards health care access is limited in Puerto Rico and suggests a need for research. Therefore, this descriptive study aims to evaluate future physician's knowledge about the Deaf culture and community in a student cohort at San Juan Bautista School of Medicine (SJBSM).

Methods: A survey utilized in a previous study by Hoang et al. was targeted to 230 medical students to evaluate their knowledge of (D&HH) patients. The survey consisted of three parts testing awareness, exposure, and knowledge of the Deaf community. Responses from the Knowledge section were graded using an answer key, and correct answers were added to create an overall continuous sum score per participant, with higher scores meaning higher knowledge. Participants also were asked to write in possible issues deaf patients may face when hospitalized, excluding communication problems. All data were recorded and used for descriptive analysis.

Results: 158 (68%) medical students participated. 63% reported exposure to D&HH people, and 80% were aware of the Deaf culture. 21% of students answered to have attended an American Sign Language (ASL) class, and 86% expressed interest in taking an ASL class. The overall percentage of correct answers of all the medical classes evaluated was 39%, with increasing percent knowledge as medical student year increased. The most frequently listed problem by respondents that deaf patients may face when hospitalized was dealing with an emergency in the hospital, such as the fire alarm.

Conclusion: Students from clinical years (MSIII & MSIV) showed a better understanding of the Deaf culture when compared to students in pre-clinical years (MSI & MSII). Nevertheless, knowledge was limited in all groups. The information generated is not only valuable for our school but the health-care community as well. The literature related to Deaf culture, particularly in the medical setting in Puerto Rico, is limited. Therefore, there exists a need to continue investigating ways to improve medical students' education of the Deaf culture and community.

Background

Hearing impairment is a growing disability in the world that comes with its own set of challenges and changes. According to the World Health Organization, an estimate of 466 million persons in the world live with hearing disability, a number that is expected to increase over the years [1]. Disabling hearing impairment is unequally distributed around the world. In Puerto Rico, 4.3% of the population suffer from a hearing disability and face challenges with daily activities and access to healthcare services [2, 3]. Individuals with a Puerto Rican background were associated with the highest prevalence of hearing difficulty when compared to other Latino groups in the US [4].

Access to health care for Deaf and Hard of Hearing (D&HH) patients has proven to be a global challenge [5–8]. A study conducted among 91 Deaf individuals and their experiences with using American Sign

Language (ASL) in the healthcare environment found that D&HH individuals were afraid of miscommunication with their physician and preferred the use of an interpreter [9]. According to a systematic review of specialized healthcare for D&HH people, hospitals and health care systems in 30 countries had access to a qualified sign language interpreter; however, the availability of those interpreter services was still limited [6, 8, 10]. Here in Puerto Rico, limited interpreter access exists with interpreters also not receiving adequate training to be certified sign language interpreters [11]. As a response, many countries have started increasing access to more sign language interpreters via online or remote services. France, the USA, the UK, Spain, and Japan have reported ease of communication with D&HH patients with these online and remote services, leading to improved patient-physician satisfaction and increased preventive care outcomes [8]. Still, the use of these technologies come with their challenges such as lack of personal interaction as well as misinterpretation of the patient's concerns or responsiveness during an emergency [12]. Deaf patients may delay health care as a result of communication difficulties, and instead wait until their condition worsens to utilize emergency services or see a specialist [13]. The delay in seeking medical care places deaf individuals at higher risk factors for cardiovascular disease, hypertension, diabetes, and depression [7].

A successful therapeutic doctor-patient relationship is achieved when there is effective communication that allows the physician to obtain the appropriate information to arrive at an accurate diagnosis and treatment plan [14]. D&HH patients rely on sign language to communicate. Still, most health care providers do not know sign language, which can result in increased language difficulties and jeopardize adequate access to health care for these individuals [15–17]. This, in turn, may pose an issue towards effective communication between health care providers and D&HH patients and may be a violation of their rights per the Americans with Disabilities Act [18]. Both the National Academy of Medicine and the American Medical Association have recognized the need for awareness and understanding of the cultural differences that influence the quality of health care provided for D&HH patients [19, 20].

Although medical students are taught the importance of effective communication with patients from the beginning of their training, many students may be unaware that patients with hearing impairments experience inadequate communication with providers. Incorporating awareness of communication with the D&HH patients in medical education can help to meet the special needs of this community [10]. Some US medical schools have made efforts to increase cultural competency of the D&HH community in the medical school curriculum [21]. Students from Kirksville College of Osteopathic Medicine were provided with a 4 hours deaf culture competency and ASL workshop, which showed increased knowledge and reported confidence in interacting with the Deaf community [22]. In a UK study, medical students who completed a deaf awareness and basic sign language module showed improved attitudes towards deaf individuals and higher knowledge scores than the control group [23]. This proved to be an effective mechanism for improving attitudes toward deaf individuals and improving student's knowledge; also, this indicated the value of dedicated deaf awareness training. First and second year medical students at Dalhousie University in Canada had workshops on deafness and hearing impairments along with group discussions [24]. These workshops were conducted in an effort to increase awareness among medical educators about the needs of teaching future physicians and the Deaf.

San Juan Bautista School of Medicine (SJBSM) is one of four LCME accredited medical schools in Puerto Rico with a majority Hispanic population. Education of Deaf culture within medical school curricula has been found in the literature [21, 23, 25–29]; however, none have been specifically reported in Puerto Rico. With an estimated 150,000 to over 200,000 hearing-impaired individuals on the island [3, 30, 31], knowledge of D&HH patients and their health care access for this community is important for future health professionals and poses a need for an investigation. Therefore, this study aims to describe future physician’s knowledge and awareness of Deaf culture and community by assessing medical students enrolled at San Juan Bautista School of Medicine (SJBSM).

Methods

Study Design

A descriptive study using a questionnaire-based survey was given to medical students from San Juan Bautista School of Medicine, Caguas, Puerto Rico. The survey (Appendix 1) was used with permission from the authors of “Assessing Deaf Cultural Competency of Physicians and Medical Students” [27] and was modified to add in a demographics section. The survey is composed of three sections: 1) demographic information in relation with our study population such as age, gender, and year of study; 2) five yes-or-no questions assessing user experience; 3) knowledge questions with six multiple-choice questions and 28 true-false questions, each with a “don’t know” option, and a free-response question asking participants to list five problems that hospitalized deaf patients might face other than issues communicating with the physician or answering the phone. Questions included commonly held misperceptions of deafness and Deaf culture, common difficulties experienced by deaf patients in the clinical settings, errors commonly made by providers working with interpreters in the clinical setting, and the participants’ prior exposure to the Deaf community. The study was approved by the San Juan Bautista School of Medicine Institutional Review Board (EMSJB-5-2018).

Recruitment and Survey Implementation

230 SJBSM medical students from all four years were invited to complete a confidential and anonymous questionnaire from April 19, 2018 through June 22, 2018. Study participation was completely voluntary, and no compensation was offered to those who completed the survey. Students from the first, second, and third years (MSI, MSII, MSIII) were asked to fill out a paper questionnaire on three designated dates following their block exam. Given the likelihood of away rotations in the fourth year, MSIV students were recruited via email with a link to the electronic-version of the questionnaire (Google Forms). All willing participants provided their signed consent prior to the start of the survey, and returned surveys were de-identified by using only a number for record tracking and data collection purposes. All documents were retained by a single investigator (SC) and only available for investigators to view on campus.

Data Collection and Analysis

All responses were stratified by class and recorded using Microsoft Excel 2012. The Knowledge section was graded and measured in a matter similar to Hoang et al. Each participant's responses were graded using an answer key provided with the original questionnaire. We added the responses to create an overall continuous sum score per participant, meaning higher scores indicated greater knowledge (Appendix 1). A binary coding system (1 = correct, 0 = incorrect) was used to record results and percent correct was calculated for each question set and by medical student year. Results were measured using univariate descriptive statistics (frequencies, percent distributions, mean, median, mode, and standard deviation).

Results

A total of 158 (69%) SJBSM medical students participated in the survey (Table 1). The second section of the questionnaire is composed of yes/no answers related to their experience with the Deaf culture (Table 2). The results presented in this table are those students that answered yes to the questions. When asked about student experience with Deaf culture, 63% reported having exposure to D&HH people and 24% reported having a D&HH person in their social circle (Table 2). 80% of respondents were aware of a Deaf culture, with MSIV students having the highest percentage awareness. Collectively, 21% of the medical students had taken an ASL class, and 86% expressed wanting to take an ASL class.

Table 1
Demographics of SJBSM Medical Student Participants

	MSI	MSII	MSIII	MSIV	Total
	% (n)				
Sex					
Male	52% (25)	37% (20)	57% (26)	45% (5)	48% (76)
Female	48% (23)	63% (34)	43% (19)	55% (6)	52% (82)
Age					
18–22	19% (9)	-	-	-	6% (9)
23–27	79% (38)	91% (49)	78% (35)	45% (5)	80% (127)
28+	2% (1)	9% (5)	22% (10)	55% (6)	14% (22)
Total Participants	48	54	45	11	158

Table 2
SJBSM Medical Students' Experience with Deaf Culture

	MSI	MSII	MSIII	MSIV
	% (n)	% (n)	% (n)	% (n)
1. Have you ever had exposure to deaf or hard-of-hearing people?	58% (28)	61% (33)	69% (31)	73% (8)
2. Has there ever been a deaf or hard-of-hearing person in your social circle?	21% (10)	33% (18)	16% (7)	27% (3)
3. Are you aware that there is a Deaf culture?	83% (40)	72% (39)	82% (37)	91% (10)
4. Have you ever taken an American Sign Language (ASL) class?	23% (11)	11% (6)	29% (13)	27% (3)
5. Have you ever wanted to take an ASL class?	92% (44)	83% (45)	84% (38)	82% (9)

For the knowledge section, the overall percentage of correct answers in our total study population was 39%. SJBSM students showed an increase in the percent correct score with each academic year, such that MSI students scored lowest and MSIV students scored highest (Table 3). MSI students scored 34% in the section of knowledge of Deaf culture, while MSII, MSIII and MSIV students scored 38%, 43% and 46%, respectively. (add Table 3 below)

Table 3
Knowledge of SJBSM Medical Students of Deaf Culture

Knowledge Items	% correct (N)			
	MSI	MSII	MSIII	MSIV
Item 1: A cochlear implant				
A. Will allow a deaf adult to immediately begin hearing and understanding oral conversation (incorrect)				
B. Destroys any residual hearing in the ear that the patient may have had (correct)	10% (5)	4% (2)	12% (5)	-
C. Corrects for any type of hearing loss (incorrect)				
D. Is desired by at least 90% of deaf people (incorrect)				
E. Do not know (incorrect)				
Item 2: in a medical setting, it is the right of the deaf patient				
A. To express a preference for a particular interpreter (correct)	-	8% (4)	(2%) (1)	55% (6)
B. To be provided with an interpreter by the practitioner (correct)	80% (39)	64% (34)	62% (26)	45% (5)
C. To determine how much personal information he/she wants to disclose in an interpreted situation (correct)	4% (2)	4% (2)	5% (2)	-
D. Do not know (incorrect)				
ABC, best answer	4% (2)	9% (5)	12% (5)	-
Item 3: the hospital has arranged for you to give a presentation on an important health topic with the assistance of an ASL interpreter. The audience, which consists mainly of deaf patients, are all socializing prior to the presentation. You are ready to begin your presentation. You should:				
A. Stand on stage and wait patiently for the audience to settle down (correct)	4% (2)	2% (1)	7% (3)	36% (4)
B. Flick the lights on and off several times in order to get the audience's attention (correct)	22% (11)	17% (9)	17% (7)	9% (1)
C. Clap loudly (incorrect)				
D. Ask the interpreter to sign that you are ready to begin (correct)	55% (27)	52% (28)	52% (22)	36% (4)
E. Do not know (incorrect)				

The percent correct for each question assessing knowledge of deaf culture by class. The higher total correct sum indicates higher knowledge.

	% correct (N)			
ABD, best answer	-	-	2% (1)	-
Item 4: in a consultation room, where would you suggest the patient and interpreter to sit?				
A. Place the interpreter beside the patient. The patient and the interpreter are facing the provider (incorrect)				
B. Place the interpreter beside the provider. The provider and the interpreter are facing the patient (correct)	29% (14)	37% (20)	26% (11)	45% (5)
C. Place the interpreter at an equal distance between the provider and the patient (incorrect)				
D. Do not know (incorrect)				
Item 5: You have a deaf couple who refuse to have their newborn baby's hearing tested. You should:				
A. Tell them this is required by law, and that it has to be done for their baby's benefit (incorrect)				
B. Tell them it is their decision, but explain that this lack of knowledge will put their baby at risk (incorrect)				
C. Accept their decision (correct)	6% (3)	15% (8)	26% (11)	-
D. Do not know (incorrect)				
Item 6: you are in the Emergency Department (ED) and you call for a patient several times. Others in the ED point to a person reading a magazine and say "She's deaf." You should				
A. Approach the patient and gently tap her on the shoulder (correct)	49% (24)	39% (21)	40% (17)	82% (9)
B. Approach the patient and call their name louder (incorrect)				
C. Approach the patient, making small gestures in her field of vision to try to get her attention (correct)	39% (19)	39% (21)	38% (16)	9% (1)
D. Do not know (incorrect)				
AC, best answer	-	2% (1)	5% (2)	-
Table 3 (continued). Knowledge Questions				
1. Only 30% of the English language can be accurately lip read (true)	6% (3)	13% (7)	26% (11)	18% (2)

The percent correct for each question assessing knowledge of deaf culture by class. The higher total correct sum indicates higher knowledge.

	% correct (N)			
2. You are running considerably behind schedule. Your deaf patient is waiting with his/her interpreter. The interpreter is ethically bound to wait with the patient until you are ready to see them (false)	8% (4)	7% (4)	9% (4)	-
3. ASL is a pictorial language that produces a word-for-word translation of what is being said in English (false)	49% (24)	43% (23)	52% (22)	45% (5)
4. The majority of hearing parents with deaf children never learn to sign (true)	16% (8)	15% (8)	12% (5)	18% (2)
5. When communicating with a deaf patient through an interpreter, you should face the interpreter and explain to the interpreter what the patient needs to know (false)	59% (29)	48% (26)	50% (21)	82% (9)
6. Trying to help cure your patient's deafness should be your top priority (false)	59% (29)	74% (40)	69% (29)	73% (8)
7. Because deaf people rely upon printed forms of information, their literacy is equal to or better than the general public (false)	22% (11)	31% (17)	40% (17)	27% (3)
8. A good interpreter will be able to step out of his/her interpreting role in order to explain to the provider what the patient is really trying to say (false)	20% (10)	20% (11)	24% (10)	55% (6)
9. When there is a dominant source of light, such as a window, your deaf patient should be seated with his/her back to the light source and you should be seated facing the light source (true)	29% (14)	20% (11)	36% (15)	18% (2)
10. For an infant, there is very little that can be done to improve an infant's hearing due to its age (false)	65% (32)	61% (33)	69% (29)	91% (10)
11. When speaking to a deaf patient through an interpreter you should speak each word very slowly, to allow the interpreter time to sign or fingerspell your words (false)	18% (9)	26% (14)	43% (18)	18% (2)
12. For most members of the deaf community, English is their primary language (false)	22% (11)	24% (13)	43% (18)	55% (6)
13. When a deaf patient is hospitalized, the entire staff should be notified that the patient is deaf (true)	80% (39)	84% (45)	83% (35)	91% (10)
14. When hiring an interpreter, the minimum time per session is two hours (true)	6% (3)	9% (5)	9% (4)	27% (3)
15. At the end of the health care visit, the interpreter should again review the information with the patient (false)	8% (4)	13% (7)	7% (3)	9% (1)
16. Early in the conversation, your patient mentions to you that he has Usher's syndrome. This information will influence how you communicate with him (true)	16% (8)	6% (3)	17% (7)	27% (3)

The percent correct for each question assessing knowledge of deaf culture by class. The higher total correct sum indicates higher knowledge.

	% correct (N)			
17. Deaf patients generally do not participate in support groups such as those that help patients cope with disease or death. The main reason for this is due to the language barrier (true)	10% (5)	19% (10)	33% (14)	45% (5)
18. On average, deaf patients report that they are unable to convey adequate information to their doctors (true)	55% (27)	63% (34)	60% (25)	73% (8)
19. Less than 50% of physicians who have deaf patients use a certified interpreter (true)	24% (12)	43% (23)	60% (25)	73% (8)
20. Working with other minority and/or disabled population will adequately prepare a physician to work with the deaf (false)	29% (14)	41% (22)	50% (21)	27% (3)
21. Ninety percent of deaf people have hearing parents (true)	8% (9)	24% (13)	21% (9)	27% (3)
22. If a child is found to have a hearing loss, you should also refer the child to an optometrist (true)	24% (12)	26% (14)	33% (14)	55% (6)
23. It is the patients' responsibility to schedule the interpreter if they think one will be needed (false)	51% (25)	56% (30)	50% (21)	55% (6)
24. You have complicated surgical information to communicate to a deaf patient, so it would be wise to tell the patient to bring along a friend or family member to assist with the interpretation (false)	39% (19)	67% (36)	64% (27)	73% (8)
25. If the patient requests an interpreter for a visit with their health care provider, it is the patient's responsibility to pay for the interpreter (false)	57% (28)	70% (38)	55% (23)	55% (5)
26. If a deaf patient requests an interpreter, you may ask your nurse, who has taken several semesters of ASL classes, to interpret for the consultation (false)	59% (29)	67% (36)	60% (25)	91% (10)
27. If you suspect hearing loss in an infant, you should make a note to recheck the infant's hearing on the next visit (false)	10% (5)	13% (7)	21% (9)	9% (1)
28. American Disabilities Act requires an interpreter be present whether the patient wants one or not (false)	6% (3)	15% (8)	19% (8)	-
Total correct	34% (561)	38% (699)	43% (659)	46% (171)
The percent correct for each question assessing knowledge of deaf culture by class. The higher total correct sum indicates higher knowledge.				

Lastly, students had the opportunity to write in five (5) problems a deaf person may have when hospitalized. The most frequently written in answers by SJBSM medical students regarding possible issues hospitalized deaf patients may experience in addition to communication problems with health professionals are presented in Table 4.

Table 4
Issues Hospitalized Deaf Patients May Experience

<ul style="list-style-type: none"> • Emergency (fire alarms, codes, announcements) * • Emotions (anxiety, depression, isolation, fear, confusion, frustration) ** • Lack of interpreter*** • Privacy issues • Discrimination by health providers and patients • Communication problems • Issues with non-trained ASL health care professionals • Information loss upon exchange of medical staff • Lack of understanding medical condition therapy • Disorientation to time • Problem communicating need • Autonomy not respected
*Most common response
** Second most common response
*** Third most common response

Discussion

Overall, we found that the majority of medical students in our study had an awareness of the existence of the Deaf culture and community. Still, only 63% had previous exposure to this community. Students in the clinical years (MSIII and MSIV) reported more exposure to D&HH people over students in the pre-clinical years (MSI and MSII). This difference in exposure is likely due to the greater exposure to patients in clinical rotations during MSIII and MSIV at our institution. Although only 21% of participants from all four classes reported taking a sign language class in the past, a large part of the student community expressed an interest in taking an ASL class. These results provided useful information for our medical school faculty to provide opportunities in the curriculum to acquire knowledge and skills to address better the health needs of D&HH populations.

With the overall knowledge section scores less than the 50th percentile, our medical students showed limited knowledge of the Deaf community and their health needs, similar to findings reported by Hoang et al. [27]. Although the MSIV showed a higher percentage of knowledge compared to their peers, the sample size was far less than other classes. It is also possible that these respondents had more awareness and exposure to the Deaf community because they had more clinical experience. Previous studies have reported the increase in knowledge scores for those who have completed sign language

courses or education about the deaf community [22, 23, 27]. Gilmore et al. reported that medical students who completed sign language courses had a higher knowledge score in the questionnaire assessment and a more positive attitude towards the Deaf culture community. Lapinski et al. found increased scores from pretest to posttest after attending a 4-hour workshop, as well as increased confidence when interacting with the Deaf patients. Regardless, our results indicated that all of our students could benefit from more exposure to Deaf culture.

Through the evaluation of the open-ended responses, it became clear that despite a minimum exposure to this community, students were able to point out a variety of problems that a deaf patient might encounter in the healthcare setting. The third most common response was the lack of interpreters, a very valid concern in our daily life in Puerto Rico. According to Rivera, K.Y., the majority of interpreters work primarily in educational and video relay services, which make their availability for medical healthcare centers limited [11]. Also, there is no testing system in Puerto Rico to evaluate interpreters' competencies to work in any setting. This limitation raises the concern if it is necessary to add ASL classes to the curriculum of medical schools, which we believe it would be in the best interest and beneficial to the D&HH community.

Even though our study focused on providing initial descriptive data to understand the medical students' knowledge and awareness of the Deaf culture community, a limitation of this study was the low participation of medical students in their fourth year. We need further analysis to identify when is the most compelling moment in which to include this topic in the curriculum to improve the medical students' knowledge. As of this time, deaf awareness training is available in many countries but differs among medical schools. Despite these resources being available at many medical schools around the world, none have been standardized and permanently established in the medical curriculum. Given that communication with healthcare providers is challenging for D&HH patients, it would be prudent to provide deaf awareness/communication training as part of the standard medical curriculum. Previous studies have shown that without proper training, medical students lack the knowledge and competency related to Deaf culture that is needed to provide adequate health care to this patient population. [22, 27].

Conclusion

This study describes the future physician's knowledge and awareness of Deaf culture and community in a student cohort at SJBSM in Puerto Rico. Our findings support the need to identify strategies and create opportunities in the medical curriculum to improve students' knowledge of Deaf culture. We believe that by understanding that the deaf community has unique social, linguistic, and cultural needs, this will aid physicians to better target issues of diversity in the health care environment.

Abbreviations

ASL: American Sign Language

D&HH: Deaf and Hard of Hearing

MSI: Medical school first year

MSII: Medical school second year

MSIII: Medical school third year

MSIV: Medical school fourth year

SJBSM: San Juan Bautista School of Medicine

IRB: Institutional Review Board

US: United States

UK: United Kingdom

Declarations

Ethics approval and consent to participate

This study was reviewed by the San Juan Bautista School of Medicine Institutional Review Board (SJBSM IRB) and approved for investigation, IRB# EMSJB-5-2018. Consent was obtained prior to study and all ethical standards and considerations were followed.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

YH conceived the project topic. AL, VC, LR, MK, GD, YH, AB, and PR were aided by YD and AV in designing the study. SC supervised and approved project design, the main conceptual ideas, and proof outline. AL, VC, LR, MK, GD, YH, AB, and PR conducted literature review for background information. AL, VC, LR, YH, AB, and PR led the surveys for data gathering. MK, YH, AB performed data input. MK, LR, SC, YH, and AB analyzed and interpreted survey data. YD and AV aided in data analysis and interpretation. YH, AB, PR and GD drafted the manuscript and designed the tables. AL, VC, LR, and MK wrote the paper with input from all authors. All authors read and approved the final manuscript.

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