Enhancing Dental Students' Understanding of Poverty Through Simulation

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Abstract: Dental students should develop an understanding of the barriers to and frustrations with accessing dental care and maintaining optimal oral health experienced by persons with limited resources rather than blaming the patient or caregiver. Developing this understanding may be aided by helping students learn about the lives of underserved and vulnerable patients they will encounter not only in extramural rotations, but throughout their careers. The aim of this study was to determine if dental students' understanding of daily challenges faced by families with low income changed as a result of a poverty simulation. In 2015 and 2016, an experiential poverty simulation was used to prepare third-year dental students at one U.S. dental school for their upcoming required community-based rotations. In 2015, United Way staff conducted the simulation using the Missouri Community Action Poverty Simulation (CAPS); in 2016, faculty members trained in CAPS conducted the simulation using a modified version of the tool. In the simulation, students were assigned to family units experiencing various types of hardship and were given specific identities for role-playing. A retrospective pretest and a posttest were used to assess change in levels of student understanding after the simulation. Students assessed their level of understanding in five domains: financial pressures, difficult choices, difficulties in improving one's situation, emotional stressors, and impact of community resources for those living in poverty. The survey response rates in 2015 and 2016 were 86% and 74%, respectively. For each of the five domains, students' understanding increased from 58% to 74% per domain. The majority reported that the exercise was very valuable or somewhat valuable (74% in 2015, 88% in 2016). This study found that a poverty simulation was effective in raising dental students' understanding of the challenges faced by low-income families. It also discovered that framing the issues in the context of accessing dental care was important.

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In the United States, low income has been identified as a social determinant of poor oral health status across all age cohorts.[1,2] Adults living below the Federal Poverty Level (FPL) are only half as likely to have seen a dentist in the past year as those whose family income is greater than 400% of the FPL.[3] Other factors associated with poverty impact the ability of low-income individuals to access dental care: these include but are not limited to lower education level, minority race and ethnicity, access to dental insurance, and geographic location.[4]

The University of North Carolina School of Dentistry's (UNCSOD) long-standing community-based education program, called Dentistry in Service to Communities (DISC), requires all dental students in the summer between their third and fourth years to spend eight weeks practicing in community settings.[5] The program provides students with supervised experiences in delivering clinical dental services to vulnerable and underserved populations in both rural and urban settings. Extramural rotation sites include local health departments, Federally Qualified Health Centers (FQHCs), Indian Health Service facilities, correctional health facilities, hospitals, volunteer clinics, and community-based non-governmental dental clinics. Through DISC, these future practitio-

ners learn about the oral health needs of populations they may not see in the dental school clinic. The program also helps future generations of dentists understand the ethical imperative to provide care to disadvantaged populations and allows them to experience a broad array of public health settings and consider practice in these environments as a viable career option.

Although the poverty rate for the U.S. population decreased slightly from 14.8% in 2014 to 13.5% in 2015, 43.1 million Americans continued to live in poverty.[6] Advocates have argued that new practitioners should be educated about the realities of the lives of patients living in poverty and the causal relationships between poverty and poor health.[7,8] Parents whose children receive dental benefits through the Medicaid program have described experiencing prejudice and shame when visiting the dentist.[9,10] Furthermore, one study found that clinicians working in settings providing care to patients with low income were sometimes perceived by clinicians working in traditional settings as being inferior to those in private practice and thus being relegated to providing care to patients some described as being apathetic about their own oral health.[7]

Dental students should develop an understanding of the barriers to and frustrations with accessing dental care and maintaining optimal oral health experienced by persons with limited resources rather than blaming the patient or caregiver. Developing this understanding usually requires opportunities for students to learn about the lives of the underserved and vulnerable patients they will encounter not only in their extramural rotations, but throughout their careers. Although community service is sometimes a requirement for admission to dental school, applicants' understanding of the issues faced by low-income families is not assessed at our school. Pedagogical tools are thus required to help dental students understand the stresses associated with poverty and how these factors impact patients' oral health status and the provision of patient-centered care.

An experiential learning modality to increase students' understanding of poverty—the Missouri Community Action Poverty Simulation (CAPS)—has been used with undergraduate students and with graduate students in social work, nursing, and public health.[11-17] Results from those studies reported increases in students' understanding of conditions that contribute to poverty and students' gaining a deeper understanding about what it is like to live in poverty. Several tools have been used to measure these outcomes. Most common is the retrospective pretest and posttest method measuring changes in understanding of the challenges faced by families living in poverty.[15,18] This method differs from the traditional pretest-posttest design in which the pretest is conducted prior to and the posttest after the intervention. In the retrospective pretest and posttest methodology, both surveys are conducted at the same time after the simulation, looking back to one's perceptions before and after. This design is useful for evaluating professional development when participants initially may not have sufficient familiarity with the terminology to take a pretest. As a result of their new understanding of issues after the simulation, respondents can more accurately rate their perceptions before participating in it. Another tool used to assess understanding of issues faced by individuals living in poverty is the 21-item Attitude Toward Poverty scale.[19] This comprehensive instrument measures students' attitudes toward poverty, rather than the impact of an educational intervention.

The aim of this study was to determine if dental students' understanding of daily challenges faced by families with low income was changed as a result of the poverty simulation. The goal was to provide an opportunity for students to gain a deeper understanding of the impact of poverty on health and health-related behaviors for families living in a variety of situations resulting in poverty. The evaluation sought to determine if and how the simulation changed students' understanding of the effects of poverty and whether they found the simulation to be a valuable experience.

Methods

Prior to the simulation, the University of North Carolina Office of Human Research Ethics determined the study was exempt from further review (study #: 15-0744). The UNCSOD introduced this simulation experience into the third-year dental curriculum in April 2015 just before students embarked on their mandatory extramural rotations beginning in May. The simulation was repeated in 2016.

In 2015, staff from the United Way of the Triangle (UWT) conducted the simulation utilizing CAPS. The "Triangle" refers to a three-county area in North Carolina that encompasses the cities of Raleigh, Durham, and Chapel Hill. UWT staff have been trained in utilizing this tool and regularly

conduct poverty simulations for local organizations and educational institutions throughout the region.

The total time designated for the simulation exercise is three hours. The first hour is devoted to preparing students for the simulation. The UWT facilitator introduced students to the experience using a script built upon a template provided in the CAPS kit. Students were advised that the goal of the simulation was to sensitize them to the day-to-day realities of life faced by people with low incomes and to motivate them to become involved in activities that help to reduce poverty throughout the Triangle region of North Carolina.

Once students entered the simulation space (the central atrium at the UNCSOD), they were randomly assigned a role to play as a member of a low-income family. Chairs were grouped with individual addresses and clearly marked with the last name of the family the students were assigned, so they could sit as a family unit. Students received a packet that described the family, its individual members, the family's sources of income, monthly bills that needed to be paid, and various other items the family needed to survive. These family groups varied, consisting of single parents trying to care for their children, the newly unemployed, homeless individuals and families, senior citizens living on Social Security, and grandparents raising their grandchildren along with other scenarios. Each student was assigned to the role of a specific family member and given a name tag.

The simulation occurred during the second hour (Figure 1). During this time, the task of each family was to provide food, shelter, and other basic necessities for four 15-minute "weeks," representing one month in the life of the family. At various times throughout the simulation, "Luck of the Draw Cards" were passed out to the families describing an unexpected occurrence that needed to be addressed such as a car repair, a medical bill, or need for additional school supplies for children. The main goal for all families during the entire exercise was to provide food and housing for the family.

At the various tables around the room were UNCSOD staff and faculty volunteers acting as community resources that could provide assistance to the families. These resources included a bank, a community action agency, an employer, the utility company, a pawn broker, a grocery, a social service

Figure 1. Students arranged in family housing units during simulation

Note: Tables around the perimeter represent social service agencies and community resources available to families in simulation.

agency, a faith-based agency, a payday and title loan facility, a mortgage company, a school, a community health center, and a child care center. Families interacted with these resources during the time designated as "work days" during the simulated month. Often there were long lines, bureaucratic hurdles, or limitations to the quality and types of services available to the families through the community resources.

A debriefing session occurred during the final hour. The students formed a circle around the facilitator who asked a series of questions to stimulate discussion and reflection among the participants. The facilitator asked students to describe the feelings they experienced during their "month in poverty." They were questioned about their family situation, needs of the family, and how others responded to those needs. Students were asked to discuss whether their attitudes about those living in poverty had changed because of the experience. The facilitator directed them to describe insights or conclusions about the life experiences of low-income families.

The director of the DISC program closed the first poverty simulation session by asking those who were playing the role of a child to raise their hands. He advised those students that many of the children they would be treating during the extramural rotations had life experiences similar to those of the children they portrayed during the simulation. The director did the same for those who played the roles of adults, of seniors living on Social Security or disability funds, and of those who had been incarcerated. He emphasized that the patients they would be seeing in local health department clinics, FQHCs, and correctional facilities were similar to those whose identities they had assumed during the simulation.

UNCSOD's second poverty simulation occurred in spring 2016. Before the second simulation, the director of the DISC program, along with three additional faculty members, traveled to Missouri to participate in a 1.5-day CAPS facilitator training program sponsored by the Missouri Community Action Network. A CAPS kit for UNCSOD was also purchased for future use. A script was developed by the faculty members informing students that the objective of the experience was to sensitize them to the day-to-day realities of life faced by people with low incomes and to help students understand what lives are like for many of the patients they would be seeing during their DISC rotations.

Immediately following the debriefing session, the confidential retrospective pretest and posttest questionnaires were administered. The questions were identical to those used by Yang et al. in their poverty simulation reaction questionnaire to evaluate the impact of the simulation on student understanding.[15] In both 2015 and 2016, students assessed their level of understanding before and after the simulation (on a scale of no understanding, little understanding, moderate understanding, quite a bit of understanding, and complete understanding) specific to each of the following five challenges faced by low-income families: financial pressures experienced by low-income families when attempting to meet basic needs; the difficult choices people with limited resources must make each month when stretching limited income; the difficulties in improving one's situation and becoming more self-sufficient on a limited income; the emotional stressors and frustrations created by having limited resources; and the positive/negative impact of obtaining community resources for people with limited resources. After the surveys were collected, the results were downloaded into SPSS files. Descriptive statistics were calculated and summarized.

Students were also asked to describe on a scale from 1 to 10 how they would rate the value of this simulation exercise in preparing them to understand the challenges faced by patients with limited incomes/resources they would be seeing during their DISC rotations. For analysis, responses were grouped into four ordinal categories: very valuable, scores 8-10; somewhat valuable, scores 6-7; not very valuable, scores 4-5; and not valuable, scores 1-3. A Cochran-Mantel-Haenszel statistic was calculated to compare the distribution of students' ratings in 2015 to 2016. Responses to three open-ended questions were also compiled: 1) In your opinion, what do you think was the best part of the activity?; 2) Please list any suggestions you have to improve this activity; and 3) Please provide any additional comments you have about this morning's poverty simulation.

Results

In 2015, 80 students participated in the simulation. Of those, 69 (86%) returned the surveys with questions about challenges faced by low-income families and answered the value question; 50 of the 69 (72%) provided written comments to the open-ended questions. In 2016, 78 students participated, 58 (74%) returned the surveys and answered the value question, and 49 of those (84%) responded to the open-ended questions.

The mean pretest scores were the same in 2015 and 2016 for four of the five questions with a score of 3 indicating moderate understanding of the specific challenge (Figure 2). In 2015, the percentage of students who indicated their understanding increased after the simulation by at least one level on the ordinal scale for each of the five questions was as follows: 64% reported an increase in understanding the financial pressures faced by low-income families, 68% for the difficult choices families must make, 60% for the difficulty in improving one's situation, 58% for emotional stressors and frustrations faced, and 61% on the impact of community resources. In 2016, the results were very similar. The percentage of students who indicted that their understanding increased by a least one level for each of the five questions was as follows: 67% for the financial pressures faced by low-income families, 74% for the difficult choices families must make, 68% for the difficulty in improving one's situation, 67% for emotional stressors and frustrations faced, and 60% on the impact of community resources (Figure 3). The remainder of the students indicated no change in their understanding of these forces.

The distribution of students' ratings of the value of the experience was significantly different for 2015 and 2016 ($p=0.0022$), with the ratings more favorable in 2016. In 2015, 74% of students reported the experience was somewhat or very valuable compared to 88% in 2016. The percentage of students who reported no value in the simulation fell from 12% in 2015 to 2% in 2016 (Figure 4).

Discussion

The underlying goal of the simulation was to increase dental students' understanding of the challenges faced by low-income families. There is minimal published research on health professionals' understanding of the relationship between poverty and poor oral health. Two studies found CAPS to be an effective means to teach nursing students about the experience of living in poverty.[14,15] In another study, graduate students in public health and public health professionals who participated in CAPS showed an increase in empathy, understanding, and knowledge of the barriers faced by low-income populations.[16] Our findings support arguments made in a study involving sociology, gerontology, and psychology students.[11] We found that understanding of the challenges faced by low-income families among our dental students who participated in CAPS was similar to that experienced by students in those other disciplines.

Reflection on an experience that occurs when dental students participate in community-based rotations has been found to connect learning to the experience.[20,21] At the UNCSOD, students are required to complete a critical incident essay on returning

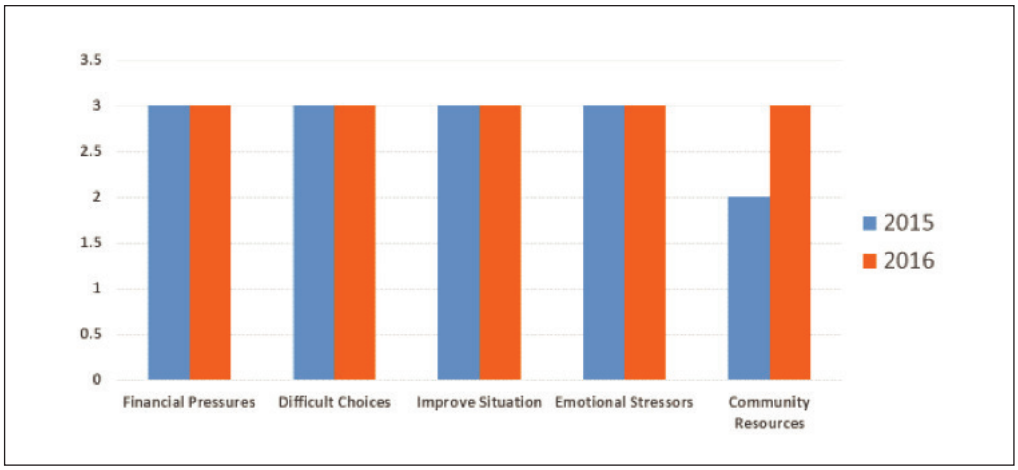

Figure 2. Median pretest scores of students' self-rating of their understanding of each domain by year

Note: Scores were on scale from 1=no understanding, 2=little understanding, 3=moderate understanding, 4=quite a bit of understanding, to 5=almost complete understanding.

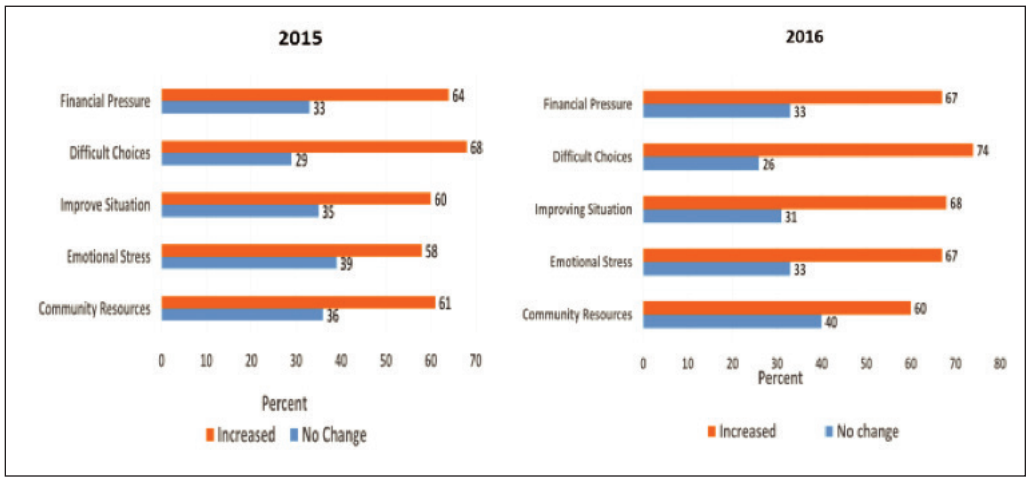

Figure 3. Percentage of students with increase and no change in perceived understanding by domain after the simulation by year (N=69 in 2015; N=58 in 2016)

Note: Percentages may not total 100% because of rounding; there were no students who decreased in understanding.

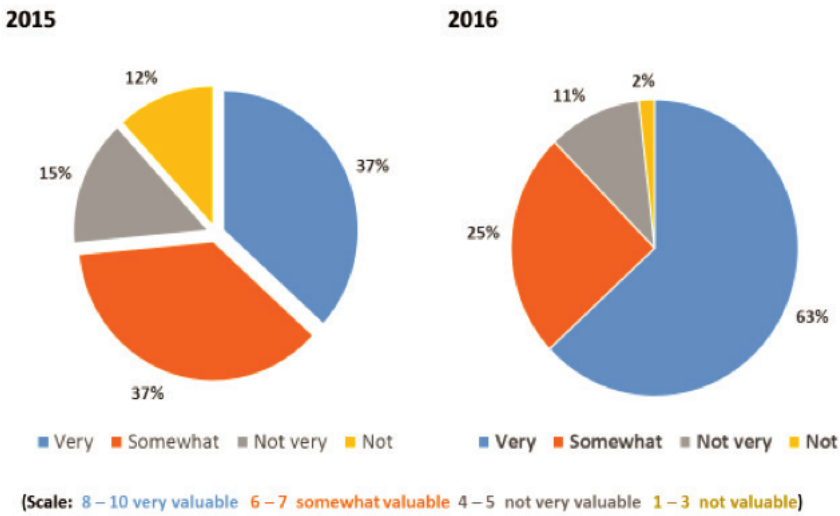

Figure 4. Percentage distribution of students' perceived value of simulation by year (N=69 in 2015; N=58 in 2016)

Note: Question was worded as follows: "On a scale from 1 to 10, how would you rate the value of this simulation exercise in preparing you to understand the challenges faced by patients who have limited income/resources that you will be seeing during your DISC rotations?" Responses were then grouped into four categories as shown. Percentages do not total 100% because of rounding.

from their DISC rotations. They also participate in small-group discussions to share their DISC rotation experiences with classmates. Historically, prior to introduction of this stimulation, little had been done by DISC to prepare students to understand the challenges faced in accessing dental care by low-income individuals and families.

An ethnographic study focused on dental students' participation in community-based rotations found students' comments regarding patients or

parental behaviors of pediatric patients were at times disparaging and victim-blaming.[7] The investigators described how students questioned parenting skills and blamed low-income parents for a child's poor oral health. Some students felt the food choices families made that were harmful to oral health derived from the family's limited knowledge of good nutrition. Some questioned whether low-income patients valued dental care because they would not show up for scheduled appointments rather than call to cancel the appointment. These comments revealed the disconnect between such perceptions and a deeper understanding of how layered the factors behind accessing care can be. Addressing students' misperceptions can, however, have long-term consequences: a study found that one dental school's students and alumni who felt they had been better prepared during dental school to treat underserved populations were more positive about providing care to them.[22]

When we asked the students in our study about the value of the simulation, there were notable differences between those who participated in 2015 and in 2016, with significantly higher ratings in 2016. We attribute this difference primarily to how the simulation was introduced to the students. In 2015, the UWT facilitator introduced the simulation, whereas in 2016 it was introduced by the DISC program director. The UWT's goal is for participants to take action to combat poverty in the Triangle area, and it uses the poverty simulation as a tool to achieve its purpose to "create awareness of the issues, ignite a call-to-action around systems change, and unite the community around sustainable, scalable solutions" to address poverty in this area of North Carolina.[23] UWT also uses CAPS as a tool to recruit volunteers, raise funds, or support various UWT programs. As a result, the UWT facilitators spent time talking about UWT's advocacy efforts that were not relevant for this academic exercise, so that was off-putting to some students. Also, having the simulation introduced by a faculty member may have made it seem a more essential aspect of the school's curriculum than when introduced by someone from outside the school.

In the written comments after the 2015 simulation, the majority of students described the experience as being realistic, emotionally stressful, an accurate representation of the frustration involved while trying to get ahead, and an opportunity to be mindful when treating low-income patients. One student wrote, "This should be offered more places so people (especially students getting ready to go into the workforce) can be mindful of others' situations . . . and operate with compassion." At the same time, several students expressed frustration that classmates were not taking the experience seriously and compared it to simply playing a game. Several comments were of concern. One student wrote, "I think that in many ways this simulation is insensitive to some. There ARE people who have experienced life like this or something similar, and it is unfair to make all simulate something like this." Another wrote, "I grew up in poverty. Although I'm sure there were good intentions behind this, it was hurtful for me to see this as an 'example' for wealthy classmates to feel like they now better know poverty. You cannot simulate what it feels like to be hungry!"

In 2016, the director of the DISC program served as the primary facilitator. During the orientation to the simulation, he told students that the purpose of the experience was not only to sensitize them to the day-to-day realities of life faced by people with low incomes but also to help them understand what lives are like for many of the patients they would be treating during DISC rotations. He emphasized that the simulation could never truly reflect what it was like to live in poverty, but that it was designed to help students better understand challenges faced by patients they would soon see. He also emphasized that some students in the class may have experienced hunger and lived in poverty, and he acknowledged that a simulation could never recreate what that felt like. Those students who had experienced poverty were told that the purpose of the simulation was to make classmates who were privileged more aware and empathetic toward the patients they would be seeing. The facilitator asked students to be patient with those classmates who had not experienced poverty and to consider that, for many students, the experience would be similar to that of someone living in another country and not being able to speak the language. He also emphasized that the simulation was not a game.

The positive impact of this reframing became evident when the written comments in that year were reviewed, particularly for those students who had experienced poverty. When asked to describe the best part of the simulation, one student wrote, "You can better understand what resources/opportunities are and are not available to people. Also you understand what pressures people have put on them. As a child, I was much more aware of the struggles my family faced which forced me to 'grow up' more quickly." Another said, "Hearing my classmates' experiences

and seeing them gain a better understanding of how poverty affects priorities and life choices." A third wrote, "Working with classmates who may not fully understand low-income life stressors. It was interesting to share some knowledge [since I came] from a similar situation."

There were several limitations to this study. Demographic data including students' family socioeconomic status were not collected. Some students knew of the challenges faced by low-income families from personal experience but were not identified in the survey. They would not be expected to show changes in understanding. The retrospective pretest and posttest methodology has some weaknesses because it relies on recall for the pretest measure and could be influenced by the social desirability of the respondent who wants to demonstrate a learning experience. If the poverty scale or other measurement had been utilized, results may have differed from those described here. These findings may not be generalizable to all dental schools as student populations, family backgrounds, clinical experiences, and curricula differ. Results in our state may differ from those in states like Michigan where efforts were found to be successful in reducing dentists' preconceived notions regarding Medicaid-enrolled children.[24] Additional research is planned with students after their DISC rotations to determine if the poverty simulation helped them better understand the challenges faced by their actual low-income patients during their rotations. It may also be useful to conduct in-depth interviews with a sample of our students in order to better understand their attitudes about poverty, as done in Reis et al.'s participatory case study.[25]

Conclusion

Our evaluation of a poverty simulation, conducted over two years with successive classes of third-year dental students, found it was effective in raising their understanding of the challenges faced by low-income families. An important finding was that the way the facilitators explained the purpose of the exercise had a significant impact on students' attitudes. It was beneficial to frame the issues faced by these families within the context of their accessing dental care in community-based settings, similar to those the students would be treating in their extramural rotations. Future research will determine whether increasing dental students' understanding of challenges faced by low-income families through the poverty simulation will make students more understanding, mindful, respectful, compassionate, and less judgmental toward patients they treat during their extramural rotations.

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