Original Article

Impact of Virtual Dementia Tour on empathy level of nursing students: A quasi-experimental study

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ABSTRACT

Objective: As a developable ability, empathy is significantly associated with patient-centered care. The authors intended to evaluate the effect of Virtual Dementia Tour (VDT) upon nursing students' empathy level and propose practical rationales for optimizing future dementia care.
Methods: A total of 45 second-year undergraduate nursing students were organized to watch a theme movie entitled *Still Alice* and participate in an 8-min VDT. Jefferson Scale of Empathy-Health Professional Students (JSE-HPS) was employed for evaluating the empathy level of nursing students. After VDT, all nursing students participated in a structured interview. Descriptive statistics and paired t-tests were performed using SPSS 24.0.
Results: Their empathy levels demonstrated significant overall improvements (106.69 ± 9.49 vs 115.51 ± 10.16, $P < 0.01$). During the course of VDT, nursing students experienced varying levels of anxiety and frustration. All of them were satisfied with the program since they had gained a deeper understanding of demented patients and the program could change their attitudes toward demented elders.
Conclusion: Watching a specially selected movie and participating in VDT may be an effective method for enhancing empathy and caring during nursing student education.

What is known?

- Although nursing students demonstrated acceptable empathy levels, there is still much room for improvement.
- Empathy is a kind of ability that can be facilitated but cannot be forced to occur. The most effective empathy education strategies in undergraduate nurses were immersive and experiential simulations that focused on vulnerable patient groups and provided opportunities for guided reflection.

What is new?

- Watching a movie and participate in the Virtual Dementia Tour significantly improved nursing students' empathy, changed their attitude toward the older adults and people with dementia, and may have positive impact on their future nursing practice.

1. Introduction

Empathy is defined as understanding, sharing and creating an internal space for accepting another person, hence helping them feel understood and not alone [1]. It includes both cognitive and affective aspects allowing an individual to respond to verbal and nonverbal cues of others [2]. Over 200 scientific publications have supported the potential mechanisms of action and outcome measures for compassionate care, such as lowering anxiety and distress, fewer medical errors, better patient therapeutic adherence and self-efficacy, higher quality of care and optimized patient experience, etc [3]. Nursing students are future practitioners. And the levels of empathy in nursing students were positively correlated with their attitudes toward elders and the willingness to care for senior citizens [4,5]. Although nursing students demonstrated acceptable empathy levels, there is still much room for improvement [6]. Thus it is imperative to take effective measures of enhancing nursing students' empathy.

With a rapid aging of global population, the number of demented elders continues spiking. According to the World Alzheimer Report 2019, over 50 million people were demented globally and it is projected to surpass 152 million by 2050 [7]. Dementia is frequently associated with other symptoms, including memory loss, disorientation, confusion, loss of mobility, hallucinations and difficulties of undertaking daily activities and navigating physical environments [8]. Clinical care providers should appreciate their unique experiences and utilize empathetic communication skills for building a rapport. Yet around 40% of demented patients

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thought that healthcare providers tended to ignore them and failed to understand their needs [7].

As reported by a systematic review, the most effective intervention of empathy for nursing students was immersive and experiential simulations of vulnerable patients [9]. Distorting visual, audio and touch information through goggles, headphones and gloves, Virtual Dementia Tour (VDT) simulated cognitive declines during conducting tasks within a structured environment [10]. It offered caregivers a rare opportunity of experiencing the plight of elders in a hand-on manner so as to improve the caregivers' understanding of demented persons [11]. As a popular evidence-based study tool, VDT has been employed for boosting empathy and optimizing the delivery of care [12]. To the best of our knowledge, it has not been applied in China. With the largest population of demented patients in the world [13], China has an urgent need for training dedicated providers for dementia cares. Therefore the objective of this study was to explore the impact of VDT upon empathy of nursing students, summarize the experiences of participating in VDT training and provide rationales for optimizing future nursing practices for dementia.

2. Methods

2.1. Study design

This study was a one-group quasi-experiment with pre-and post-test.

2.2. Setting and sampling

The academic setting was a medical university located in Central South China. Convenient sampling was used for recruiting undergraduate nursing students from two classes. The inclusion criteria were as follows: 1) full-time second-year undergraduate nursing students; 2) completing nursing ethics courses and passing the exams; 3) willing to participate in the study.

2.3. Ethical considerations

Permission of conducting the study was granted by the Institutional Review Board (IRB) of the university. The first author visited the class, explained detailed procedures, addressed various questions and concerns of participants, recruited participants and obtained informed consents. No identifying information was included on the survey questionnaire.

2.4. Interventions

The participants were organized to watch a theme movie entitled *Still Alice* and participate in the modified VDT.

2.4.1. Movie overview

The movie retraced the life story of a successful woman named Alice. At the age of 50 year, her memory deteriorated gradually and she was diagnosed as Alzheimer's disease. Ongoing dementia greatly changed her life, her relationship with her family and the world. However, with steady supports of her family members and companions, she became brave and lived for the moment. The students watched the movie together in a classroom on October 14, two days before participating VDT.

2.4.2. Modified VDT

Some tools and tasks were modified according to the study of Beville [11]. For example, a pair of acupoint massage slippers was employed for simulating foot pain instead of dried corn kernels in shoes. And the participants were requested to thread a needle

instead of color-coordinate clothes in closet. On September 15, a pilot study of 6 participants was conducted and threading a needle was proved rather difficult. Then the task was replaced by picking up 3 small balls. For simulating impaired vision and sensory deficit, the participant wore a pair of blurred goggles and large gloves. For simulating loss of mobility and hand motor skills, thumb and forefinger on the participant's dominant hand and the last three fingers of nondominant hand were taped together too.

The VDT room was dimly illuminated and furnished with desk, chair, closet, sofa and various objects for additional confusion. Upon room entry, a trained observer greeted each participant, played the audiotapes of radio noise for simulating hearing loss and heightening the sense of confusion. The participants were supposed to complete 5 tasks including wearing a pair of yellow socks, folding towels, brushing teeth, composing a three-sentence note or drawing a simple picture, and picking up 3 small balls. The observer did not repeat the above 5 tasks and remained silent in the process. The number/contents of tasks completed and the behaviors exhibited were recorded with a standardized form. All participants were told to stop after 8 min and refrain from discussing VDT with others.

2.5. Measurements

2.5.1. Jefferson Scale of Empathy-Health Professional Students (Chinese version)

The level of empathy was measured by the Chinese version of Jefferson Scale of Empathy-Health Professional Students (JSE-HPS) [14]. The permission for using the scale was obtained from the original author. JSE-HPS was composed of 20 items and 3 subscales, including perspective taking (10 items), compassionate care (8 items) and standing in patient's shoes (2 items). Each participant was requested to indicate their level of agreement or disagreement with each statement (1 = strongly disagree, 7 = strongly agree). With a range from 20 to 140, a higher score denoted a greater level of empathy. The modified scale was translated into Chinese and its reliability supported by 229 practicing nursing students with a Cronbach's α coefficient of 0.836 [15].

2.5.2. Scheduling of a semi-structured interview

A semi-structured interview was formulated based upon the study's objective and a thorough review of the relevant literature [16]. It was intended to address four broad aspects, such as experiences, benefits, impact on future practice and practical recommendations. The interview lasted around 10 min and it was digitally-recorded with the participants' permission.

2.6. Procedures

A set of demographic questionnaire and JSE-HPS with a randomly generated number was distributed to each participant and completed before September 15. The participants were required to remember the random number assigned to each one. On September 15, a pilot trial of 6 nursing students was conducted. On October 14, all participants watched the movie together. On October 16 and 17, each of them was "garbed" in the same way and took the VDT in turns on specific timepoints. From October 18 to 22, JSE-HPS was re-assessed and each questionnaire was taken back with the assigned random number. A semi-structured interview was conducted separately.

2.7. Data analysis

Data analysis was performed with the IBM SPSS Software package version 24.0 for Windows. Frequencies, percentages, means and standard deviations were used for describing the

Table 1
Demographic characteristic of participants ($n = 45$).

Characteristic	n (%)
Age, Mean±SD	18.93 ± 0.75
Sex	
Female	42 (93.3)
Male	3 (6.7)
From	
City	13 (28.9)
Rural area	32 (71.1)
Have siblings	
Yes	9 (20.0)
No	36 (80.0)
Willing to be a nurse before entering college	
Yes	27 (60.0)
No	18 (40.0)
Grade of nursing ethics' test	
A	8 (17.8)
B	37 (82.2)

Table 2
Pre–post changes in nursing students' empathy ($n = 45$, Mean ± SD).

Subscale	Pre-test score	Post-test score	t	P
Perspective taking	53.58 ± 4.98	58.00 ± 5.30	—5.481	<0.01
Compassionate care	41.96 ± 4.42	45.36 ± 4.52	—5.211	<0.01
Standing in patient's shoes	11.16 ± 1.68	12.16 ± 1.60	—4.062	<0.01
Total score	106.69 ± 9.49	115.51 ± 10.16	—6.669	<0.01

Table 3
Themes for the interview ($n = 45$).

Content	n (%)
Experiences	
I could not remember all the tasks.	10 (22.2)
I wanted to give up.	20 (44.4)
I felt frustration, helpless or angry.	40 (88.9)
Benefits	
The program is effective.	45 (100)
The VDT is more effective than watching the movie.	45 (100)
Impact on the future	
I would like to be more patient with the elderly.	45 (100)
I plan to help them.	42 (91.3)
I will give them enough time.	38 (84.4)
I will not ask them to complete some tasks at a time.	20 (44.4)
Recommendation	
I am very satisfied with the program.	45 (100)
I will recommend the program to others.	45 (100)

participants' socio-demographic factors and empathy competences. Pre and post-simulation differences in empathy levels were assessed by paired t-test. A two-sided $P < 0.05$ was deemed as statistically significant. NVivo version 11.0 was employed for analyzing and collating the qualitative data of the interview.

3. Results

3.1. Demographic characteristics of participants

A total of 45 participants completed the intervention. The mean age was 18.93 (ranged 18–20) years. Most of them were females with siblings and selected nursing as a major on their own (Table 1).

3.2. Score of empathy

As shown in Table 2, the nursing students demonstrated a relatively high level of empathy at pre- and post-test on JSE-HPS (Mean ± SD, pre-test: 106.69 ± 9.50, post-test: 115.51 ± 10.16, maximum score possible = 140). A statistically significant increase in their empathy levels occurred after completing VDT ($P < 0.05$)

3.3. Documentation of VDT

It is very stressful to complete the 5 tasks in the limited time so that only 3 participants completed all 5 tasks, 27 (60.4%) participants fulfilled 4 tasks and all finished 3 tasks. All five tasks were assigned verbally in the same order. Some started with the first task on the list, some with the last while others opted for the most visually accessible task. During the tour, most of them were anxious, angry and frustrated. They think aloud, asked for assistance and even refused to continue.

3.4. Findings from the interview

All participants expressed their satisfaction with the program for its novelty and effectiveness. And VDT was so impressive that the program would change their attitudes toward dementia elders. In their opinions, this program should be recommended to other students and healthcare professionals. In addition, some participants gained new insights, such as that patients should be offered ample time for finishing a task (Table 3).

4. Discussion

Significantly associated with patient-centered care [17], empathy is considered one of the most important components of a therapeutic nurse-patient relationship [18]. Understanding demented persons and empathetic communication skills are necessary for building a rapport and fulfilling their personal needs [19]. Second-year nursing students were selected since they began to acquire nursing knowledge and empathy education was essential during this period [20,21]. The mean total score of empathy at baseline was 106.69 ± 9.49. And it was relatively moderate and consistent with the empathy level of other Chinese nursing students [20,21]. VDT has been employed to help sensitize healthcare providers, such as nurses, aides, social workers, activity directors, administrators and medical staff [11,16]. It was the first time that VDT was successfully adopted for improving nursing students' empathy. The domain of perspective taking showed the greatest improvement. And it was consistent with previous domestic simulation studies of situated teaching program [20] and behavior simulation [22].

Our study revealed that watching a movie and participating in VDT was effective in improving nursing students' empathy. Such an innovative approach was consistent with other film interventions [23] and VDT simulations [10,11,16]. The major reasons for marked improvements were as follows. 1) Second-year nursing students lacked clinical experiences. The vivid movie enabled them to understand the progression of Alzheimer's disease more intuitively and grasp the dilemmas of patients and family members. In future nursing practices, they were more inclined to cultivate a higher level of empathy toward demented persons; 2) Demented patients had no way of articulating what was happening in their brains and might resort to the voices of caring staff. Point-of-view disability simulation allowed nursing students to stand in someone else's shoes and develop empathy [24]. In the process of simulation, nursing students experienced the distortions of vision, touch and sound similarly to demented persons, elicited emotional responses of anxiety, anger frustration and helplessness, displayed some dementia-like behaviors and consequently became a "voice" for them[11]. Thus it offered a person-centered approach to gaining an in-depth understanding of daily challenges faced by demented persons and created a strong sense of empathy.

During the interview, most students indicated that VDT changed their attitude toward elders and contributed positively to their future nursing practices. With more patience, they would issue one

order at a time and offer ample time for completing tasks. The process of behavior simulation enabled them to be directly involved in patient behaviors and emotions, helping them experience the plight of confused elders, realizing that behavioral expectations should be lowered for dementia patients, prompting them to think about patient needs and developing skills of assisting patients.

Currently great advances have been achieved in applying virtual reality simulation training for dementia care [19]. Programs such as myShoes [25], Into D'mentia [26] and Through the D'mentia Lens (TDL) [27] have demonstrated marked improvements of empathy for both caregivers and students. However, all three programs were technology-based simulations. Computer hardware and software were utilized for boosting dementia awareness from the perspective of demented persons. That is to say, experiencing the world as they experienced it. Despite its effectiveness, practical restraints of computer technology and special equipment have limited its application. VDT simulated symptoms through goggles, special slippers, gloves and headphone. As compared with the above three programs, it was more convenient, flexible and affordable. At the same time, it took merely about 20 min to prepare and participate in VDT. Remarking that VDT was impressive and effective; all students were satisfied with the program and would recommend the program to other nursing students and health professionals.

Several limitations were inherent in this study. Firstly, the participants were selected by a convenient sampling of undergraduate nursing students at a single medical institution. As a result, the results might not be generalized for all nursing students. Secondly, it was not a randomized control study since there was no control group. Thirdly, a self-reported questionnaire was utilized for evaluating the effects of empathy after intervention. Long-term efficacy was not examined with follow-ups.

5. Conclusion

Empathy is a developable ability. Diverse methods have been adopted for improving empathy among nursing students. The present results indicated that watching a movie and participating in VDT could significantly boost empathy and change their attitudes toward dementia care. And VDT represents an innovative educational tool providing insights into the world of dementia persons. Further research is needed to explore longitudinal impact of watching patient-care-themed film and VDT on empathy performance of nursing students.

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Author statement

Xiya Peng: Conceptualization, Methodology, Funding acquisition, Software, Writing- Original draft preparation. **Liaofang Wu:** Methodology, Writing- Reviewing and Editing. **Xiaoshu Xie:** Investigation, Data curation. **Mengjun Dai:** Validation. **Donghua Wang:** Conceptualization, Supervision

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ijnss.2020.06.010.

References

[1] Cunico L, Sartori R, Marognolli O, Meneghini A. Developing empathy in nursing students: a cohort longitudinal study. J Clin Nurs 2012;21(13-14): 2016–25. https://doi.org/10.1111/j.1365-2702.2012.04105.x.

[2] Lorié Á, Diego A, Margot Phillips R, Linda Z. Culture and nonverbal expressions of empathy in clinical settings: a systematic review. Patient Educ Counsel 2017;100(3):411–24. https://doi.org/10.1016/j.pec.2016.09.018.

[3] Trzeciak S, Roberts BW, Mazzarell AJ. Compassionomics: hypothesis and experimental approach. Med Hypotheses 2017;107:92–7. https://doi.org/10.1016/j.mehy.2017.08.015.

[4] Insun J, Oh Doonam, Yeon SK. Factors associated with nursing students' willingness to care for older. Int J Nurs Sci Adult Kor U S 2019;6:426–31. https://doi.org/10.1016/j.ijnss.2019.09.004.

[5] Keping T, Rujun A, Hui H, Qifeng L, Liyang K, Ruifang C. Correlation between nursing students' attitudes and empathy towards the elderly. Chin J Gerontol. 2016;36(5):1516–7.

[6] Li M, Hongli L. Analysis of empathy status and influencing factors of nursing undergraduates. Nurs Res 2012;26(26):2727–8.

[7] Alzheimer's Disease International. World alzheimer Report 2019: attitudes to dementia. https://www.alz.co.uk/research/WorldAlzheimerReport2019.pdf. 2020-02-28.

[8] Alzheimer's Disease International. World alzheimer Report 2012: overcoming the stigma of dementia. https://www.alz.co.uk/research/WorldAlzheimerReport2012.pdf. 2020-02-28.

[9] Tracy LJ, Robyn C, Samuel L. A systematic review of the effectiveness of empathy education for undergraduate nursing students. Nurse Educ Today 2019;75:80–94. https://doi.org/10.1016/j.nedt.2019.01.006.

[10] Beville P. Dementia simulation: methods and systems for simulation of cognitive decline. https://qioprogram.org/sites/default/files/DementiaSimulation.pdf; 2014. 2020-2-24.

[11] Beville P. Virtual Dementia Tour® helps sensitive health care providers. Am J Alzheimer's Dis Other Dementias 2002;17(3):183–90. https://doi.org/10.1177/153331750201700301.

[12] Alessandra M. Virtual dementia Tour®: limitations and ethics. Qual Ageing 2018;19(2):146–55. https://doi.org/10.1108/QAOA-11-2017-0042.

[13] Longfei J, Meina Q, Yue F. Dementia in China: epidemiology, clinical management, and research advances. Lancet Neurol 2020;19(1):81–92. https://doi.org/10.1016/S1474-4422(19)30290-X.

[14] Hojat M, Gonnella JS, Nasca TJ. Physician empathy: definition, components, Measurement, and relationship to gender and specialty. Am J Psychiatr 2002;159(9):1563–9. https://doi.org/10.1176/appi.ajp.159.9.1563.

[15] Li X, Sun H. Translation and reliability, validity testing of TSE-HP(nursing student edition). Chin J Mod Nurs 2011;17:2853–6. https://doi.org/10.3760/cma.j.issn.1674-2907.2011.24.001.

[16] Slater P, Hasson Felicity, Gillen. Patricia A research evaluation of an interactive training experience: the virtual Dementia Tour (VDT)-Ulster Institutional Repository. http://uir.ulster.ac.uk/38648/; 2017. 2020.02.28.

[17] Brandy H, Seong kH, Patricia W, Claudia B, Mallikarjuna RR, Michael A. Relationships among active listening, self-awareness, empathy, and patient centered care in associate and baccalaureate degree nursing students. Nurs Plus Open 2017:11–6. https://doi.org/10.1016/j.npls.2017.05.001.

[18] Dinkins CS. Helping nursing students unblock empathy: a big idea from William James. Nurse Educ Today 2017;61:194–6. https://doi.org/10.1016/j.nedt.2017.11.027.

[19] Hirta J, Beera T. Use and impact of virtual reality simulation in dementia care education: a scoping review. Nurse Educ Today 2020;84:1–8. https://doi.org/10.1016/j.nedt.2019.104207.

[20] Lee KC, Yu CC, Hsieh PL, Li CC, Chao YFC. Situated teaching improves empathy learning of the students in a BSN program: a quasi-experimental study. Nurse Educ Today 2018;64:138–43. https://doi.org/10.1016/j.nedt.2018.02.013.

[21] Chao QL, Qian M, Yu YL, Kun JJ. Are parental rearing patterns and learning burnout correlated with empathy amongst undergraduate nursing students? Int J Nurs Sci 2018;5:409–13. https://doi.org/10.1016/j.ijnss.2018.07.005.

[22] Chen J, Shuyan T, Miaohong C, Zhexin L, Ningxiang L, Liping W, et al. Effect of case teaching method of nurse-patient communication situation on empathy ability of nursing undergraduates. Mod Clin Nurs 2017;16(11):38–42.

[23] Briggs CL, Fox L, Abell CH. The influence of film on the empathy ratings of nursing students. Int J Hum Caring 2012;16:59–63.

[24] Levett JT, Lapkin S, Govind N, Pich J, Hoffman K, Jeong YS, et al. Measuring the impact of a 'point of view' disability simulation on nursing students empathy using the comprehensive state empathy scale. Nurse Educ Today 2017;59: 75–81. https://doi.org/10.1016/j.nedt.2017.09.007.

[25] Adefila A, Graham S, Clouder L, Bluteau P, Ball S. My Shoes—the future of experiential dementia training. Ment. Health Train Educ Pract 2016;11(2): 91–101. https://doi.org/10.1108/jmhtep-10-2015-0048.

[26] Jutten LH, Mark RE, Maria Janssen BWJ, Rietsema J, Droes RM, Sitskoorn MM. Testing the effectivity of the mixed virtual reality training into D'mentia for informal caregivers of people with dementia. Protocol for a longitudinal, quasi experimental study. BMJ Open 2017;7. https://doi.org/10.1136/bmjopen-2016-015702.

[27] Wijma EM, Veerbeek MA, Prins M, Pot AM, Willemse BM. A virtual reality intervention to improve the understanding and empathy for people with dementia in informal caregivers: results of a pilot study. Aging Ment Health 2017;22(8):1121–9. https://doi.org/10.1080/13607863.2017.1348470.