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ORIGINAL RESEARCH

Developing Empathy: Does Experience Through Simulation Improve Medical-Student Empathy?

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Abstract
Objective This study used a role-play experience of stroke to improve student empathy for patients with neurological deficits.
Method Participants were 4th- and 5th-year medical students (n = 62). Students worked in pairs, one as patient, and the other as carer/observer. To simulate middle cerebral artery infarction, the patient was fitted with a leg splint, their arm was placed in a sling with the hand taped closed, and they wore glasses that blocked half of their visual field in each eye to simulate homonymous hemianopia. The patient then attended to their daily duties and completed a list of tasks. All participants completed the Jefferson Scale of Physician Empathy (student version) before and after the role-play exercise and wrote a reflection about their experience.
Results There was a statistically significant increase in mean empathy scores from baseline to post-participation. Students found the experience valuable and reported increased recognition of the time taken to complete tasks, receiving odd looks and stares, feeling judged, and greater understanding of stigma and of the experiences of people with disabilities.
Conclusion This role-play of a stroke experience improved medical-student empathy. Role-play experiences could be used more widely in clinical education.

Keywords Empathy · Stroke · Neurological · Role-play · Medical student · Medical education

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Introduction

"No one cares how much you know, until they know how much you care"—Theodore Roosevelt [1].

Empathy is valued as an important personal quality to effectively practice medicine. The ability to effectively and empathetically communicate with both patients and their relatives, and with other professionals, is defined as a fundamental outcome of the University of Adelaide's undergraduate Bachelor of Medicine and Bachelor of Surgery Graduate Program.

Hojat [2] defines empathy in patient-care situations as a cognitive attribute that involves an ability to understand the patient's inner experiences and perspective and a capability to communicate this understanding. Although the concepts of empathy and sympathy are often mistakenly tossed into one terminological basket, they should be distinguished [3]. Both concepts involve sharing, but empathetic physicians share their understanding, while sympathetic physicians share their

emotions with their patients [4]. Hojat [2] proposes that physician empathy is a multidimensional concept involving at least three components, which are perspective taking, compassionate care, and standing in the patient's shoes.

There are many reasons why empathy in doctors and medical students is considered to be so important and valuable. Empathy in doctors has been associated with higher levels of patient satisfaction, adherence to medical recommendations or regimens, and improved clinical outcomes. Empathy also seems to positively affect doctors themselves, as empathy has been linked to lower levels of burnout [5], higher well-being [6], higher ratings of clinical competence [7], and less medical-legal risk [8].

However, despite extensive evidence demonstrating the multiple benefits of physician empathy for patients and physicians, it has been demonstrated that empathy is at a lower than ideal level in medical professionals [9]. Studies indicate that doctors often overlook or miss empathetic opportunities during encounters with patients [10, 11].

Patient reports also point to a lack of physician empathy [9]. Even more discouraging is the finding that not only is empathy limited among medical students and physicians, numerous studies have also shown that empathy declines throughout medical training, in both medical school and residency [12–14]. This lack of empathy among doctors and the decline in empathy throughout medical training is concerning, especially considering the significant role that physician empathy plays in patient health and well-being [14].

Given the importance of empathy in medicine, we suggest that it is paramount that an effort is made in medical training to increase student's empathy. A systematic review in 2014, looking at interventions to cultivate physician empathy, found that there is support for the notion that empathy can be increased through interventions [15].

Taking into account Hojat's concept of empathy [2] specifically the notion that a part of empathy is being able to stand in the patient's shoes, we hypothesized that empathy in medical students would be enhanced if they were able to experience a simulated medical disability. Our study aimed to provide insight into whether a role-play exercise involving the experiences of a patient who has had a stroke would improve the level of understanding medical students have for their future patients. Moreover, we assessed if participation in this study provided a useful learning experience for medical students and had the potential to improve their empathy for people with physical disabilities.

Method

This was a mixed-method study that included both qualitative and quantitative measures.

Patients

The participants in the study were 4th- and 5th-year medical students from the University of Adelaide currently on a neurology or psychiatry rotation at the Royal Adelaide Hospital, Glenside Campus or the Lyell McEwin Hospital. Written informed consent was obtained from each participant and time was given to provide clarification about what the study entailed. Approval was obtained from institutional research and ethics committees for each site. Students had to be in pairs of the same gender to participate. They were allowed to choose their own partners for the study. One of the students acted as a patient, while the other acted as a carer, and was available to help if necessary. The students decided between themselves who would fill each role prior to participating in the study. The role-play was organized by psychiatry trainees who were not involved in student assessments or grades.

Procedure

We created an experience of a common type of stroke, a middle cerebral artery infarction, within the hospital environment. The patient was fitted with a leg splint, made out of cardboard. They had their hand placed in a sling with the respective hand taped closed. They were also instructed to wear glasses that blocked half of their visual field in each eye using electrical or masking tape to simulate homonymous hemianopia. The arm and leg on the patient's dominant side was restricted. Once fitted, the patient was then required to attend to their daily duties while on their clinical rotation, such as attend the ward handover, lectures, and seminars as per any other day of their clinical unit. They also were required to complete a list of designated tasks. These included ordering and eating lunch in a cafeteria, completing a computer-based quiz in the hospital's library, making a phone call on a public phone, writing and sending a letter from a post office box, and purchasing an item at the hospital's gift shop. Both patient and carer participants completed the Jefferson Scale of Physician Empathy (student version) [16] prior to and at the end of the experiential learning exercise.

Each participant was also asked to write a reflection about their experience. The instructions for this were the following: "please take some time to reflect on your experiences as part of this research, whether as an individual simulating a stroke, or as a carer. We ask that you then write about your day, considering the following questions. You are welcome to write as much you would like, however please look to write at least one page. As outlined previously, this information will remain confidential and de-identified.

- *What was the experience like for you?*
- *What were people's reactions to you (the general public, patients, staff, fellow students)?*

- *What did you learn from this experience?*
- *Do you think it was a valuable learning experience?*"

Measures

The Jefferson Scale of Physician Empathy (student version) (JSPE) is a 20-item self-administered questionnaire. Each question is marked on a 7-point Likert scale (1–7) with 1 being "strongly disagree" and 7 being "strongly agree." Adding together the values for each of the questions generated scores ranging from 20 to 140 with higher scores indicating greater empathy [16].

Analyses

Jefferson Scale of Physician Empathy (Student Version) The mean (SD) scores before and after the role-play were calculated. The scores for the total group were compared using a paired sample *t* test. Further paired sample *t* tests were undertaken separately for the patient participants and the carers. Next, change scores were calculated for each participant as the difference between their score before and after the role-play. Paired sample *t* tests were used to compare the change scores for the patients and the carers, and for male and female participants. Analyses were undertaken using IBM SPSS 19.0 and $p < 0.05$ was taken to indicate significant difference between groups.

Reflective Writing Two doctors (psychiatry trainees, MC and SK) separately assessed participant's reflective writings. The content was analyzed and categorized according to all of the different themes, or comments, provided by students. These themes are listed in Table 2.

Results

The study had a total of 62 participants (31 patients and 31 carers). Of the 31 groups, 11 pairs participated at the Royal Adelaide Hospital, 18 at the Lyell McEwin hospital, and 2 at Glenside Campus. Thirty four participants (55%) were male and 28 (45%) were female. The mean age of participants was 22.3 years (range 20–45) and 90.2% were right-handed. Nearly 1 in 5 (19.7% of participants) had previously experienced a significant injury and 18% identified someone close to them previously experiencing a significant injury. One participant from the patient group failed to return their post-JSPE form; otherwise, all data was provided.

The results of a paired sample *t* test demonstrated a statistically significant increase in empathy scores as rated on the Jefferson Scale of Physician Empathy student version, [16] from baseline to post-participation. There was a significant increase in the mean score for all participants ($n = 61$) as well for patients ($n = 30$) and carers ($n = 31$) separately. The mean score for all participants as a collective increased from a mean JSPE score of 108.7 (SD 9.1) pre-participation to 114.0 (SD 9.9) post-completion of the simulation exercise (*t* score − 6.74, $p < 0.001$). This was compared to the individual patient and carer groups which returned a baseline mean score of 107.2 (SD 9.1) and 110.1 (SD 9.0) and post-exercise score of 112.1 (SD 10.8) (*t* score − 4.32, $p < 0.001$) and 115.8 (SD 8.7) (*t* score − 5.16, $p < 0.001$), respectively (see Table 1).

The mean change in JSPE scores from baseline to post-participation for all participants was 5.29 (SD 6.12) with a range from − 6 to + 18. There was no statistically significant difference with regards to mean change in JSPE scores between patients and carers (t (59) = − 0.45, $p = 0.66$). Similarly, there was no statistically significant difference with regards to mean change in JSPE scores between males and females (t (59) = 0.60, $p = 0.55$).

Table 2 shows the breakdown of pre- and post-mean scores from all participants. Results were corrected for multiple comparisons using the Bonferroni method, with an adjusted *p* value of 0.0025. The largest increase in mean scores was noted for JSPE items 1, 9, and 17 with a mean increase of 0.57 ($p < 0.002$), 0.50 ($p < 0.001$), and 0.51 ($p < 0.001$), respectively.

Table 3 summarizes the themes highlighted from medical student's patient experience in their reflection piece. The qualitative data has been summarized into tabled form with (Number) coinciding with the number of participants reporting the experience during the simulation. The table

Table 1 Baseline and post-participation scores of individual patient and carer groups

	n	Baseline score Mean (standard deviation)	Post-participation score Mean (standard deviation)	Paired sample *t* test *t* value	*p* value
All participants	61	108.7 (9.1)	114.0 (9.9)	− 6.74	< 0.001*
Patients	30[a]	107.2 (9.1)	112.1 (10.8)	− 4.32	< 0.001*
Carers	31	110.1 (9.0)	115.8 (8.7)	− 5.16	< 0.001*

Please note higher scores = greater empathy

[a] One participant did not provide a post-JSE form

*$p < 0.05$

Table 2

Jefferson Scale of Physician Empathy—student version: item breakdown

JSPE item	Mean score		
	Pre	Post	*p* value
JSPE 1. Physicians' understanding of their patients' feelings and the feelings of their patients' families does not influence medical or surgical treatment	5.48	6.05	0.002*
JPSE 2. Patients feel better when their physicians understand their feelings	6.25	6.48	0.007
JSPE 3. It is difficult for a physician to view things from patients' perspectives	3.70	3.31	0.039
JSPE 4. Understanding body language is as important as verbal communication in physician-patient relationships.	5.95	6.03	0.374
JSPE 5. A physician's sense of humor contributes to a better clinical outcome	4.85	5.15	0.030
JSPE 6. Because people are different, it is difficult to see things from patients' perspectives	3.60	3.39	0.223
JSPE 7. Attention to patients' emotions is not important in history taking	6.27	6.39	0.260
JSPE 8. Attentiveness to patients' personal experiences does not influence treatment outcomes	5.59	6.08	0.001*
JSPE 9. Physicians should try to stand in their patients' shoes when providing care to them.	5.52	6.02	< 0.001*
JSPE 10. Patients value a physician's understanding of their feelings which is therapeutic in its own right	5.79	6.20	< 0.001*
JSPE 11. Patients' illnesses can be cured only by medical or surgical treatment; therefore physicians' emotional ties with their patients do not have a significant influence in medical or surgical treatment.	5.79	6.13	0.003
JSPE 12. Asking patients about what is happening in their personal lives is not helpful in understanding their physical complaints	5.89	6.31	<0.001*
JSPE 13. Physicians should try to understand what is going on in their patient's minds by paying attention to their non-verbal cues and body language	5.70	6.18	0.001*
JSPE 14. I believe that emotion has no place in the treatment of medical illness	6.32	6.46	0.231
JSPE 15. Empathy is a therapeutic skill without which the physician's success is limited	5.75	6.00	0.079
JSPE 16. Physicians' understanding of the emotional status of their patients, as well as that of their families is one important component of the physician-patient relationship	5.97	6.25	0.016*
JSPE 17. Physicians should try to think like their patients in order to render better care	4.82	5.33	0.001*
JSPE 18. Physicians should not allow themselves to be influenced by strong personal bonds between their patients and their family members.	3.25	3.63	0.057
JSPE 19. I do not enjoy reading non-medical literature or the arts	5.98	6.10	0.018
JSPE 20. I believe that empathy is an important therapeutic factor in medical treatment.	6.23	6.49	< 0.001*

*$p < 0.0025$

emphasizes the most common responses being recognition of the difficulties in time taken to complete tasks, receiving "odd looks and stares," reporting an "eye-opening or valuable experience" a myriad of physical symptoms, feeling judged, and insight into understanding stigma and the experiences of disabled patients. Overall, it is clear the most emphatic responses related to increasing understanding and insight of what it is like to receive care as a patient with a disability and identifying with the difficulties faced on a daily basis.

In Table 4, the responses from the carer group are summarized following the role-play. The carer reflections highlighted similar themes to the patient group. Twenty four (77.4%) of the carers recognized the simulation as valuable and fifteen (48.4%) reported finding the task difficult.

Discussion

The results of this study indicate that this experiential learning role-play, in which students undertake a simulated experience as either a stroke patient or a carer, is effective in improving medical-student empathy. This is evidenced by the statistically significant increase seen from pre- to post-participation scores on the Jefferson Scale of Physician Empathy—student version [16]. Interestingly, this increase was seen in both individual patient and carer results. There was no significant difference between the increases noted from patient and carer results with an average collective increase of 5.29 on the JSPE. There was also no difference in the pattern of change across the various questions. Interestingly, observing their partner undertake the role-play was as effective as undertaking the roleplay themselves, in terms of improvement in empathy. The feedback received indicated it was valuable albeit challenging exercise.

The study demonstrated no statistically significant gender difference in JSPE scores. This differs from several other studies that had previously noted female students scoring higher on empathy scales than their male colleagues [2, 7, 17–19]. However, the finding was consistent with a study performed by Bunn and Terpstra [20] who did not find a gender difference.

Table 3 Qualitative responses: patient participants

Qualitative response from patient group	Number	Percent
Recognized increased length of time to complete tasks/tasks more complex	25	83.3
Valuable experience/"eye-opening experience"	22	73.3
Increased empathy/understanding and "insight," recognizing others' frustration, can relate to patients better and understand stigma	21	70.0
"Staring," "gaining more attention," "sensing others curiosity," receiving "odd looks"	21	70.0
Poor vision significantly impacted/straining to see	16	53.3
Interesting experience	15	50.0
Found exercise challenging	13	43.3
Frustration/irritability during exercise	13	43.3
Feeling judged, "felt uncomfortable" or avoiding people, "self-conscious," and embarrassed	13	43.3
Loss of independence	10	33.3
Appreciation and better insight/taking independence for granted (esp. basic tasks)	9	30
Fatigue/exhaustion	9	30
More difficult/challenging than expected	9	30
Appreciate only short-term deficit, coped knowing not permanent/feeling would not manage beyond several hours	8	26.7
Students/staff indifferent (knowledge of study or seen before) impacting attitude	8	26.7
Observing laughter from others	7	23.3
Avoiding tasks areas/modifying usual behavior	6	20.0
Difficulty initially with later adaption and learning	4	13.3
People generally courteous "opening doors" or assisting in some way	4	13.3
Belief that functioned quite well	3	10.0
Feelings of guilt when requesting carer help or hindering others	3	10.0
Reliance on environmental supports/carers	3	10.0
Reported good tolerance by others	3	10.0
Leg cramping and pain	3	10.0

The role-play was generally well received by the student participants. Qualitative data indicated that of a possible 31 groups, 22 patients and 24 carers identified the experience as valuable, worthwhile, and an "eye-opening experience." Similarly, 21 of the patient group wrote that they felt after the study that they would be able to better relate to their own patients. The students attributed this to improved insight, empathy, and understanding of disability and chronic disease. In addition to the group effects noted, the effect of the individual stroke patient and carer experience should also be appreciated. The simulation clearly drew more than a simple empathic response. Students reflected on a multitude of broader issues including and not limited to a greater appreciation for perceived lack of disability services, and feelings of vulnerability and safety concerns navigating the street and hospital. Students also discussed how the study made them more aware of the carer's role and the various emotional components that come with that responsibility, including the feelings of guilt, carer anxiety, frustration, and the potential for future carer burnout.

Table 4 Qualitative responses: carer group

Qualitative responses from carer group	Number	Percent
Valuable learning experience	24	77.4
More difficult than expected	15	48.4
Frustration during the exercise	8	25.8
Interesting experience to take part in	8	25.8
"Looks"/reactions from public	4	12.9
Better understanding of what people with disabilities experience	3	9.7
Feeling embarrassed due to feeling judged by others	3	9.7
Gained insight from the experience	3	9.7
Great/good experience	3	9.7

Limitations of the study include the results being restricted to a single medical school. Therefore, the results cannot necessarily be generalized. Also, as a self-reporting tool, the JSPE suffers from the same limitations as many other self-assessments [20]. This may mean that it will not necessarily correlate with behavior-based measures [7, 20] and can be vulnerable to reflection bias. Behavioral changes may be better measured through direct observation. Another possible limitation of the study is the absence of a comparison group. Finally, prior to undertaking the study, students may have witnessed their colleagues perform the learning exercise, as the student pairs participated in the study over the course of several weeks, which may impacted on their experience and

understanding of the study. All participants were assured anonymity in responses but social desirability bias may have influenced responses.

On reviewing previous empathy studies, an empirical study, Hojat et al. [13] found that there was a decrease in emotional empathy prior to and following clinical experiences among medical students. Given the importance of empathy in medicine, it is paramount that an effort is made to devise methods of improving this quality during medical training, rather than allowing it to diminish [21]. Our study demonstrated that empathy might be able to be increased through the use of an experiential role-play aimed at increasing student understanding in the experience of disability.

At present, this learning exercise has been targeted to clinical students in 4th and 5th years of the medical program with potential to incorporate as a permanent workshop in the curriculum for all clinical students prior to undertaking internship.

Medical schools need to adopt strategies to enhance empathy in undergraduate medical students. Thus, specific interventions like participating in a role-play of a stroke patient and carer can aid students to increase their empathy. While this role-play is specific to post-stroke patients with disability, we suggest that this learning experience would lead to broader empathy for all patients and carers.

Implications for Educators

- Experiential learning is an effective means to change medical students' attitudes to patients with physical disabilities.
- Neurological disability (stroke) can be simulated using easily available materials.
- Students became more aware of stigma and the reactions of others to people with disabilities.
- Students were able to reflect on their experiences and found the role-play exercise valuable.
- Experiential learning should be used more widely in medical training to help students develop empathy and relate to their patients.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

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