

Original Research Paper

Development and Psychometric Test of the Empathy and Understanding in Dementia Index for Health Professionals

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Abstract: Empathy among health professionals requires the application of empathic understanding in practice and in the way, care is provided. To date, few tools have been specifically designed to measure empathy concerning dementia training. Therefore, this study aimed to develop a psychometrically valid and reliable tool to measure empathy among health professionals. A mixed methods sequential exploratory design was adopted guided by Fields' theoretical structure. Phase 1-4 (development) of the instrument was based on (1) an extensive literature review, (2) qualitative research, and (3-4) the contribution of a variety of stakeholders and supported by an empathic theoretical framework. Phase 5 (validation) involved a quantitative study among a convenient sample of multi-health professionals ($n = 223$) to evaluate validity and reliability and finalize the tool. Full ethical approval was acquired. A 19-item questionnaire that includes four constructions (Previous training $\alpha = 0.88$, empathy $\alpha = 0.91$; Understanding behavior $\alpha = 0.85$; and Person-centered practice $\alpha = 0.91$) emerged from qualitative findings and a strong theoretical basis. It was verified that the tool had acceptable psychometric properties, acceptable factor loadings, and internal consistency measures. The intervention had a significant impact on the empathy of the participants. The tool proved to be an effective measure of empathy, understanding, and empathy in the performance of health professionals concerning the care of a person living with dementia. It proved to be an effective measure of change over time as a result of an intervention. The intervention produced a significant change in empathy and understanding of the symptoms and impact of dementia. This difference was observed regardless of the health profession. The empathy and understanding in the dementia index are potentially useful tool for estimating empathy among health professionals using virtual reality. The questionnaire demonstrated sufficient structural validity and internal consistency in empathy and understanding of the symptoms of health professionals and the impact on the person living with dementia. Further psychometric investigation including larger samples is recommended.

Keywords: Dementia, Empathy, Questionnaire, Validation, Psychometrics

Introduction

The growth in the number of people living with dementia worldwide is expected to reach 135.5 million by 2050 (WHO, 2015) and older people constitute the largest section of attendees in acute and community hospital settings (WHO, 2015; Mudge and Hubbard, 2019). Consequently, health professionals require a richer

understanding of the impact the condition has on People Living with Dementia (PLWD) (Surr *et al.*, 2017). Empathy is recognized as playing a significant role in the provision of effective medical care (Spiro, 2009), particularly for those with PLWD (Wijma *et al.*, 2018). Health professionals have to be aware of the psychological and emotional aspects of dementia, and its impact and facilitate positive health care actions

(Sulzer *et al.*, 2016; Fagiano, 2019). To facilitate this there has been a significant increase in simulation training employing Virtual Reality (VR) technology with older people in areas such as pain management (Benham *et al.*, 2019), mild cognitive impairment (Faucounau *et al.*, 2010), and navigation (Coutrot *et al.*, 2019). However, there is a paucity of robust research designs and evidence to examine how virtual reality can impact health professionals' understanding of the psychological and emotional symptoms of conditions such as dementia. Evidence from research studies involving health professionals (Slater *et al.*, 2019) and (informal) carers (Wijma *et al.*, 2018) highlighted the significant impact of VR interventions on the promotion of understanding of symptoms and empathy for what it's like to live with dementia and the production of positive changes to practice (Slater *et al.*, 2019; 2017). However, the research designs underpinning the evidence are limited by issues of internal and external validity (Slater *et al.*, 2017). In part, this is due to a lack of a psychometrically sound measurement tool of empathy and understanding of PLWD and its subsequent measurement.

Several authors report there is a necessity to equip health professionals/carers with an empathetic understanding of dementia, to enhance care, increase communication between carer and PLWD and reduce caregiver burden (Dal Santos *et al.*, 2014; Ahrweiler *et al.*, 2014; Jütten *et al.*, 2017). In a systematic review of the impact of empathy on patients, Derksen *et al.* (2013) reported a significant increase in patient satisfaction and adherence to care, decreased anxiety and distress, more accurate diagnostic and better clinical outcomes, and greater patient enablement has been reported. Empathy has been described as a core tenet in caring relationships (Mercer and Reynolds, 2002; Percy and Richardson, 2018; Levett-Jones *et al.*, 2019) and essential for the provision of compassion (Straughair, 2012) and person-centered care (Griffiths *et al.*, 2012). In some instances, the lack of empathy has been linked to the presentation of burnout in some healthcare professionals (Kelm *et al.*, 2014), and often patients report a lack of empathy displayed by health professionals towards them during caring practices (Jangland *et al.*, 2009).

However, creating empathy and understanding of the world of PLWD adds a new dimension of difficulty due to the degenerative nature of the condition, the fragmented and confusing world that it creates, and the challenges in communicating this world to outside observers (Cunningham, 2006). This has given rise to the growth in simulation training as an immersive tool to replicate real-world situations (Gaba, 2004;

Dudding and Nottingham, 2018). The simulation of symptoms allows the participants to enhance awareness of personal empathy enabling reflection on how this may inform and alter their behavior with patients and families (Addison and Morley, 2019).

Virtual Reality and Empathy

There has been a significant increase in VR programs as effective models of dementia training including my Shoes project, Virtual Dementia Experience, (VDE), Virtual Dementia Tour (VDT) ® (Beville, 2002; 2014), and through the D'mentia Lens (Hattink *et al.*, 2015; Slater *et al.*, 2019) for further details). Whilst the research evidence has been generally supportive to date, given the novelty of the virtual reality application within dementia, the quality of the research designs has been weak. Empathy assessment is heterogeneous (Fragkos *et al.*, 2019; Hirt *et al.*, 2019) in a scoping review of assistive technology for PLWD and their caregivers found a commonality of themes converging from the data and with clear variability in the tools used to measure the empathy as a concept (Table 1).

Doube and MacGuire (2016) using a quasi-experimental design, reported that the VDE showed significantly improved empathetic understanding and knowledge of dementia, compared to traditional classroom training (2016). The change was measured using an unspecified instrument. Adefila *et al.* (2016) using the interpersonal reactivity index (Davis, 1980) to measure taking the perspective of and having empathetic concerns for others, reported that my shoes project increased awareness of the symptoms of dementia, increased empathy, and compassion among social workers and students. Qualitative findings report a positive change in clinical practice, moving participants to 'think beyond treatment and to see the world of the person behind the condition (Adefila *et al.*, 2016).

Beville (2002) designed a self-developed 8-item survey with limited psychometric details to measure the change in participants. Topics included (1) understanding the emotional needs of people with dementia (2) the necessity to sensitize to symptoms (3) justification of inappropriate behavior and (4) PLWD receiving effective care. The author reported increases in the understanding of the emotional needs of PLWD and increased sensitivity to their symptoms and why people living with dementia may display inappropriate behavior. Participants reported a reduction in agreement that people with dementia receive the care they need. Beville concluded that the 'sensitizing of caregivers to the physical realities of people living with dementia should be a paramount issue in training' (2002, p.262).

Table 1: VR studies, primary measurement tools, and expected results (Adapted from Hirt and Beer, 2020)

Study		Primary measures/tools topics
Beville (2002)	DACE - 8 questions	Understand emotional needs; need to raise awareness of PLWD needs; justification for inappropriate care for behavior; provision of appropriate PLWD
Doube and MacGuire (2016)	Reserved	Empathic understanding professional awareness about PLWD
Wijma <i>et al.</i> (2018)	Approach to the dementia questionnaire: Subscales: The centrality of the person; interpersonal subscale: Perspective taking empathy	Understanding of the person with dementia; person-centered and reactivity index
Jütten <i>et al.</i> (2017)	Interpersonal reactivity index: Subscales take-on perspective and empathic concern	Cognitive empathy Affective empathy
Adefila <i>et al.</i> (2016)	Interpersonal reactivity index inventory of interpersonal problem generalized anxiety disorder	Attitudes and behavior of dementia patients, self-perception of confidence, competence and compassion
Slater <i>et al.</i> (2019)	18 Semi-structured interviews	The 4 components of morse empathy cognitive, affective, moral and behavioral
Meyer <i>et al.</i> (2022)	8 In-depth interviews	Simulated learning addresses an educational the gap that traditional teaching methods do not fill: Understand the experience of living with dementia and comorbid conditions: Applying simulation learning to improve practice
Peng <i>et al.</i> (2020)	Jefferson empathy scale-professional health students	Perspective took compassionate care standing in patients' shoes

Jütten *et al.* (2017) relied on a battery of standardized instruments such as the interpersonal reactivity index examining person-centeredness and empathetic concern. Wijma *et al.* (2018) used a combination of subscales from instruments such as the person-centeredness subscale in the approach to dementia questionnaire. Slater *et al.* (2017; 2019) conducted a qualitative investigation into the impact of VDT on health professionals and confirmed the usefulness of the VR program and it provided an opportunity to imagine what it was like to live with dementia, enabling an enhanced empathetic state. Participants were immersed within the world of the person with dementia, enabled to experience the impact of dementia on thoughts and emotions and to translate these into changes in their professional practice.

The findings from the VR studies align with the theoretical frameworks of empathy reported by Sulzer *et al.* (2016) (thinking, feeling, and acting) (2016) and Fagiano (2019) theory of empathy (feeling into, feeling with, and feeling for). No tools currently exist that specifically use these theories of empathy as a model underpinning instrument development; a point that is evident in the range of tools developed that quantitatively measure the impact of VR interventions (Hirt *et al.*, 2019). Therefore, it is time to generate a new, psychometrically sound instrument, which has credibility and effectiveness in measuring the changes in empathy and understanding of the world of the person living with dementia.

Materials and Methods

Mixed methods sequential exploratory research design was used, with qualitative investigation followed by

quantitative testing. The development of the tool was robust and empirically based on a multi-stage process supported by sound theoretical guidelines on the generation of instruments, as provided by Field (2003). These included (1) an extensive review of the literature; (2) qualitative research on the subject; (3) the development of central themes and clear definitions; (4) the production of items to address the central themes; and (5) psychometric tests and refinement of the tool. This study was conducted in 2019 in the following five phases.

Phase 1-2: Questionnaire Development

A review of the literature on VR and the training of health professionals in dementia awareness indicate a shared commonality of the themes identified within the findings of qualitative research. The themes identified resulted from a thematic analysis of qualitative content and related to the impact of virtual reality on dementia training (Slater *et al.*, 2017; 2019). Topics relevant to the effective training of dementia have been identified, (1) being able to put themselves in the world of a person with dementia, (2) cognitively processing and understanding how having dementia impacts the emotions, (3) understanding how emotions and thought translate into behavior and (4) ensuring the prospect of starting from a PLWD external position-"interpreting the world through the mind of a person with dementia".

A conceptual model of understanding the psychological world of dementia emerged from the data (Fig. 1). The interaction of the dimensions created a greater awareness of the emotional response of the person with dementia and increased sensitivity to the condition.

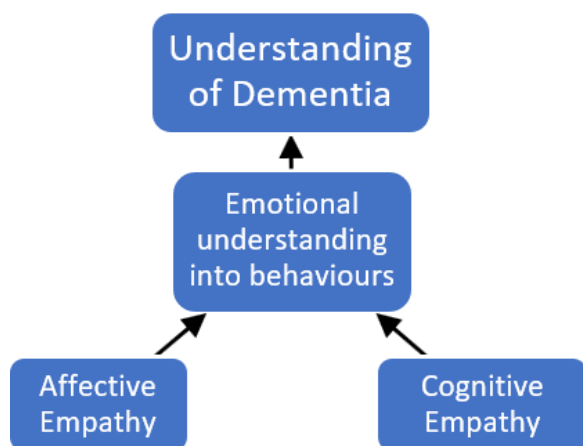


Fig. 1: An interactive model, including three dimensions, emerged from qualitative data

Phase 3: Development and Definition of the Main Themes

These findings aligned with Fagiano's theory of empathy (2019) comprising: Emotional empathy as 'the ability to share the feelings of another person. This type of empathy helps you establish emotional connections with others. This aligns with the theme-of being able to place oneself into the world of a person living with dementia.

Cognitive empathy addresses our understanding of how a person feels and, as a consequence how these impact on one's thinking. Cognitive empathy makes us better communicators because it helps us relay information in a way that best reaches the other person. This incorporates two themes: Understanding the emotional aspects of living with dementia and understanding how emotions translate into behavior; compassionate empathy (or moral empathy) moves us from feeling and thinking to action, to help however we can. This aligns with the role of empathy in providing effective care.

Phase 4: Developing of Items

The questionnaire items were generated by an expert panel ($n = 5$ comprising a psychologist, dementia specialist nurses, and researchers with expertise in dementia) to provide face and content validity. The items were based on the research findings and a review of instruments used in previous research studies, and a battery of 27 items was generated by the research team based on the themes identified. A review and a further critical analysis by the research team resulted in the tool's amendment, through the removal of duplication and ambiguous items, to leave 15 items addressing emotional, cognitive, and compassionate empathy. All items were measured on a five-point Likert scale ranging from strongly disagree to strongly agree. The tool was called 'empathy and understanding in dementia index'.

Phase 5: Validation

Study Design, Setting, and Data Collection

This study was part of a larger study used to measure change across time on two occasions and treated as two independent cross-sectional surveys. Therefore, two sets of data were available to examine and test the psychometric properties of the tool.

Participants were purposively sampled from a Health and Social Care Trust in Northern Ireland following an open call via email and social media to health professionals, voluntary groups, and members of the community caring for a person living with dementia. Training sessions were provided in clusters of 12 people, and a maximum of 2 sessions per day, running for two weeks. This provided a potential of 240 participants. A response rate of 223 completed questionnaires for both time points represented a response rate of 93%. Examination of the characteristics of non-respondents showed that 4 participants completed pre-intervention questionnaires only and 1 completed post-intervention questionnaire only. The remaining participants (2.5%, $n = 12$) either did not turn up for training or did not wish to participate in the study.

As well as the 15 items 'empathy and understanding in dementia index', four items were included to examine how previous training had influenced participants' knowledge and understanding of dementia. These four items were only assessed pre-intervention, thus specific to the research study, and therefore are not included in the analysis. Demographic details were collected to examine differences concerning the profession, gender, age, and relevance of knowledge of dementia to clinical practice.

Data Analysis

Demographic details of the sample were examined to identify its characteristics of the sample. Descriptive statistics were generated to look at the normality of distribution (skewness and kurtosis) before full analysis. Appropriateness of the items for factor analysis was conducted with both samples using Kaiser-Myer-Olkin analysis and Bartlett's test for sphericity. An exploratory factor analysis was conducted with time 1 data using Maximum Likelihood Robust (extraction) with Varimax rotation was conducted on the 15-item questionnaire for dataset one. The emergent factor structure was examined for acceptable factor loadings and the presence of cross-factor loading. Once the factor structure had been established it was tested using Confirmatory Factor Analysis (CFA) with data set 2. Correlated errors were entered into the CFA to improve the model, if necessary. Cronbach's alpha/average variance estimates scores were calculated for each construct. Items were summated and construct scores were examined for normality of distribution as well as collinearity.

Ethical Issues

Full ethical approval was obtained from the University Ethics committee. The study used implied consent whereby a completed questionnaire was indicative of consent. Anonymity and confidentiality were assured for all participants. A unique four-digit self-completed coding system was used to ensure the anonymity of participants whilst allowing questionnaires to be pair-matched for analysis. Support services were offered to all participants on completion of the intervention.

Results

Characteristics of Participants

The sample reflected a wide range of health professionals and caregivers (formal and informal) (Table 2). The largest group identified itself as a collective of psychiatrists, psychologists, student nurses, and student social workers. The next largest group was allied health professionals and medical staff. Fifteen participants (7%) were caregivers.

Analysis of Exploratory Factors

Time 1: Analysis of Exploratory Factors

The 19 items of the questionnaire were subject to exploratory factor analysis (Table 3). A Maximum Likelihood extraction with a Varimax rotation was used to provide as clear a factor structure as possible. Kaiser Meyer Olkin test Measures of sampling Adequacy (0.88) and Bartlett's test of Sphericity (sig. 0.00) indicated that the items were suitable for factor analysis. A four-factor model emerged from the data and explained 67% of the cumulative variance (Factor 1 = 22%; 2 = 16%; 3 = 15%; 4 = 19%).

Time 2: Analysis of Confirmatory Factors

The 15 items of the questionnaire were subject to confirmatory factor analysis. A Maximum Likelihood extraction with a Varimax rotation was used to provide as clear a factor structure as possible. Kaiser Meyer Olkin test Measures of sampling Adequacy (0.90) and Bartlett's test of Sphericity (sig. 0.00) indicated that the items were suitable for factor analysis. A three-factor model emerged from the data and explained 66% of the cumulative variance (Factor 1 = 37%; 2 = 15%; 3 = 14%).

The fit statistics for time point one establish the factor structure (Chi-square 114.078, $df = 70$, $p < 0.001$; RMSEA 0.053; 90% RMSEA 0.034-0.070; CFI = 0.974, SRMR = 0.051). Four correlated error variance relationships within constructs were introduced to help the fit statistics. The fit statistics for time point two confirm the factor structure (Chi-square 112.463, $df = 70$, $p < 0.001$; RMSEA 0.052; 90% RMSEA 0.033 – 0.069; CFI = 0.964, SRMR = 0.043). All relationships at both time points were at a statistically significant level.

Factor loading scores for constructions were acceptable (above 0.4) and stable at both time points (Table 4). All four constructions presented acceptable Cronbach alpha scores above the threshold of 0.7 and, therefore, considered stable. Convergent validity is established by the Average Estimates of Variance for 4 of the 6 constructs above 0.5. There was a level of inconsistency in the mean estimates of variance at both time points.

Skewness and kurtosis have not been identified as a problem. There was a high kurtosis score issue in construct 2, but the distortion was not at a statistically relevant level (Table 5). The correlation coefficient scores show a positive correlation between constructions and scores that do not indicate collinearity problems and sufficient variability in the score to indicate that each construction is measuring different aspects of empathy.

After the intervention, all skewness and kurtosis were not significant issues. There was a high kurtosis score issue in construct 2 and 3, but the distortion was not at a statistically relevant level. This may be a result of the effect of the ceiling.

Discussion

With the increased use of simulation training as a tool to increase understanding and empathy concerning dementia (Hirt *et al.*, 2019; Plotzky *et al.*, 2021) among health professionals, informal caregivers (Slater *et al.*, 2017; 2019), and health students (Meyer *et al.*, 2022), there is a need for a psychometrically solid instrument to measure its impact on participants (Slater *et al.*, 2019). The 'Dementia Empathy and Understanding Index' is a 19-item index and includes emotions and cognitions that interplay to affect the understanding and response of HCPs to people with dementia. Addison and Morley (2019) and Cunningham (2006) highlight that addressing these areas are essential qualities among health professionals when capturing the fragmented world of the person living with dementia.

This is the first study to outline the development and testing of an instrument that is specific to dementia training among health professionals. Theoretical frameworks underpin the development process; the definition and conceptualization of empathy in dementia care; and the psychometric testing of the resulting instrument.

To ensure the quality of the instrument, its development was guided by Field (2003) phased process for instrument development techniques, integrating (1) literature findings/informed definitions of evidence and item development; and (2) psychometric examination. The fundamentals of the development of the instrument were qualitative in nature (Slater *et al.*, 2017; 2019) and focused on a review of similar studies and constructs assessed by measuring tools (Hirt *et al.*, 2019; Hirt and Beer, 2020) and existing theoretical structures for understanding empathy and care (Sulzer *et al.*, 2016; Fagiano, 2019).

Table 2: Demographic profile of participants

Gender		Education	
Female	91.5(205)	Degree	42.5(88)
Male	8.5(19)	Diploma	25.6(53)
PROFESSION		Masters and higher	5.8(12)
Nurse	12.0(26)	Other	26.1(54)
Medical/AHP	22.0(49)	Prior training	
HCA	18.0(39)	Yes	31.0(70)
Social worker	15.0(33)	No	69.0(156)
Carers	7.0(15)	SETTING	
Other	26.0(56)	Community	70.3(149)
AGE		Voluntary	4.7(10)
18-24	8.4(19)	Hospital	25.0(53)
25-34	20.0(45)		
35-44	21.8(49)		
54-54	27.6(62)		
55-64	17.8(40)		
65+	4.4(10)		

Table 3: Factor structure of the 19-item questionnaire (time 2 results in Bold) *= P<0.01

Statements (mean scores)	Factor loadings
Construct-training in dementia care	
My previous training lets me know what the physical symptoms of dementia are. (X = 3.55)	0.63
My training lets me know what the emotional symptoms of dementia are. (X = 3.50)	0.76
My training lets me know how dementia affects the mindset of the person. (X = 3.48)	0.81
My training lets me know how dementia affects the thinking of the person. (X = 3.34)	0.72
Construct - Empathic understanding of the impact of dementia	
I can see things through the eyes of the person with dementia	0.75
(X = 2.69, 4.29)*	0.85
I can 'stand in the shoes of a person with dementia	0.87
(X = 2.56, 4.11)*	0.86
I feel I can understand what it's like to live with dementia	0.80
(X = 2.72, 4.14)*	0.84
I understand how dementia impacts a person's thinking	0.65
(X = 3.06, 4.23)*	0.86
I understand how dementia impacts a person's emotions	0.65
(X = 3.15, 4.28)*	0.81
I feel I can empathize with the emotional position of the person with dementia. (X = 3.38, 4.35)*	0.41
(X = 2.62, 4.05)*	0.69
I feel I understand what it's like to think like a person with dementia	0.75
(X = 2.62, 4.05)*	0.83
Construct - Understanding the behavioral impact of dementia	
I understand how dementia can lead to aggressive behavior in people with dementia	0.84
(X = 3.65, 4.58)*	0.72
I understand how dementia can lead to agitation in people with dementia	0.84
(X = 3.77, 4.68)*	0.67
I understand the reasons people with dementia behave as they do	0.65
(X = 3.48, 4.48)*	0.55
I understand how dementia impacts a person's physical behavior	0.37
(X = 3.39, 4.45)*	0.65
Construct-provision for person-centered care	
Empathy is important for me to organize the effective care of a person with dementia	0.91
(X = 4.32, 4.78)*	0.60
I need to consider the person's emotions to provide effective care for a person with dementia	0.93
(X = 4.31, 4.78)*	0.59
To ensure effective care, I involve the person with dementia in care decisions	0.82
(X = 4.15, 4.57)*	0.62
I ask a significant other/family member about a person with dementia's emotional wellbeing in order	0.72
(X = 4.12, 4.59)* to organize effective care	0.70

Table 4: Construct Cronbach's alpha and average variance estimates for both time points

Constructs	Time 1	A.V.E.	Time 2	A.V.E.
1 Training in dementia care	0.88	--		
2 Provision for person-centered care	0.91	0.65	0.95	0.74
3 Understanding the behavioral impact of dementia	0.85	0.37	0.89	0.66
4 Empathic understanding of the impact of dementia	0.91	0.51	0.74	0.40

Table 5: Distribution measures in four constructs (*=P<0.01)

Definition of construction	Mean	SD	Skewness	Kurtosis
Training in dementia care: How well previous training provided participants with a strong evidence base of the impacts of physical and emotional well-being on mindset and thinking of the person with dementia	3.47	0.82	-0.64	0.91
Empathic understanding of the impact of Dementia: The ability of participants to understand and interpret empathy the impact of caused by dementia on a person's emotions and thought patterns.*	2.89 4.21	0.82 0.79	0.01 -1.52	-0.24 3.57
Understanding the behavioral impact of Dementia: Understanding the impact of emotional and cognitive changes caused by dementia translated into behaviors such as agitation, aggression, etc.*	3.58 4.55	0.69 0.56	0.85 -1.95	1.12 7.59
Provision of Person-centered care: The holistic role of dementia and empathic understanding in providing effective care. *	4.22	0.76	-1.68	4.54
	4.68	0.43	-1.31	0.91

The findings provide evidence of effective measurement of empathy (Coll *et al.*, 2017; Dohrenwend, 2018) that aligns with the theory offered by Fagiano (2019). For this study, the definition of empathy is based on the definition of Fagiano (2019) and on the theoretical conceptualization, which to have empathy is not enough and that it should include a measure of application positively and affectionately (Fig. 1). This definition was chosen because it portrays empathy as an active and dynamic activity and not just a physiological measure. Fagiano's theory is closely aligned with the findings of previous studies that examine the impact of virtual reality interventions on participants and, therefore, is a solid philosophical position for the generation of the questionnaire.

'Empathy and understanding in the dementia index' offers a concept of empathy among health professionals/caregivers where items investigate the understanding of the impact of dementia on the cognitions, emotions, and subsequent behaviors of the PLWD; and how this empathic presence can influence or affect the subsequent care that is provided to people living with dementia. This is the first tool to do so.

The findings demonstrate a clear factor model with an acceptable measurement model that fits the statistics and factor loadings. The measures of internal consistency demonstrate reliability within constructs; correlation scores show variability in the themes being measured. These psychometric properties remained stable between time points.

Previous studies examining the impact of virtual reality training related to dementia awareness have focused on a battery of tools using previously standardized instruments not specific to the study context and weighed (e.g.: Adefila *et al.* (2016); Wijma *et al.* (2018). Alternatively, Jütten *et al.* (2017) used parts of instruments to direct the evaluation to specific elements and reduce the unnecessary evaluation burden. Beville

(2002) developed the DACE questionnaire to measure the impact of virtual reality on health professionals, but this tool did not have established psychometric properties. The empathy and understanding in the dementia index address these deficiencies. The 'empathy and understanding in dementia index' is a single instrument, with established psychometric properties that effectively assesses participants understanding of dementia and its impact on the person, essential traits to provide effective care to PLWD (Surr *et al.*, 2017).

In general, the results prove that 'empathy and understanding in the dementia index' are adequate for the evaluation/measurement of empathy among health professionals. The study verified the structural validity of the instruments, their stability over time, and the internal consistency of the instrument. The analysis also indicates that the index can detect variations in empathy experienced by health professionals.

Limitations

As with all newly developed instruments, 'empathy and understanding in dementia index' requires further testing. Firstly, the results were mainly based on female health care professionals, it is limited in assessing the empathy of male health care professionals. Second, the study was conducted using a purposive sample rather than a probabilistic sample, therefore the findings may not be generalized to health professionals working in different cultures. Further, as this is a new instrument, and the initial test of the instrument was limited to a sample and intervention imitating moderate dementia, consequently more tests are needed. The tool was completed by several health professionals and caregivers in this study but requires a broader application with other settings and research projects.

Conclusion

Dementia is a global issue and empathy and understanding of the symptoms of dementia has a significant role to play in providing person-centered practice. The 'empathy and understanding in dementia index' proved to be an effective measure of empathy and its role among health professionals concerning the care of people living with dementia. It is an effective measure of empathy and the components that make up empathy as an active process; in understanding the impact of dementia on emotions and thinking, such as these affect behaviors; and the best way this translates into the provision of people-centered care. It can be used by educationalists and practitioners to assess healthcare professionals' empathy to enhance the care provided to PLWD. As a measurement tool, it aligns with a definition of empathy more relevant to health professionals due to its application in action in the information of the provision of practice centered on the person. The study shows that empathy can be effectively measured and altered through an intervention.

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Author's Contributions

Paul Slater and Felicity Hasson: Concept designed, data analysis, drafting of the paper and review of final submission.

Kevin Moore and Florence Sharkey: Concept designed, data collection, interpretation of initial data, drafting of the paper and review of final submission.

Ethics

Full ethical approval was obtained from the University Ethics Committee. No ethical issues arose due to the study.

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