

TESTING THE SENSITIVITY OF TWO DEMENTIA KNOWLEDGE INSTRUMENTS IN DEMENTIA WORKFORCE EDUCATION

ABSTRACT

Background: The importance of dementia education in improving the care and support that people living with dementia is well established. Previous research has shown ceiling effects in pre and post educational intervention measures of dementia knowledge using Knowledge in Dementia Scale (KIDE) on post-registered health and social care staff in Scotland. The aim was to test the sensitivity of two dementia knowledge instruments, namely the (KIDE) and the Dementia Knowledge Assessment Scale (DKAS).

Design: A pre and post evaluation comparison of two dementia knowledge scales.

Setting: The tenth cohort of Scotland's National Dementia Champions Education Programme, September 2019 - March 2020.

Participants: Post-registered Health and Social Care staff (n = 117).

Methods: Both the DKAS and KIDE scales were administered pre and post programme delivery. Wilcoxon signed-rank tests were performed to examine T1 – T2 differences in dementia knowledge for both validated measures.

Results: Ceiling effects continued to be present for the KIDE scale at T1 and T2. The DKAS responses showed a different score distribution than that achieved by the KIDE. Ceiling effects noted for KIDE at T1 were not present for the DKAS. Further, at T2, only 6% of respondents scored the maximum on the DKAS.

Conclusions: The DKAS appears to be a more useful instrument for measuring knowledge in post-registered health and social care staff; however, there was some evidence of ceiling effects post-intervention. There is a need for both scales to be tested in more educationally diverse populations, so educators and researchers can make informed decisions about the instrument's target range. Additionally, further research is needed to develop new sets of dementia knowledge items suitable for use in trained health and social care staff.

Keywords: Dementia, education, training, evaluation, knowledge, scales

INTRODUCTION

According to the World Alzheimer Report 2016, 46.8 million people worldwide live with dementia in 2015, and this number will reach 131.5 million in 2050 (ADI, 2016). In the UK there are 850,000 people living with dementia (Prince et al. 2014). Quality Education, including having the necessary vocational skills is one of the United Nations Sustainable Development Goals <https://www.un.org/sustainabledevelopment/>. This paper will discuss the application of two dementia knowledge instruments, namely the Knowledge in dementia scale (KIDE) (Elvish et al. 2014) and the Dementia Knowledge Assessment Scale (DKAS) (Annear et al. 2015) in a sample of health and social care professionals. Discerning which instrument is more useful for measuring the knowledge gained through educational interventions will help educators make informed decisions about the most effective and appropriate instrument to use with recipients of dementia education and training. Comparing the psychometric strength of these instruments will also contribute to the field of dementia knowledge measurement which is currently limited in this regard.

BACKGROUND

A key target population for dementia education are the large numbers of health and care staff who support people living with dementia. Within this, staff working in general hospital settings across the globe are recognised as a group that has not been provided with the necessary knowledge and skills to provide appropriate support and care for people living with dementia in hospital (Surr et al. 2017, Dewing and Dijk 2016, Scerri et al. 2017). This is an important gap given that people living with dementia occupy significant proportions of hospital beds. For example, it is estimated that 25% of UK hospital beds are occupied by people living with dementia (Boaden, 2016), this is estimated to be 30% in Greece (Douzenis et al. 2010) and in Germany around 40% of beds are occupied by those over 65 years with some kind of cognitive impairment (Bickel et al. 2018). Compared to people without dementia people living with dementia have more comorbidities (Poblador-Plou et al. 2014), and higher emergency admissions rates (Lamantia et al. 2016; Sommerlad et al. 2019; Shepherd et al. 2019). People living with dementia are more likely to spend longer time in hospital, during which time their functional abilities reduce and they are exposed to a greater risk of having adverse health outcomes (Möllers et al. 2019, Bail et al. 2013; Bail et al. 2015; Harvey et al. 2016, Tropea et al. 2016).

Many studies have found people living with dementia are subject to a variety of disabling experiences whilst in hospital, such as bed/ward moves, boredom, and their wishes unknown or disregarded (Hung et al. 2017, Moyle et al. 2016, Parke et al. 2017 and Prato et al. 2019). The evidence points to various contributing factors for poor care experiences, such as highly structured institutional risk averse cultures of care that prioritise efficiency and staff priorities over person-centred care (Featherstone et al. 2019, Handley et al. 2019). Additionally, many hospital staff feel under-confident, unprepared and insufficiently educated to provide quality care for people living with dementia (Cowell, 2010; Coffey et al. 2014; Hynninen et al. 2014; Pinkert et al. 2018, Featherstone et al. 2019). This highlights the critical role that dementia education has in supporting staff to provide safe, effective, and person centred dementia care. Dementia education is also key to promoting dementia care as skilled work, improving care experiences and outcomes.

Since 2011, the UK has seen various policy initiatives to improve the dementia knowledge and skills amongst the health and social care workforce. The first of the four UK nations to develop a dementia knowledge and skills framework was Scotland with the 'Promoting Excellence Framework' (Scottish Government, 2011). The Higher Education Dementia Network (HEDN) then published the first UK guidance on dementia education, a 'Curriculum for Dementia Education' (HEDN, 2013). This informed the Dementia Core Skills Education and Training Framework (Department of Health, Skills for Health and Health Education England, 2015), updated to the Dementia Training Standards Framework in 2018. Wales developed the 'Good Work: Dementia learning and development framework' (Care Council for Wales, 2016), and Northern Ireland developed the 'Dementia Learning and Development Framework' (Health and Social Care Board, 2016). There are now calls for all four of the knowledge and skills frameworks to be referenced in Professional Regulatory Body (PRB) requirements (Knifton et al. 2019). The authors argue that referencing the frameworks would support their adoption as a sector minimum standard across professional boundaries and promote a more coherent approach to pre and post-qualifying dementia

education across the UK (Knifton et al. 2019). Not all staff working in general hospital settings will be educated in HEIs. A UK wide audit of dementia education provided outside of HEIs found variability in the degree and nature of education and training (Smith et al. 2019). They concluded that although the amount of dementia training provision has increased, the quality of content and pedagogical approaches to dementia education remains inconsistent (Smith et al. 2019).

The interest in evaluating the impact and efficacy of dementia education and training has grown in line with the increased provision (Allegrì et al. 2021, Schneider et al. 2020, Jack-Waugh et al. 2018, Surr et al. 2017, Scerri et al. 2017, Elvish et al. 2014, Raymond et al. 2014). The international interest in the impact of dementia education on hospital staff specifically is also growing (Allegrì et al. 2021, Schneider et al. 2020). One method for evaluating the efficacy of educational interventions is to use established dementia knowledge measurement instruments to assess for increases in knowledge post educational intervention. To reliably measure an unobservable trait such as knowledge, questionnaires or scales must be developed and tested using established guidelines such as those detailed in Streiner, Norman & Cairney (2015). The use of instruments that do not demonstrate psychometric quality indicators in specified populations may lead to inconsistencies in findings. The field of dementia knowledge measurement is currently narrow and not well-established, with a number of instruments remaining untested for psychometric strength beyond development (Spector et al. 2012; Sullivan and Mullan, 2017; Thu-Hong and Huang, 2020). This poses challenges for researchers and educators in selecting an appropriate instrument that: (i) addresses the research question and (ii) has sufficient psychometric properties for reliable measurement.

Measuring knowledge gain in Scotland's National Dementia Programme

Scotland's National Dementia Champions programme has been running since 2011 (Banks et al 2014, Jack-Waugh et al 2018). The programme's key aim is to enable the participants, post-registered health and social care staff, to support and lead change in the workplace, so they can improve the experience, care, treatment and outcomes for people with dementia, their families and carers in and at the interface of general hospitals. The programme has used repeated standardised tools to measure attitudes to, knowledge of dementia, and a self-efficacy scale related to the learning outcomes of the programme.

Since 2015 (cohort six) the 16 item Knowledge in Dementia (KIDE) Scale has been used to measure knowledge gained; selected as suitable because it had been tested on a similar population and was reported to have good face validity and internal consistency reliability (Elvish et al. 2014). However, over subsequent cohorts, we observed that participants had higher baseline scores and therefore smaller effect sizes post-intervention due to the observed ceiling effects; a finding that is supported by other studies where the KIDE has been administered in groups of trained healthcare staff (Lorio et al. 2017). This observation led us to question the appropriateness and sensitivity of the KIDE to measure increases in dementia knowledge in our target population as an outcome of this educational intervention (Jack-Waugh et al. 2018). As such, a second dementia knowledge instrument was introduced in an attempt to address the high baseline scores that lead to the ceiling effects observed with the KIDE.

The Dementia Knowledge Assessment Scale (DKAS) (Annear et al. 2015; 2017) was developed and validated for healthcare staff and students. Confirmatory factor analysis of the 25-item scale supported four domains of dementia knowledge (causes and characteristics, communication and engagement, care needs, risks and health promotion) for which adequate subscale internal consistency reliability was reported ($\alpha \geq .65$; subscales) (Annear et al. 2017). To date, the DKAS has been subject to more rigorous

psychometric testing and evaluation than the KIDE. In a comparative validation study (Annear et al. 2016) between the DKAS and the Alzheimer's Disease Knowledge Scale (ADKS) (Carpenter et al. 2009), the DKAS was found to be stronger with regards to parameters of response, lack of ceiling effects, and ability to discriminate between pre and post educational intervention scores. In 2017, the 25 item DKAS was tested amongst 3649 volunteer respondents who were completing a Dementia Massive Open Online Course (MOOC). The findings suggested that the DKAS was a reliable and valid measure of dementia knowledge and importantly was sensitive to differing baseline levels of knowledge, therefore able to facilitate changes in knowledge levels after educational interventions (Annear et al. 2017). The aim was to test the sensitivity of these two dementia knowledge instruments, namely the KIDE (Elvish et al. 2014) and the Dementia Knowledge Assessment Scale (DKAS) (Annear et al. 2015).

METHODS

In an attempt to address ceiling effects and lack of sensitivity to knowledge change identified in previous Dementia Champions evaluations, we administered both the 25 item DKAS and the 16-item KIDE to participants of Cohort 10 pre and post-delivery of Scotland's National Dementia Champions programme between April 2019 and March 2020.

Recruitment: Before the first day of teaching, all participants were invited to participate in the study. Their pre-programme pack included a consent form, participant information sheet and baseline questionnaires. The research team was available to answer questions about the research before the first day of teaching by phone or email and in-person during the first day. Participation was entirely voluntary, to not exert any undue pressure, participants were encouraged to handback the consent forms and questionnaires, whether completed or not. This procedure meant those deciding to opt-out were not identifiable at the point of data collection. Ethics approval was granted by [REMOVED].

Sample: Participants were post-registered Health and Social Care professionals working in and at the interface of hospital settings, for example, settings that receive people on discharge such as intermediate care. The majority (70%) were nurses employed by the NHS. The others came from a variety of allied to health disciplines such as Occupation Therapy, Physiotherapy, Podiatry and social care professions such as social workers who worked in hospitals. Ninety percent of each cohort was female. Data on age was not collected.

Analysis: All analyses were performed using SPSS v25. Raw data for each participant were matched based on the postcode identifiers on the pre and post questionnaires. Score frequency distributions were examined to evaluate potential ceiling effects in the KIDE and DKAS response data at both time points. To determine any statistically significant differences between pre and post educational delivery mean scores, Wilcoxon signed-rank tests were used; this is a non-parametric test suitable for non-normally distributed scores.

RESULTS

At Time 1 (T1) 117 participants out of 120 (97.5%) fully completed both the DKAS and KIDE and at Time 2 (T2) 84 out of 100 (84%) participants did so. Of the possible 16 correct answers to the KIDE, the sample mean was high at both T1: 13.04 (SD 1.73), and T2: 14.92 (SD 1.26). *Table 1* shows the frequency of scores for the KIDE responses pre and post-intervention; none of the participants scored 0-7 out of 16, these rows have been omitted from the table.

INSERT TABLE 1 HERE

Consistent with previous cohorts, ceiling effects were present at T1, with the greatest frequency being a score of 14 out of a possible 16 (38 participants, 32.5% of total). T2 frequencies demonstrate the challenges posed by the ceiling effects clearly, with almost half of respondents achieving the maximum score (37 participants, 44% of total). Further, at T2, the lowest score achieved by participants, 11 out of 16, potentially indicating that more than half of the KIDE items did not provide any information in this sample. This can be seen clearly in *Figure 1*, where the data are not normally distributed, being heavily skewed towards the right-hand side of the graphs; this effect is more extreme at T2.

INSERT FIGURE 1 HERE

Of the possible 25 correct answers to the DKAS, the sample mean was relatively high at T1: 16.95 (SD 2.17) and T2: 20.88 (SD 2.69) though not to the same extreme as the KIDE responses. *Table 2* shows the frequency of scores for the DKAS responses pre and post educational intervention. None of the participants scored 0-9 out of 25, these rows have been omitted from the table.

INSERT TABLE 2 HERE

The DKAS generated a wider response distribution than the KIDE amongst this sample. The extent of ceiling effects noted in the KIDE responses at T1 were not to the same degree in the DKAS results, with the highest sum score being 23 out of a possible 25. This can be seen in *Figure 2* by the more centrally distributed responses at T1, with the peak of the curve positioned only slightly to the right-hand side of the graph. Further, at T2, only 6% of participants scored the highest possible mark on the DKAS, whereas 44% scored full marks on the KIDE. However, it should be noted that, similarly to the KIDE items, a high proportion of the DKAS items were unable to provide any information about our sample, with 9 of the 25 DKAS items being scored correctly by 100% of participants at T1, and 13 items scored 100% at T2.

INSERT FIGURE 2 HERE

The Wilcoxon signed-rank tests revealed that there were statistically significant differences in mean scores at T2 for both the KIDE responses ($z = -7.152$, $p = <0.005$) and the DKAS responses ($z = -7.596$, $p = <0.005$), though the effect size was larger in the DKAS responses. These results indicate that participants had significantly increased dementia-related knowledge on completion of the Dementia Champions programme (post educational intervention).

DISCUSSION

Over successive cohorts of the Dementia Champions programme the KIDE increasingly showed ceiling effects, which limited the effective measurement range of knowledge gained in this sample. It could be argued this was in part due to a step-up in baseline knowledge amongst this population since the

development of the KIDE in 2014. To address this, we additionally included the DKAS to compare instrument performance. Results from this sample showed that ceiling effects were still predominant with the KIDE both pre and post educational intervention. The DKAS showed no ceiling effects pre-intervention, and participant knowledge levels showed a significant increase post-intervention. However, post-intervention, there was some evidence of moving towards ceiling effects in the DKAS. Nevertheless, the DKAS indicated that participants had significantly increased dementia-related knowledge on completion of the Dementia Champions programme. As such, results from this study suggest that the DKAS is a stronger and more appropriate dementia knowledge instrument than the KIDE for populations of trained health and social care staff. Future research could test the KIDE and the DKAS in populations with less expected/anticipated knowledge for educators to ascertain the most appropriate target range for these instruments. There is also scope for new sets of dementia knowledge items to be developed and tested for professional health, and social care staff populations. Another area for future research is building on the recent study that set out to assess the impact of training on the care outcomes of people living with dementia in hospital (Allegri et al. 2021). Their findings demonstrated that the intervention group (those who were cared for by staff who have received dementia training) had a shorter hospital length of stay and higher retained functional status at discharge compared to the control group (Allegri et al. 2021). In addition to examining the educational intervention effect in a larger sample for longer, it would also be interesting to explore whether dementia education had any positive effects on families' care experiences.

CONCLUSION

Our findings suggest that the DKAS appears to be a more suitably targeted instrument for measuring dementia knowledge in post-registered health and social care staff. The results of testing the sensitivity of two dementia knowledge instruments may help educators and researchers select the most appropriate and reliable instrument for measuring knowledge gain as a result of an educational intervention.

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