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Abstract

Clinical empathy has been identified as an essential skill for healthcare workers to provide quality healthcare. One teaching strategy for improving clinical empathy towards people with psychiatric disabilities is the Hearing Voices Simulation. This study used an explanatory sequential mixed methods design to evaluate change in clinical empathy among occupational therapy students after participating in the Hearing Voices Simulation. Participants (N=71) completed the Jefferson Scale of Empathy- Health Professions Student Version (JSE-HPS) prior to and following the simulation. A paired samples t-test compared whether the change in scale scores was equal to zero. Subsequently, focus groups were used to collect qualitative data. This study found that although already high at baseline, mean JSE-HPS scores increased significantly following the simulation experiences (p=.004). Four main themes emerged from the focus groups: 1) temporary discomfort, 2) improved understanding, 3) reformulating stigmatizing attitudes and sharing with others, and 4) planned changes for fieldwork and future clinical practice. Auditory simulations may increase occupational therapy students' empathy. Occupational therapy programs may consider the Hearing Voices Simulation or other simulations for improving clinical empathy among students.

Keywords

Empathy, occupational therapy students, auditory hallucination, simulation

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A Simulation of Auditory Hallucinations Improved Empathy Among Occupational Therapy Students

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ABSTRACT

Clinical empathy has been identified as an essential skill for healthcare workers to provide quality healthcare. One teaching strategy for improving clinical empathy towards people with psychiatric disabilities is the Hearing Voices Simulation. This study used an explanatory sequential mixed methods design to evaluate change in clinical empathy among occupational therapy students after participating in the Hearing Voices Simulation. Participants (N=71) completed the Jefferson Scale of Empathy- Health Professions Student Version (JSE-HPS) prior to and following the simulation. A paired samples t-test compared whether the change in scale scores was equal to zero. Subsequently, focus groups were used to collect qualitative data. This study found that although already high at baseline, mean JSE-HPS scores increased significantly following the simulation experiences (p=.004). Four main themes emerged from the focus groups: 1) temporary discomfort, 2) improved understanding, 3) reformulating stigmatizing attitudes and sharing with others, and 4) planned changes for fieldwork and future clinical practice. Auditory simulations may increase occupational therapy students' empathy. Occupational therapy programs may consider the Hearing Voices Simulation or other simulations for improving clinical empathy among students.

Empathy is an essential skill when providing quality healthcare. Empathetic care is associated with higher satisfaction (Little et al., 2015), less anxiety (Fujimori et al., 2014), and less pain (Vangronsveld & Linton, 2012) among patients. In physical medicine and rehabilitation, empathy is associated with higher reported treatment satisfaction, goal attainment, adherence, and acceptance among patients (Posa et al., 2022).

Recent systematic reviews have demonstrated a wide range of interventions are used to improve empathy among students in health and rehabilitation sciences professions (Bas-Sarmiento et al., 2020; Baugh et al., 2020; Chua et al., 2021; Samarasekera et al., 2022). These studies highlight that about 70% of interventions showed improvements in empathy (Bas-Sarmiento et al., 2020), though the few studies with long-term follow up tend to demonstrate that empathy wanes over time (Baugh et al., 2020). Commonly used approaches to teaching empathy include role play, use of simulated patients, experiential learning, peer teaching, reflective writing, communication training, expressive methods such as literature, arts, and storytelling, as well as simulations of disease states and poverty (Bas-Sarmiento et al., 2020; Baugh et al., 2020; Chua et al., 2021; Samarasekera et al., 2022).

A small body of existing literature demonstrates that overall, students in occupational therapy programs tend to exhibit high levels of empathy (Brown et al., 2010; Kelly, 2021; Logan et al., 2022; Metz & Christoff, 2020; Serrada-Tejeda et al., 2022; Williams et al., 2017). When comparing levels of empathy among students across professions, findings diverge somewhat. A study comparing undergraduate students in Australia found that empathy was lowest among nursing students and higher among occupational therapy students (Williams et al., 2017); similarly, Masedo and colleagues (2021) found that occupational therapy students had more positive attitudes towards people with mental illness compared to medical and nursing students. However, Metz and Christoff (2020) found similarly high empathy scores among students in occupational therapy, physical therapy, and speech language pathology. Importantly, two studies have found that empathy scores tend to remain high over the course of occupational therapy programs; in other words, empathy does not appear to decline as students advance through coursework (Brown et al., 2010; Serrada-Tejeda et al., 2022).

The approaches described in occupational therapy to improve empathy have included a literary narratives intervention (Kelly, 2021), an interprofessional simulation experience (Milliken et al., 2022), and consumer-led teaching, in which course content was co-designed and co-taught with people who had mental illness (Logan et al., 2022). One approach to improving empathy and attitudes towards people who experience auditory hallucinations is through simulations, such as the Hearing Voices Simulation. This intervention involves using an MP3 player with headphones to listen to an audio recording while it plays sounds, such as voices, that are similar to some experiences of auditory hallucinations; meanwhile, participants attempt completing tasks, including a mental status exam (Pat Deegan PhD & Associates, LLC, 2023). Prior research has demonstrated that the Hearing Voices Simulation improved empathy among students in programs including pharmacy (Skoy et al., 2016), nursing (Mawson, 2014; Orr et al., 2013), and medicine (Bunn & Terpstra, 2009), and it improved attitudes (Mawson, 2014) and understanding (Kepler et al., 2016) among nursing students. In addition, it has been shown to improve conversations that psychiatrists have with patients (McCabe et al., 2016). Ozelie and colleagues (2018) demonstrated that occupational therapy students reported improved attitudes towards and preparation to work with people who have

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auditory hallucinations after having completed the Hearing Voices Simulation. However, previous studies have not evaluated whether the Hearing Voices Simulation improves empathy among occupational therapy students.

This study involved administering a modified version of the Hearing Voices Simulation to occupational therapy students, who meanwhile participated in occupations and a cognitive assessment. The study was designed to assess change in empathy before versus after the intervention as well as students' experience of the intervention.

Methods

This study used an explanatory sequential mixed methods design to evaluate the change in empathy towards people with psychiatric disabilities among occupational therapy students. The quantitative component of this study involved administering a survey before and after a modified version of the Hearing Voices Simulation (Pat Deegan PhD & Associates, LLC, 2023). Subsequently, focus groups were then conducted both in person and via zoom to explore students' experiences with the intervention.

Sampling and Inclusion Criteria

The sample consisted of second semester occupational therapy doctorate (OTD) students attending one program in the Midwest. The OTD program involved multiple pathways: one in-person, synchronous pathway and two asynchronous, distance pathways located in two different states. Participants were recruited via convenience sampling through a relevant course. Participants were invited to participate in the study if they were enrolled in the course and were present during the session in which the simulation occurred.

Instrumentation

The Jefferson Scale of Empathy- Health Professions Student version (JSE-HPS) was used to measure empathy before and after the Hearing Voices Simulation experience. The JSE-HPS includes 20 statements with Likert-type response options. A higher score on the assessment corresponds with a greater degree of empathy. Strong construct and criterion-related validity as well as strong internal consistency reliability has been established for the JSE-HPS (Fields et al., 2011).

The self-developed focus group questions consisted of seven open-ended questions, and additional prompts that were used as needed to elicit detailed responses. Questions addressed the experience of the Hearing Voices Simulation, changes in perceptions of auditory hallucinations, changes in empathy, how the simulation affected fieldwork, and how the simulation would affect practice. One investigator developed a first draft of the questions used during the focus group and shared with the co-investigator and lab assistant. The investigators finalized the questions through a consensus-building meeting. The focus-group questions are included in Table 1, below.

Table 1

Qualitative Interview Guide with Main Questions and Probes

Tell us about your experience with the Hearing Distressing Voices simulation.
- What was your emotional response to the simulation?
- How easy or difficult was it to do the activities (cognitive questionnaire, origami, interview, grocery list, conversation prompts)?

What were your perceptions of auditory hallucinations before the simulation? Did they change?

Did your empathy towards people with psychiatric disabilities change because of the simulation?
- If so, how?

Did this simulation affect your performance during fieldwork?
- ...or for those of you who had fieldwork before the simulation, is there anything you learned during the simulation that would have been helpful for you during fieldwork?

Do you think you could do anything differently in future clinical experiences based on this simulation?
- Are any of the lessons from the simulation applicable to your future work?
- Do any of the lessons from the simulation apply to other practice settings? If so, how?

Do you think this simulation is a helpful aspect of the occupational therapy curriculum?
- Why or why not?
- Interesting point. Why do you say that?
- What might make it more helpful?
- What aspects of the simulation experience were helpful and why?

Is there anything else about the simulation that you would like to share?

Procedure

The research team first obtained approval from the university's institutional review board. Then, one investigator sent an email explaining the study to students enrolled in the course. All students received as part of the course prior to the simulation a 90-minute lecture about the diagnosis, symptoms, and occupational therapy interventions for individuals with schizophrenia and schizoaffective disorders. In addition, all students independently viewed a 30-minute pre-simulation video which accompanies the Hearing Voices Simulation.

The Hearing Voices Simulation experience was a required activity in the course; however, students could opt into or choose not to participate in the survey and focus groups. The incentive for completing the survey was 5 extra-credit points. To avoid the potential for coercion, the course offered extra-credit opportunities which did not relate to research. Prior to the Hearing Voices Simulation, students were invited to sign up to participate in a qualitative focus group, which was voluntary and incentivized with a small amount of credit to use at the dining services offered at the university. All

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participants provided informed consent to take part in the study. All students were advised that they had the option to discreetly turn off the sound if the simulation became too distressing.

On the day of the Hearing Voices Simulation experience, students who chose to participate in the survey completed the JSE-HPS. Immediately prior to the simulation, the researchers provided an orientation to the simulation and the stations through which students would rotate and advised students that they could discreetly turn off the simulation at any time if they felt distressed. Students then participated in the Hearing Voices Simulation lab, which involved wearing headphones that played a recording of distressing voices, noises, words, and conversations intended to simulate the experience of auditory hallucinations. The stations were modified to increase relevance to occupational therapy practitioners; they included meal planning and budgeting for groceries; origami, which was a novel activity for many students; and completing a cognitive assessment. Other aspects of the intervention activities were retained, including filling out a job application, completing a word search, and completing a number search. Following the simulation, students participated in a structured debrief session led by lab faculty. Then, students who opted into the research study completed a post-test survey consisting of the JSE-HPS.

Focus groups were conducted two weeks after the simulation experience. Students who opted into the focus groups and attended the in-person occupational therapy program attended an in-person focus group, and students who attended the asynchronous, online occupational therapy programs attended focus groups via Zoom. Interviews were recorded using Zoom. Each focus group lasted between 45 minutes and an hour. The audio recordings were transcribed verbatim, and the transcripts were reviewed for accuracy. Then, the audio recordings were deleted.

Data Analysis

Quantitative data analysis included univariate analyses of pre-test and post-test JSE-HPS scores. Then, the change in JSE-HPS scores for each participant was computed by subtracting the pre-test scores from the post-test score. A paired samples t-test evaluated whether the average change in JSE-HPS scores was equal to zero, assuming an alpha level of 0.05. All statistical analyses were conducted in Stata 14.0.

The qualitative data analysis involved an inductive thematic analysis of the focus groups. Three coders independently coded transcripts and met to discuss and build consensus regarding codes, potential themes, memos, and the codebook. After reaching a consensus of overall codes and themes, investigators independently applied the codes and themes to the text using Microsoft Word. Another consensus meeting was conducted to compare a second iteration of codes and themes. Then, the authors revised the codes and themes to improve clarity and met a third time to reach consensus. Consistent with a general inductive approach, investigators identified codes, themes, and links between them.

Results

Quantitative Results

In total, 73 students participated in the quantitative portion of the study; however, two observations were omitted due to missing data, which left a final analytic sample of 71. This represented a response rate of 61.7% (N=71 in the analytic sample out of 115 students invited to participate in the study).

A paired samples t-test examined change in empathy scores before versus after the Hearing Voices Simulation, finding significantly higher post-test scores (M=116.1, SD=10.7) compared to pre-test scores (M=114.0, SD=10.2; $t(70)=2.99$, $p=0.004$), although a small effect was found (d=0.27). These results are reported in Table 2.

Table 2

Mean, Standard Deviations, and t-test of Empathy Scores Before Versus After Hearing Voices Simulation (N=71)

	Pre-test		Post-test		*t*(70)	*p*-value	Cohen's *d*
	M	SD	M	SD			
Jefferson Empathy Scale Scores	114.0	10.2	116.1	10.7	2.99	0.004	0.27

Qualitative Results

The investigators conducted three focus groups, which each lasted between 45 minutes and one hour. A total of 12 students opted into one of the three focus groups the researchers convened (n=8 for the in-person focus group, n=2 for the first focus group via Zoom, and n=1 for the second focus group via Zoom). There were three themes which emerged from the focus groups: 1) temporary discomfort, 2) the simulation improved understanding, 3.) reformulating stigmatizing attitudes and sharing with others, and 4) changes to fieldwork and future clinical practice.

Theme One: Temporary Discomfort

The first theme captures that the students had temporary difficulty during the simulation, insofar as they found seemingly straightforward occupations to be challenging to complete, and that they had emotional responses to both that challenge and to the simulation itself.

Most participants described that the occupations were difficult to complete, and this caused frustration for many. One person described that

> "it was really difficult to do the activities [like] the cognitive questionnaire.... I would say probably the origami was the easiest one; the grocery list and filling out the job application were both really challenging. When you're thinking about one thing and you're trying to write something else, that's challenging, so when you have those voices in your head and you're thinking about that and you're trying to write, that was really challenging."

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Another person said, “I found it very difficult to do the activities... I got a perfect score [on the MOCA], but it was really delayed; [it took] a lot of time to process... I did the word search; I could hardly find three words.”

Participants also relayed their emotional responses to listening to the simulation while trying to complete the challenging occupations. One described that, “...my response to hearing the voices was [thinking it] is annoying. I wish I could stop it. The activities... were harder for me. I can't even do origami [and having] someone in my ear telling me I can't makes it even harder.”

Another added that

> “my emotional response to the simulation was a feeling of overwhelm and a feeling of frustration with feeling an inability to focus. And gosh, there are so many feelings confusion... There was a point where I was doing a task and there were people coming down the hall talking amongst each other, and I couldn't differentiate if that was the voices in my head or if that was real life. That was a real moment for me, of understanding people who are hearing those voices and how real it feels. I got, I almost got a little angry at one point because I was like, oh my gosh, I just want it to stop and that really opened my eyes to how angry, frustrated I felt after only 15 minutes. I couldn't imagine what that would feel like to have it constantly happening.”

One person explained,

> “I found that very frustrating to do just basic things. I [felt] like I should be able to do [the activities] … [I was] tired afterwards. So I can just imagine... how exhausting that would be. I feel like the biggest thing I remember thinking partway through was [that] this will be over in an hour or so. And it made me think how much even more distressing it would be to know that you don't know when, or if this ever will stop... that was probably the more distressing part: not the actual sounds [of the simulation, but] the thought that you couldn't control it.”

The simulation stirred up feelings of self-doubt for some participants; one explained,

> “Even with simple tasks, I found myself looking over at others to see if I was doing it right because I had all these negative things that were going through my head... And so I [felt] like I'm just doing everything wrong. Even when we were like making the [grocery] list, I [added] yogurt and [wondered if other] people... are they doing the same. It would be so hard to always have those negative voices and be confident that you're doing the things you're doing correctly. I just felt like I always had to look at someone else and make sure I wasn't doing it some outlandish way that I shouldn't be.”

Participants also recognized how others responded to them, which was anxiety-provoking. One person described that during the cognitive assessment, she was “overly sensitive to any time [the lab instructor] said something short, because I felt more

heightened anxiety [and felt like] I have to get this right because she's already mad at me for not being able to focus on what she's saying. So I was just hypersensitive to the tone of voice or how the questions are asked."

The discomfort was temporary though; a few students identified that the safety of the environment and debriefing as a class were both helpful for gaining closure. One person said, "The conversation that we had after [the simulation] was really beneficial. I think we did it in a really safe environment and we had opportunity to pause it or stop if we wanted to do so." Another offered that

> "my lab instructor did a really good job. I really loved her and we all did. So that helped with opening up communication because I think if you don't necessarily have rapport with somebody, it'd be pretty challenging to be authentic in what you're saying... It helped that all of our dynamics were good... A comfortable place to kind of unpack your experience."

Theme Two: The Simulation Improved Understanding

The second theme captures that the simulation helped participants develop a more nuanced understanding of auditory hallucinations. Participants described that it can be difficult to distinguish hallucinations from reality, and that it is challenging to know how others experience the world. One person said,

> "I would say before the simulation, I thought of it more as [people are] aware that it's a hallucination and then afterwards realizing that it's really hard to tell the difference between what is and what isn't an auditory hallucination when you're experiencing that. So I would say it changed in that sense that I had more of a realization of how real it feels in that it's really hard to differentiate."

Others described that the nature of auditory hallucinations were different than they expected. One person identified that it bothered her when hallucinations didn't make sense. She said, "I would try to like read into it and [ask myself] 'What is it trying to say? Is that something that's random?' That surprised me."

Other participants were also surprised that hallucinations can be mundane. One said,

> "Before [the simulation], I very much had a stereotypical idea that the voices that are always trying to make you do something that's bad and super negative... it was interesting, sometimes they're not nice voices, sometimes it's a nice thing that you're listening to or it's a sound or you can't even identify [what it is]. I didn't realize that it could be like so hard to understand what they're saying... I guess I thought it would be for lack of a better word, scarier."

One with similar insight said,

> "it wasn't as scary as I thought or like, demonic, I guess. I think sometimes hearing voices is [experienced] as a conversation in my head that I would normally have, [or] louder music that didn't make sense." Another participant identified that, "I'd always thought of it like the devil on the shoulder and the angel and shoulder, and just one voice that you just always hear, but clearly that's not the case... That's really not the same at all."

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Participants discussed how the simulation helped them recognize the difficulty of understanding the reality that others experience. One said, “It opened my mind to the fact that we truly have no idea what's going on in someone else's mind. And you might be working with a patient who is dealing with a physical injury or disability, and they might have another world existing in their mind that you know nothing about.” Another said, “I've worked with a kid who's experiencing auditory hallucinations, but have another level of understanding... I don't think you can completely grasp what that actually means or what that feels like, so having like this brief experience with it gives you so much understanding.”

The functional implications of auditory hallucinations were clearer to students after the simulation. One said,

> “I think it really showed the functional implications for me. I wasn't able to finish any of the tasks in the time that we had. I heard the time constraints [and thought] ’oh, we have plenty of time. I can easily get this done.’ So it made me think of how much longer your days seem but how much shorter time it seems like you have to get your daily needs accomplished when your mind is constantly busy with other things.”

Theme Three: Reformulating Stigmatizing Attitudes and Sharing with Others

The more nuanced understanding of auditory hallucinations helped students reformulate stigmatizing attitudes they held, and they found this insight compelling enough to share widely with others. One participant shared,

> “To be really transparent, I did not understand what somebody who was standing on the corner yelling at themselves was experiencing...I have a completely different perception... Maybe I was judging sometimes, but I just didn't understand and now I feel like I have an understanding that they're talking back. to the voice that's in their head that’s with them all the time. I would talk back to it as well! That's part of the reason I wanted to share with a lot of people because the more understanding that we all have around what other people are experiencing, the better. [It can result in] less stigma, which means that those people can experience life in a different way where they don't feel like they're so alone in what they're going through.”

Another person shared that the simulation,

> “definitely changed my perspective on those with psychiatric disorders... if you drive through downtown, you'll see a lot of people on the street and it just like made me look at them differently – they're not all just strung out on drugs or anything like that. They didn't choose the life. It makes you think they might have something underlying that they can't control or that it's hard to manage, so you grow a little bit of empathy for people in real life...”

She went on to explain that this inspired her to talk to others, including her husband. She reported, “I even talked with my husband, and I noticed he even has a greater respect or appreciation [for people with auditory hallucinations], cause I share a lot of what we do in class with him. He looks at people differently too and not in a bad way, more so in a way of ‘man, it's sad that this has happened to them.’”

Another student described that previously she harbored a judgmental attitude which changed following the simulation. She said that prior to the simulation, she wondered,

> “Why do people have this? What are they doing to themselves to have these hallucinations? Now, my ‘why’ has kind of been answered... this is where they're at and they're trying to go through it on their own. [Now, I try] not judge them, I guess, basically [ask] what's going on, how can I help, but even more so now because I understand it's something that's very hard for them to control... it definitely made me even more knowledgeable and less judgmental about people who have psychiatric disabilities.”

She went on to say that the simulation, “makes you want to try and get to the root more as opposed to crucify them or think badly of them or punish them more.”

Other students described their reflections about stigma and the interactions they had with one another. One relayed this comment: “A few things that I discussed with some classmates were just the feeling of having more understanding for people talking back to the voices too. I wanted to do that and I wanted to be like ‘stop!’ or ‘I'm trying to listen to this!’ or ‘I'm trying to have this conversation!’ ...so having a conversation with my professor [during the cognitive assessment] was really challenging... and because of the stigma around it, you can't say, ‘I'm sorry, I'm having trouble focusing because I've got these voices in my head that are going.’”

Theme Four: Planned Changes for Fieldwork and Future Clinical Practice

The fourth theme in this work captured the changes students planned to make in fieldwork and future clinical practice in the wake of this simulation. Students encouraged the use of empathy and patience, as well as taking breaks and slowing down. One student said, “I totally get it now. I'm kind of looking forward to that future practice, or future empathy. I'm really promoting those rest breaks or doing whatever you need to do to stay on task or to really relax your mind. I think it's really big and important... I see a lot more that people who have auditory hallucinations [would benefit from] doing things such as stepping out or taking a walk. Another student said she plans to slow down, going on to explain that “I process things very quickly and move to the next thing in my day-to-day life. But we did quite a few different activities where there was a pretty obvious range of how people were functioning and whether or not they could do the activity. So I would maybe change some of the activities,” by either going faster or slower or modifying the activities, as needed.

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Students also identified that clients from various practice settings may have challenges with auditory hallucinations. One person said, “you just don't know what's going on in someone internally... just being very aware of that with all clients, regardless of what setting... I think I'll have a lot more patience and like be willing to consider what's going on in everyone's head because you have no idea what they're thinking, what they're hearing, what could it be happening?” Another similar comment was that a student was striving to have “more patience and empathy for clients regardless of their diagnosis or what they are being treated for. Just knowing that there could be a whole, there could be a lot going on in their mind that I have no idea about. And if there is a way to bring up the mental health aspects of it and have a discussion, if they're open to that, I think it is super important and something that I definitely want to address.”

Discussion

The purpose of this mixed methods study was to quantify empathy among occupational therapy students before and after a modified version of the Hearing Voices Simulation (Pat Deegan PhD & Associates, LLC, 2023) and to explore students’ experience with the intervention. The quantitative results of the study indicated that empathy among students significantly increased after participating in the simulation, though the effect size was small. The qualitative portion of the study found that students experienced temporary discomfort during the simulation, both in terms of the audio recording as well as with the occupations they completed; however, overwhelmingly, students found it to be a transformative learning experience in which they had a much greater understanding of the experience of auditory hallucinations. They described that the more robust understanding they had in turn reduced stigma towards people who experience auditory hallucinations, and it caused a strong desire to share this new lens with others. Finally, students also reported a desire to improve their approach to providing care by increasing their patience, taking breaks, slowing down, and anticipating patients in a range of settings may have mental health challenges.

The findings of this study largely harmonize with those of prior studies about the Hearing Voices Simulation, which has found benefits in a range of different outcomes and populations: it has been shown to improve attitudes among occupational therapy students (Ozelie et al., 2018); improved empathy among pharmacy, nursing, and medical students (Mawson, 2014; Orr et al., 2013; Skoy et al., 2016); improved understanding and attitudes among nursing students (Fossen & Stoeckel, 2016; Kepler et al., 2016; Mawson, 2014); and among psychiatrists, it improved conservations with patients (McCabe et al., 2016).

These findings also harmonized with the broader literature about empathy in occupational therapy, which has found that occupational therapy students tend to have high levels of empathy (Kelly, 2021; Logan et al., 2022), which tends not to decline over time (Brown et al., 2010; Serrada-Tejeda et al., 2022). In some studies, occupational therapy students appear to have higher levels of empathy (Williams et al., 2017) and more favorable attitudes (Masedo et al., 2021) compared to other health professions students, though one study found similarly high empathy levels among rehabilitative professions students (Metz & Christoff, 2020).

Empathy and compassion are particularly important for occupational therapy practitioners, who provide holistic care by seeing clients as whole people, viewing them in the context of their lives, and providing interventions which help clients participate in occupations. To be effective in that capacity, it is helpful to empathize with clients. In fact, prior research comparing health professions students in terms of their attitudes toward people with mental illness found that occupational therapy students held the most positive attitudes (Masedo et al., 2021); the authors advocated for reducing negative attitudes by demonstrating the capacity for recovery, educating about the efficacy of psychosocial interventions, viewing patients' context, and using a holistic approach. Notably, these are areas in which occupational therapists excel. Furthermore, Masedo and colleagues (2021) also suggested improving student attitudes by incorporating contact with recovered patients. Logan and colleagues (2022) described a similar approach in occupational therapy education, in which a teaching team of faculty and three mental health "consumers" co-designed a mental health curriculum; this study found similar levels of positive attitudes among students who had direct instruction from mental health consumers and among students who had direct instruction from faculty.

Prior literature points to strategies to consider when designing interventions to improve empathy among students. A systematic review and meta-analysis of randomized controlled trials regarding improving empathy among healthcare students found that multi-session interventions and group-based simulation delivery were most effective, and role play was an especially helpful approach (Chua et al., 2021). The present study's use of a group approach and one component that involved playing a patient interacting with a simulated healthcare provider who administered a cognitive assessment may have been an especially impactful component of the simulation and is an approach we recommend that occupational therapy educators consider.

Limitations

The study had several limitations. The sample consisted of second semester occupational therapy students attending an occupational therapy program; therefore, findings may not be fully representative of a broader population of occupational therapy students. We did not collect data about how many students turned the simulation off, or at what point in time they did so. Additionally, the findings may have been affected by social desirability bias and acquiescence bias, insofar as students could have been inclined to report a more positive view than they felt and during focus groups, may not have wanted to challenge the opinions of their peers. Given that the study had no comparison group, it was not possible to assess the extent to which empathy may have changed in the absence of the intervention. In addition, the data collection points were very close in time; the study did not assess whether empathy waned over time.

Implications for Occupational Therapy Education and Future Research

Quantitative results from this study indicated that the Hearing Voices Simulation (Pat Deegan PhD & Associates, LLC, 2023), with modifications to increase relevance to occupational therapy, improved empathy towards people with psychiatric disabilities among occupational therapy students. Furthermore, qualitative results of the study indicated that the simulation improved understanding, reduced stigma, and encouraged

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changes to future practice. Occupational therapy programs may consider adopting the Hearing Voices Simulation as part of their curricular content related to mental health and modifying the activities as described in this paper to increase relevance to occupational therapy. Particularly helpful components of the simulation included the cognitive assessment and the other occupations that students completed while undergoing the Hearing Voices Simulation; this is an approach other educators may consider.

Future research could assess whether the Hearing Voices Simulation improves interactions with clients in the context of fieldwork and clinical practice, and the extent to which the effects of the Hearing Voices Simulation on empathy are maintained over time.

Conclusion

This exploratory mixed-methods study found that the modified Hearing Voices Simulation significantly improved empathy in occupational therapy students, though the effect size was small. It also found that though the simulation caused initial, temporary discomfort, it was a transformative experience that increased students' understanding, reduced stigmatizing attitudes, and encouraged changes to clinical practice. These findings suggest that though initially high to begin with, empathy and understanding of psychiatric disabilities may be improved among occupational therapy students if they have a simulated experience of auditory hallucinations. Future research could address the impact of the Hearing Voices Simulation over time, and the extent to which it improves interactions with clients in the context of fieldwork and clinical practice.

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