Do interventions with staff in long-term residential facilities improve quality of care or quality for life people with dementia? A systematic review of the evidence.

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Abstract

Common sense suggests and research indicates relationships between staff factors in residential dementia care and quality of life for residents, with poor care increasing suffering. However, we do not have a coherent picture of which staff interventions have an impact on quality of care (QOC) or resident quality of life (QOL). A comprehensive search of 20 years' peer-reviewed literature using Medline, PsycINFO, Embase, PubMed, CINAHL and the Cochrane, Campbell Collaboration identified 4,760 studies meriting full text review. Forty-six met the inclusion criteria, namely interventions in long term facilities helping staff develop their capacity to provide better care and/or QOL for residents with dementia. Thirty-five other papers comprised an associated predictor review. Conclusions from these limited data are further compromised because nine studies failed to measure effects on residents and only half assessed effects after the project team withdrew. Of these, excellent studies produced change over the medium (3-4 months) or longer term, including reduction in challenging behaviour and restraint use but this applied only to a minority. A number of studies failed to measure effects on QOC, limiting conclusions about mechanisms underlying change. In general, level of intervention required depended on the target. For outcomes like restraint use, structured education sessions with some support appear adequate. Programs to reduce pain require more support. For complicated issues like challenging behaviour and increasing co-operation in showering, detailed, supportive, on-site interventions are required. Improvements in restraint and staff/resident interactions were the most promising findings. (Review registration number: PROSPERO 2014:CRD42014015224).

Introduction

When families can no longer cope, many people with dementia spend the end of their lives in long-term residential care facilities, which range in quality from simply excellent to 'execrable' (Rosewarne *et al.*, 1997). Most will be at a stage of impairment where it is difficult or impossible to understand what is happening and why, instead of family or friends, they are dependent on care staff. The staff, themselves always extremely rushed, will be of varying quality, often poorly paid and supported, accorded low status and sometimes minimally trained (Beck *et al.*, 1999; Daly and Szebehely, 2012; Edberg *et al.*, 2008). Despite this, for good or ill, care staff can be the most important part of the resident's social world, with interactions ranging from a brief smile or sharp reprimand to supporting or forcing intimate personal care. It is a symbiotic relationship in what can be highly emotional as well as physical and technical work. What staff feel and do and the way they do it affects residents' emotional response and behaviour, and what residents do and feel affects staff well-being and behaviour (Berg *et al.*, 1998; Daly and Szebehely, 2012; Holst *et al.*, 1999; Wells *et al.*, 2000). This systematic review aims to shed light on interventions into the first part of this dynamic relationship, using data published in peer-reviewed English language journals over the last 20 years.

That is, we examine the effect of interventions at staff level on two possible outcomes: (i) quality of care and (ii) consequent effects on resident quality of life, broadly defined across a range of outcome variables (see Figure 1). The ideal is studies which show the effect on both outcomes but eligible papers must link the intervention with at least one of them. Thus, papers which examine effects only on staff, for example an intervention to change

attitude which only has internal staff outcome measures are ineligible. We are interested solely in interventions whereby direct care staff are educated, emotionally supported or otherwise targeted with the explicit aim of improving and maintaining quality of care and/or physical and emotional quality of life for the resident with dementia, and where at least one of these outcomes is adequately measured. It is not enough to know that it has an effect on staff. Instead of the common assumption that, for example, changed staff attitude will automatically lead to better care or quality of life, there has to be credible evidence of change at care or resident level.

Figure 1. Relationships between Variables

The focus therefore is on interventions explicitly aimed at providing care staff with sufficient tools to deliver the intervention during the measurement period, and then maintain improvements after the project team withdraws. We particularly need to know what is possible in the many facilities where existing hands-on staff are the only available resource for change.

Definitions: staff variables, quality of care, quality of life

We are solely interested in staff factors that are genuinely variable: that is, potentially capable of change following interventions at the individual or collective staff level. Variables such as staff age or gender are irrelevant because they cannot be changed. Interventions trying to improve variables like level of skill or knowledge are much more salient. We also look at potentially adjustable within-facility staff variables, such as level of support, the way shifts are organised, but not at facility-level variables such as type of unit (e.g. Special Care Unit (SCU) versus nursing home, private versus for profit), which is not an accurate enough variable and is already heavily reviewed with equivocal results (e.g. Chappell and Reid, 2000).

We are then interested in what happens after an intervention – at a minimum whether anything changes in what staff actually do - quality of care. Some studies treat quality of care as a black box, an intervention is delivered and results on residents assessed, but we believe it is important to assess the mediating factors in order to more accurately target interventions. We define quality of care as anything which is done to or with the resident, such as the way showering is carried out, how staff communicate with residents, use of psychotropic medication, how much time residents spend alone. Variables such as pain or aggression or pressure sores are often used as quality of care measures in the literature, but they are only proxies for presumed poor care (Beerens *et al.*, 2014). Without true quality of care measures, for example frequency of pain assessment or level of staff skill in bathing, it is merely an assumption that they reflect poor care. We regard these commonly used proxies as quality of life variables, representing the resident's state. We define quality of life much more broadly than a score on a quality of life scale. We do include studies with such

scales as an outcome but pay equal weight to specific medical/physical and psychosocial conditions that affect or reflect the residents' state: for example, pain, depression, social engagement, malnutrition, and challenging behaviour.

We accept evidence of changed quality of care as a minimum clinical target in its own right but are chiefly interested in studies which also examine whether quality of life of residents also improves. If only quality of care is measured, we do not know whether life improves for the resident – presumably the ultimate goal of the exercise. If only quality of life is measured after an intervention we do not know what staff are doing differently to produce improvement. For all of these variables we require validated or clearly objective measures.

Summary of aims

In summary, our aim was to answer a basic question. Which interventions aimed at residential care staff experience, practice, belief, or deployment improve the way care is carried out and, as a consequence, improve the lives of the people with dementia in their care over a sustained period?

Method

Ethical considerations

Since this review only encompasses readily available literature, the Human Research Ethics Committee at the Australian National University advised that ethical approval was not required.

We acknowledge that the terms used in this review, such as challenging behaviour, are limited by the articles we have included and what has been published historically.

Search Strategy

We searched 6 on-line databases: MEDLINE, EMBASE, PsycINFO, Cochrane Campbell Collaboration, PubMed, and the Cumulative Index to Nursing and Allied Health Literature (CINAHL). Search terms were developed by two of the authors (MB & KA) and added to by referring to the MESH thesaurus, Emtree thesaurus and the Thesaurus of Psychological Index Terms. Prior to the initial search, the list of search terms were reviewed by the project consultative committee, comprising a consumer representative, industry representatives and an expert in workforce and management change. Further adjustments to the search terms were made when indicated from initial searches and readings. To identify any potentially overlooked publications, the reference lists from retrieved publications were also manually searched and a second search was conducted in April 2015 to identify new publications. The overall search strategy used was: Dementia AND Setting AND Intervention

but see Table 1 for detail under each heading. We also used truncation (for example, cogniti$ to cover terms like cognition and cognitive) and used proximity operators, to find terms that were adjacent or near each other (for example, memory adj2 (imp$ or declin$ or deterior$ or deficit$ or degenerat$ or los$ or disturb$ or complain$). To ensure coverage of the variables, all outcomes of interest were included in this review, irrespective of whether or not the authors of the included studies regarded the outcomes as primary or secondary. The review protocol was registered with PROSPERO prior to data extraction (Anderson, Bird, MacPherson and Blair, 2014).

We used only the existing peer reviewed literature for our review. We did not canvass work in progress, nor contact authors for more detail. We relied solely on the data available to everybody and published from Jan 1995 to February 2015.

Inclusion Criteria

Only studies involving long term residential aged care for people with dementia were included and we were only interested in clinical interventions with care staff aimed at developing their capacity to provide better care and/or quality of life for residents.

Participants: Residents, facilities, and staff

We decided to accept papers where at least 80% rather than 100% of the sample had dementia because of a preponderance of mixed sample studies. The 80% was chosen for pragmatic reasons because it ensures that more than three quarters of the population in

mixed studies had dementia. Studies had to take place in long-term residential care, defined as any facility where people with dementia are cared for on a permanent basis and could include traditional nursing homes, special care units/dementia specific units, integrated units, or group homes. Day-care, acute care and similar were excluded. Home type was not a variable of interest but we do show the type of facilities involved in Appendix B. Staff could be any worker directly involved in the care of residents, ranging from nursing aides to senior Registered Nurses (RNs). Allied staff such as activity workers were included if involved in daily care.

We firstly searched for randomised controlled clinical trials (RCTs), including both randomised cross-over trials and cluster randomised trials. Given the paucity of properly conducted RCTs in this area, we broadened our search to quasi-randomised controlled trials, controlled before and after studies, interrupted time series, and before and after studies. We excluded qualitative only studies, individual case studies or those with a sample size of less than 25.

Screening the Studies

All titles and abstracts (n=33,204) initially identified were independently screened by two of the authors (KA & SM) for obviously off-topic articles. For the 4,760 potentially relevant abstracts, the full articles were examined by MB and KA against the inclusion criteria and nearly 4700 more excluded. The final number was 81 papers, 46 in this review, and 35 presented in an associated publication seeking to determine from cross-sectional or longitudinal prospective studies which staff variables are commonly associated with or

predictive of quality of care/ resident quality of life (Anderson *et al.*, 2016). See Figure 2 for this process. Table 2 shows the reasons for exclusion. Apart from general articles, opinion pieces, editorials and similar, the most common reasons for exclusion were: existing reviews (these were also scoured for potential references); only one part of the model in Figure 1 was present; interventions delivered primarily by outsiders rather than training staff to do them; and not being primarily about dementia (less than 80% of the sample) or long-term residential care.

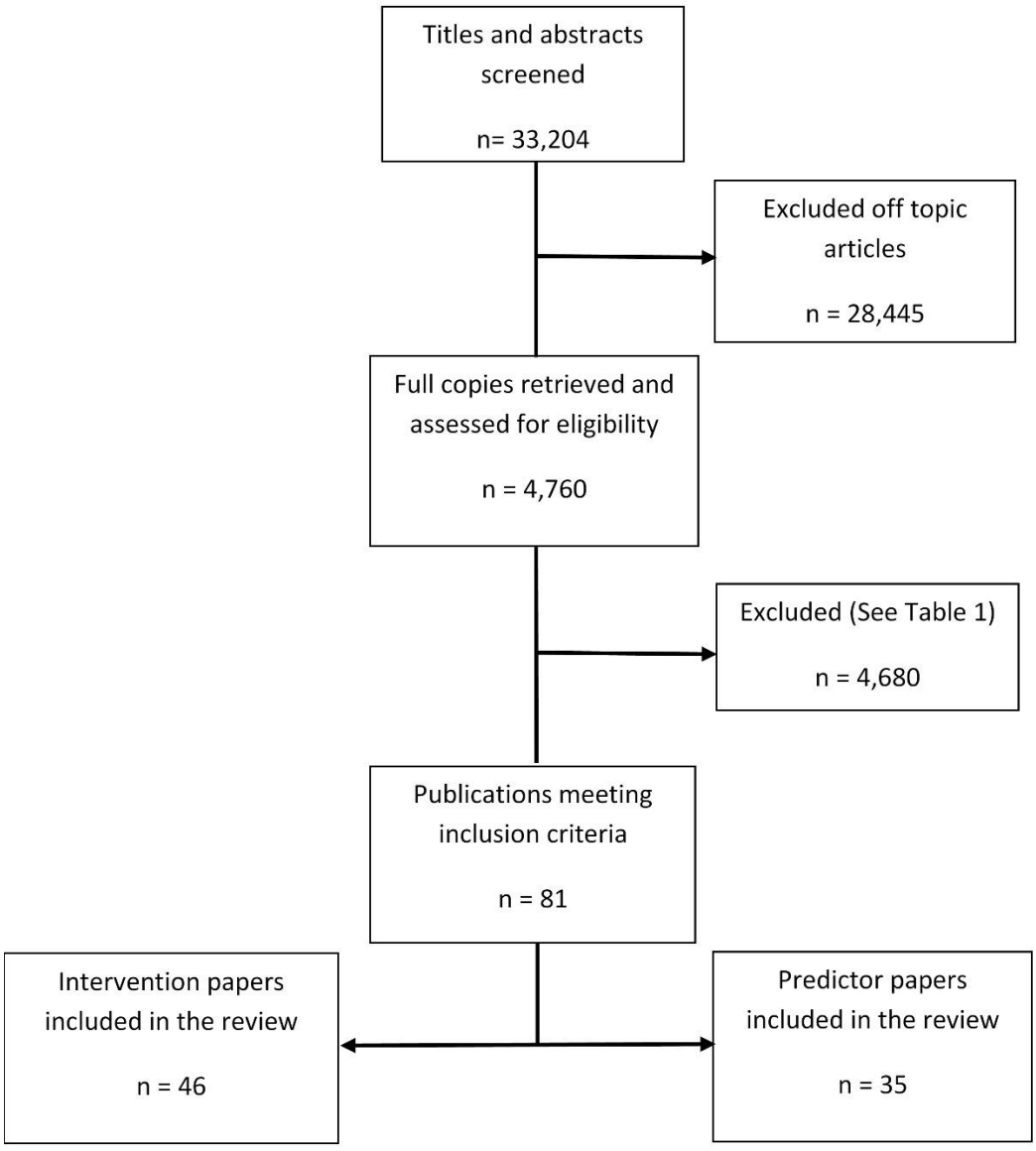

Figure 2. Flow chart of study selection process

Risk of Bias and Quality appraisal

Risk of bias was independently assessed by MB and KA with any discrepancies resolved by SM. We used the Cochrane criteria for RCTs and also for non-randomised studies (Higgins and Green, 2011). There is increasing sophistication in minimising bias in intervention trials with this population (Woods and Russell, 2014) but there remain criteria which are irrelevant to psychosocial trials with this population. For example, it is impossible for a clinician delivering a complex psychosocial intervention not to know what it is. It is not a pill. Accordingly, we grade bias realistically. We also look at quality of methodology and analysis, in particular methods used where there is, inevitably, high attrition at follow up because of the fragile nature of this population. Of particular note is that we include studies which are less than methodologically pure. This is partly because of the difficulties of research with this population but also to provide a broader clinical overview for clinicians seeking guidance on the scope of interventions with RACF staff caring for people with dementia.

Data Collection and Synthesis

Extracted data was entered into Eppi-Reviewer 4 by KA or MB, with the other author validating the entries of the first by: independently evaluating the articles; checking for errors, omissions or inconsistencies; and, highlighting required changes for discussion and referral to a third author if necessary. SM carried out a further accuracy check. The Eppi-Reviewer 4 file was developed, modified and piloted based on the Cochrane Consumers and Communication Review Group Data Extraction (2013). Data entered included: reference details, publication type, population description, setting, method of recruitment, study

aims, design, group allocation process, start and end date, study duration, risk of bias, randomisation, withdrawal/exclusions, clusters, baseline imbalances, age, sex, race/ethnicity, severity of dementia, co-morbidities, other treatments, outcomes including name, time points, definition, completing person, unit of measurement, scales, whether a valid and reliable tool was used, handling of missing data, power, results (including comparisons, results, effect sizes and confidence).

Notes on statistical analysis

The core components of the intervention(s) in the 44 included studies (46 articles) were broadly categorised into six levels of education, reflecting the amount of effort expended to try and make a change at the clinical coalface. These were: 1. Didactic education only (n=4); 2. Didactic plus experiential education such as discussing typical case examples (n=13); 3. Education with ongoing group or individual supervision sessions (n=9); 4. Education with a concerted effort to embed the intervention within the facility, such as through a change champion/mentor on-site (n=8); 5. A change in practice (e.g. instituting a new protocol) (n=2); 6. All components (n=9). These groupings were used in the meta-analyses below, though the number of meta-analyses was significantly restricted by inconsistencies in measurement methods, time points and intervention types. See Table 3 for the education code for each study.

To summarise the effect of interventions using the same measure ('d' values with d small ≥ .20, medium ≥ .50, large ≥ .80) for each study, effect sizes for meta-analyses were calculated post-test between the intervention and control groups where available along with the

associated standard measure. This is consistent with previous recommendations (Higgins and Green, 2011), using the assumption that no differences between the groups existed at baseline. To test this assumption, where a meta-analysis is used, baseline effect sizes between the intervention and control groups are also reported. Positive values indicate higher scores for the intervention group compared with the control, regardless of the type of outcome. In summary, positive values demonstrate improvements in areas like staff knowledge, but negative values would show improvements in areas like challenging behaviours or falls. We have not reported 'd' values for studies where there were no effects; though, where a meta-analysis is used, results without statistical significance were included. In reporting effects we have used acronyms for standard measures such as CMAI (Cohen Mansfield Agitation Inventory). The full name of each measure and citation appear at the end of Appendix B.

Detailed summaries for each study appear in Appendix B. A précis of this information comprises Table 3, which includes: a sketch of the intervention; effects on quality of care and/or staff if measured; outcome for the resident, if measured; quality of the study; and, intervention code representing the intensity of the intervention. Quality is indicated by the sign system whereby ++ shows high quality, + acceptable, and 0 unacceptable (Critical appraisal: Notes and checklists, 2015). Appendix A shows the criteria for each study which facilitated these broad measures of quality.

Results

Concordance with Figure 1

A small majority of included studies do have all basic components of the model in Figure 1. That is: interventions delivered direct to staff to change how they think or act; the measurable effects of this on quality of care; and, the measurable onward effects on resident quality of life – broadly defined. Table 3 however shows that nine studies have no measure of whether staff interventions have any effect on the residents, and consist solely of measures of quality of care after the intervention. An equal number of studies take the black box approach and have no measures of what changes have occurred at the care level in order to achieve the outcome for residents. A third of all studies have no measure of whether individual within-staff variables such as job satisfaction or knowledge have changed as a result of the intervention.

Main statistical findings

Resident Quality of Life Outcomes

i) Quality of life scales

Of the 12 studies in Table 3 that used dementia-specific QOL scales (Beer *et al.,* 2011; Chang and Lin, 2005; Charras and Gzil, 2013; Chenoweth *et al*., 2009; Chenoweth *et al*., 2014; Clare *et al*., 2013; Fossey *et al*., 2006; Goyder *et al*., 2012; McCallion *et al*., 1999; van de Ven *et al*.,

2013; Visser *et al.*, 2008; Wenborn *et al.*, 2013, only three found significant effects. Charras and Gzil (2013) demonstrated significant improvements in QOL scale scores after the simple intervention of staff wearing street clothes rather than uniforms during care (d=.870). In Clare *et al.* (2013), where staff learned to recognise awareness in residents, quality of life score was only a significant outcome when assessed by family but not staff (Staff: baseline d=.114, follow-up d=-.211; Family: baseline d=.018, follow-up d=.482). In a multi-facetted program by Wenborn *et al.* (2013), QOL scale scores were actually worse at 12-weeks post-program in the intervention compared with controls (d=-.552).

The only meta-analysis possible for QOL scales was at three to four months follow-up for education with an experiential component, with an overall *g* of .383 (CI -.421, 1.190: Q=85: p=0.001: I-squared=96.5%: tau-squared=.647: Baseline *g*=-.001). The results are far too inconsistent to draw any conclusions (See Figure 3). Thus, no conclusions can be drawn from QOL scales. All had used dementia-specific versions.

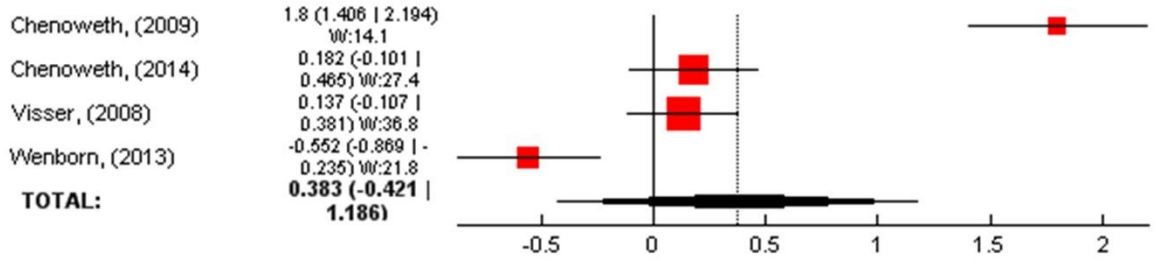

Figure 3. Forest plot for QOL scales at three to four months follow-up for education with an experiential component

ii) Challenging behaviour

Over half the studies in Table 3 examined challenging behaviour as an outcome (Beer *et al.*, 2011; Burack *et al.*, 2012; Chenoweth *et al.*, 2009; Davison *et al.*, 2007; Deudon *et al.*, 2009; Finnema *et al.*, 2005; Fossey *et al.*, 2006; Goyder *et al.*, 2012; Gozalo *et al.*, 2014; Jeon *et al.*, 2013; Kovach *et al.*, 1999; Kovach *et al*., 2006; Leone *et al.*, 2013; Magai *et al.*, 2002; Matthews, Farrell & Blackmore, 1996; McCallion *et al.*, 1999; Robison *et al.*, 2007; Schrijnemaekers *et al.*, 2002; Sidani *et al*., 2012; Sloane *et al.*, 2004; Testad *et al.*, 2010; van de Ven *et al*., 2013; Visser *et al*., 2008; Wells *et al*., 2000; Wenborn *et al*., 2013) but less than 40% produced significant change. However, those that did find effects, many of high quality, showed improvements sustained to medium-term follow-up (3-6 months) and in one case to two year follow-up. Effect sizes were low to medium, as follows:

Burack et al. (2012). CMAI Physical aggression baseline to 24 months d=.467, CMAI physical agitation to 24 months d=.506, verbal agitation to 24 months d=.382.

Chenoweth et al. (2009). CMAI agitation after PCC training or DCM training: PCC: Baseline d=-.344, post-training d=-2.058, 4 months d=-2.519; DCM: Baseline d=-.633, post-training d=-2.023, 4 months d=-2.114.

Deudon et al. (2009). CMAI agitation baseline d=.283, 3 months d=.032 (see meta-analysis for immediate post effect size), overall CMAI change for intervention d=.539.

Goyder et al. (2012). Baseline to 8 weeks follow-up disruptive behaviour d=.734.

Gozalo et al. (2014) (Cross-over study). Aggression/agitation in bathing: Wave 1 baseline to 4-6 months d=-.102; Wave 2 baseline to 4-6 months d=-.157.

McCallion et al. (1999). CMAI agitation baseline d=.220, 3 months d=-.236, 6 months d=.026.

Robison et al. (2007). Insufficient information to calculate effect sizes.

Testad et al. (2010). Baseline differences in CMAI were extensive (p=.002), suggesting that they were clinically different samples so comparisons would be misleading.

Wells et al., (2000). Agitation measured on PAS: baseline d=.169, 3 month d=.300, 6 months d=-.503

Because of different measures, time frames, or intervention types, only two meta-analyses were possible for challenging behaviour. As shown in Figure 4, education plus supervision does appear to have a small to medium bearing on reducing challenging behaviours immediately following the intervention (*g*=-.239, CI -.492, .015: Q=8.3, p=.081: I-squared=51.8%: tau-squared=.042: Baseline *g*=-.054).

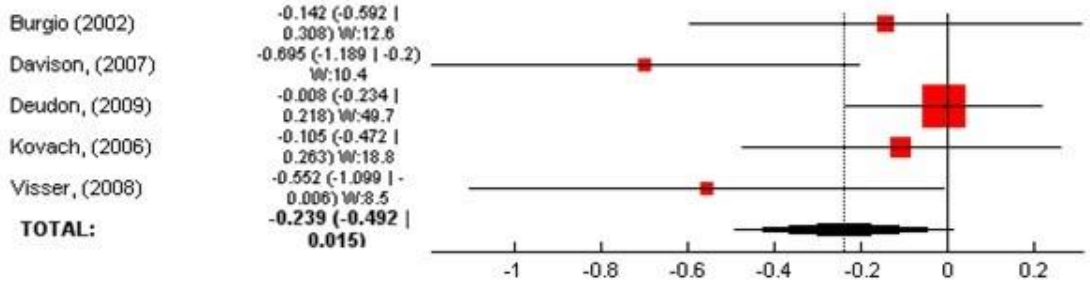

Figure 4. Forest plot for challenging behaviours immediately following education and supervision

There is a different picture at medium term follow-up. Interventions do not appear to produce sustained change, as shown in Figure 5. Meta-analysis for approximately three to four months follow-up for didactic plus experiential education showed no effect (*g*=-.020, CI -.182, .142: Q=5.54, p=.236: I-squared=27.8%: tau-squared=.009: Baseline *g*=.044). No analysis of longer-term effects was possible for this or any other level of intervention.

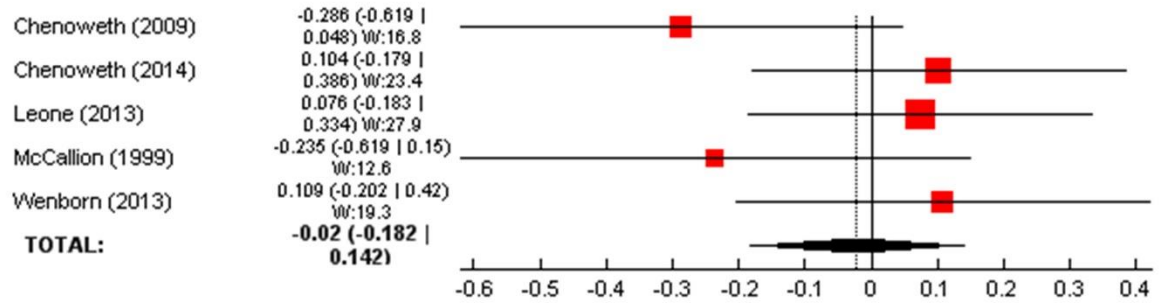

Figure 5. Forest plot for challenging behaviours three to four months after didactic plus experiential interventions

iii) Pain/physical discomfort, painful skin condition

All five intervention studies with pain as an outcome found significant reductions in resident pain/discomfort in the short-term but none assessed clinically significant follow-up. Effect sizes were as follows:

Beer et al., (2011). Brief Pain Inventory: 4 weeks d=.309, 6 months d=.377

Fuchs-Lacelle et al. (2008). PACSLAC d=-.020

Kovach et al. (1999). Pre-post discomfort behaviours d=-.910

Kovach et al. (2006). Discomfort: Baseline d=.048, 2 weeks d=-.318, 4 weeks d=-.784

Sloane et al. (2004). Discomfort: baseline d=-.025, directly after control vs shower d=-.783, directly after control vs bath d=-1.184

These studies fell broadly into two categories: those with staff education and supervision meetings (Fuchs-Lacelle *et al.*, 2008; Kovach *et al.*, 2006) and those that made a more concerted effort to embed the change through on-site change champions or mentoring

(Beer *et al.*, 2011; Kovach *et al.*, 1999). The recurring problem of different intervention types and measurement already described made meta-analysis impossible. Consistency of results is encouraging but, without finding whether effects are maintained, is of limited clinical value until investigators start assessing longer term follow-up.

iv) Mood/Affect (including Apathy)

Mood/affect featured as a quality of life outcome in 11 studies in Table 3 (Chenoweth *et al*., 2014; Finnema *et al*., 2005; Fritsch *et al*., 2009; Goyder *et al*., 2012; Huizing *et al*., 2006; Jeon *et al*., 2013; Leone *et al*., 2013; Magai *et al*., 2002; McCallion *et al*., 1999; Verkaik *et al*., 2011; Wenborn *et al*., 2013) but results were weak or mixed. Changes were mainly seen for interventions where depression was the primary focus (Leone *et al.*, 2013; Verkaik *et al.*, 2011), rather than as one of many outcomes measured. However, results differed even within studies. A typical example of mixed results is the Verkaik study. Improvements were seen on one measure of depression with good effect sizes (MDS/RAI-DRS: baseline d=1.727, 2-weeks d=-1.62, 10-12 weeks d=-.591) but no effects on the Cornell or FACE.

Random effects meta-analyses on those studies that implemented both didactic and experiential education demonstrated, at 3 to 4 weeks follow-up, a summary *g* of .344 (CI -.205, .893). However, the large variability pervasive through the mood/depression results was again seen here in Figure 6, making it difficult to form any overall conclusions from the meta-analysis (Q=14.3, p=0.001: I-squared=86%: tau-squared=.199: baseline *g*=.43).

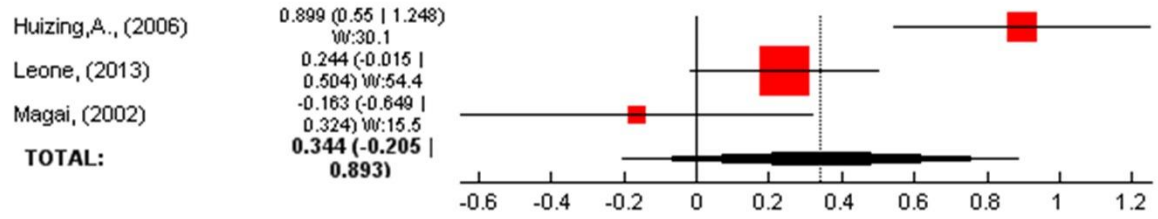

Figure 6. Forest plot for mood/affect at 3 to 4 months after didactic and experiential education

The variability continued at approximately 12 weeks follow-up for didactic plus experiential interventions. One of the studies found no effect (Jeon *et al.*, 2013; Leone *et al.*, 2013) but the other (McCallion *et al.*, 1999) actually showed higher levels of depression in the intervention group compared to controls, though the intervention group did have higher levels of depression at baseline (d=.761).

In summary, no conclusions can be drawn from interventions with staff aimed at improving resident mood.

v) Falls

Two studies found significant reductions in falls following an intervention: one from a simple education program (Baseline falls=.375; Post-intervention d=-.376, Bouwen *et al.*, 2008) and the other from the already cited study by Chenoweth *et al.* (2009), which assessed multiple other outcomes following in-depth training in DCM or PCC. They found fewer falls immediately post-intervention following DCM training but more falls with PCC (PCC d=.263;

DCM -.098) and this pattern was maintained at four month follow-up (PCC d=.104; DCM -.289; baseline PCC d=.603; baseline DCM d=.469).

Two studies looking at whether restraint reduction impacts on falls found no significant effects on falls or fall-related injuries (Gulpers *et al.*, 2011; Pellfolk *et al.*, 2010) but this is a finding in itself given that restraint use did go down. There was no significant effect on falls for one of the most comprehensive multi-targeted, case-specific interventions (Fossey *et al.*, 2006) and it may be that programs directly targeting falls are more effective. However the usual inconsistencies in reporting periods precludes the use of meta-analysis.

Quality of Care Outcomes

i) Quality of care scales

Three studies used quality of care instruments as outcome measures (Clare *et al.*, 2013; Davison *et al.*, 2007; Smith *et al.*, 2005). All aimed to improve care with clinically relevant programs but only Smith had a significant effect (inconsistent reporting makes it impossible to report accurate effect sizes), and this study was methodologically poor and had no long-term follow-up.

ii) Restraint

The most encouraging finding was that relatively straightforward interventions can impact on restraint use. Of the eight studies in Table 3 measuring restraint as an outcome (Beer *et*

al., 2011; Chenoweth *et al*., 2009; Gulpers *et al*., 2011; Gulpers *et al*., 2013; Huizing *et al*., 2006; McCallion *et al*., 1999; Pellfolk *et al*., 2010; Testad *et al*., 2010), five reported reductions sustained over longer term follow-up:

Gulpers et al. (2011). Belt restraint over time d=-.405; Physical restraint: baseline d=-.097, 4 months d=-.227, 8 months d=-.354.

Gulpers et al. (2013). Belt restraint over time d=-.579; Physical restraint: baseline d=-.276, 24 months d=-.381.

Huizing et al. (2006). Post restraint use controlling for resident characteristics d=-1.129

Pellfolk et al. (2010). Restraint: baseline d=.045, 1 month d=-.493.

Testad et al. (2010). This study was methodologically flawed. Baseline differences in restraint use were marked (p=.000), suggesting that they were clinically different samples so comparisons would be misleading.

Most interventions involved education plus some type of ongoing support or attempt to develop a train-the-trainer model. Gains were largely maintained to the last follow-up (in some cases up to 24 months). The one exception was Testad *et al.* (2010), with reductions present at six months disappearing by 12, coinciding with the end of on-site support. Inconsistencies in reporting periods, in addition to floor effects in restraint use in Chenoweth *et al.* (2009), prevented a meta-analysis.

iii) Staff resident interactions including morning/intimate personal care

Another encouraging finding is from interventions attempting to improve intimate care interactions, most involving direct hands-on training in the skills required, and assessment

using direct observation of what staff actually do. All thirteen of the studies that examined interactions between staff and residents in personal care showed significant improvements. There were in general large effect sizes.

Boettcher et al. (2004). Pre-post BARS: nonverbal d=2.20, assistance with tasks d=2.11, conversation d=2.09, unique details d=1.75.

Bourgeois et al. (2004).

Announce care: baseline d=-6.295, 4 weeks d=52.960, 3-months d=40.853;

Address resident by name: baseline d=-15.512, 4 weeks d=39.222, 3-months d=8.024;

Wait 5-sec. before helping: baseline d=-4.511, 4 weeks d=76.409, 3-months d=121.208;

Introduce self by name: baseline d=15.803, 4 weeks d=152.612, 3-months d=25.821;

Announce every ADL: baseline d=-8.483, 4 weeks d=96.518, 3-months d=43.966;

Short and clear instructions: baseline d=-.076, 4 weeks d=.905, 3-months d=.698;

Positive feedback: baseline d=-.098, 4 weeks d=1.217, 3-months d=.597;

Talk about resident's life: baseline d=-.197, 4 weeks d=.339, 3-months d=.106;

Multi-step instructions: baseline d=.266, 4 weeks d=.109, 3-months d=.514;

Unhelpful statements: baseline d=.110, 4 weeks d=-.507, 3-months d=-.466.

Chang et al. (2005; 2006). Post-intervention behaviour in feeding d=2.183.

Chenoweth et al. (2014). Care interaction quality: baseline d=0, 4 months d=.188, 8 months d=-.406.

Dijkstra et al. (2002).

Staff: baseline to post intervention

Utterances d=-.266 d=.150; Questions d=-.010 - d=-.232; Prompts d=0 - d=-.217;

Overall facilitators d=-.285 - d=.455; Repetitions d=.264 - d=-.149; Encouragements d=-.382 - d=.349.

Residents: baseline – post intervention

Utterances d=-.269 - d=.151; Words d=-.047 - d=.258; Unique words d=.033 - d=.583; Information units d=-.377 - d=.251; Global coherence d=-.351 - d=.222; Local coherence d=-.305 - d=.386; Empty phrases d=.088 - d=-.126; Repetitions d=-.348 - d=.314; Indefinite words d=.574 - d=-.174

Fritsch et al. (2009). Resident engagement d=.156.

Hoeffer et al. (2006).

Shower vs Control, Time 1 – Time 2

Gentleness d=1.046 - d=1.576; Verbal support d= 1.146 - d=.853; Confidence d=.303 - d=.638; Ease d=.686 - d=.066; Hassles d=-.534 - d=-.316

Towel bath vs Control Time 1 – Time 2

Gentleness d=1.315 - d=.915; Verbal support d=.698 - d= .596; Confidence d= .224 - d= .436; Ease d= .292 - d=.436; hassles d=.182 - d=-.501

Sidani et al. (2009). Unable to calculate d.

Sidani et al. (2012). Pre-post: introduction to resident d=.14, conversation with resident d=.15, caregiver approach d=.50, orientation to resident d=.37, use of tool d=.41, bathing, dressing grooming d=.44.

Sloane et al. (2004). Duration of bath: shower d=.544, towel bath d=.361

Three studies showed the maintenance of improvements over six months or more:

Burgio et al. (2002). Positive statements: baseline d=-.125, post-intervention d=.138. Verbal prompts: baseline d=.072, post-intervention d=0.325; Physical assistance: baseline d=.046, post-intervention d=.241.

van der Kooij et al. (2013). Baseline to 7 months emotion-oriented interaction techniques d=.8.

Wells et al., (2000).

Relevance: baseline d=.203, 3 months d=.980, 6 months d=.891;

Personal attending: baseline d=.204, 3 months d=.728, 6 months d=.851;

Relaxed: baseline d=.447, 3 months d=1.003, 6 months d=1.163;

Social/flexible: baseline d=.168, 3 months d=1.143, 6 months d=1.081;

Ease of caregiving: baseline d=.173, 3 months d=.173, 6 months d=.504;

Stress: baseline d=-.464, 3 months not assessed, 6 months d=-.370

It will be seen that three studies assessed follow-up and that effects were maintained (Burgio *et al*., 2002; van der Kooij *et al*., 2013; Wells *et al*., 2000). All were of high quality, two of which (Burgio *et al.*, 2002; van der Kooij *et al.*, 2013) went to considerable lengths to embed the intervention within the facility. Given the varying intervention types, along with different follow-up periods, meta-analysis was not suitable.

iv) Psychotropic Use

Despite being a quality of care outcome in 12 of the studies in Table 3 (Chenoweth *et al.,* 2009; Chenoweth *et al.,* 2014; Deudon *et al.,* 2009; Fossey *et al.,* 2006; Gulpers *et al.,* 2011; Gulpers *et al.,* 2013; Kovach *et al.,* 1999; Leone *et al.,* 2013; McCallion *et al.,* 1999; Pellfolk *et al.,* 2010; Schrijnemaekers *et al.,* 2002; Testad *et al.,* 2010), only two – both of high quality - demonstrated significant long-term reductions in psychotropics. Fossey *et al.,* (2006) found: neuroleptics baseline d=-.061 to 12 month follow-up d=-.490 , other psychotropics baseline d=-.026, , to 12 months d=.134. Gozalo *et al.* (2014) found significant reductions in antipsychotic use to 4 months, but insufficient information was provided for

calculating d values. Both studies could be characterised as teaching and supporting practical approaches to caring for residents with dementia, more broadly in the case-specific approach of Fossey *et al.* (2006) and specifically with bathing in Gozalo *et al.* (2014), though these definitions would also hold for some of the studies that did not see reductions. Discrepancies in the types of interventions, types of psychotropics, timeframes for follow-up, calculations and use of psychotropics in the statistics, precludes the use of meta-analysis.

v) Acute hospital admissions

Curiously, only two studies look at whether the interventions reduced hospital admissions and neither study found a significant result (Chenoweth *et al.*, 2009; Deudon *et al.*, 2009). Both of these interventions were well-conducted, with genuine attempts to embed them within the facilities. A meta-analysis was not possible.

Staff outcomes

i) Staff feelings/attitudes/knowledge

Though changes in staff personal internal states was not a primary variable, we examined them as a possible further mediating factor between intervention and quality of care/resident quality of life. Mixed outcomes meant that these results gave us little of use. Paucity of consistent effect is well illustrated by the four studies that looked at attitude before and after interventions. Clare *et al.* (2013) showed no effects. Beer *et al.* (2011)

reported changes in staff attitudes but no discernible statistical proof. Fritsch *et al.* (tendency to devalue d=-.404, positive views d=.730, 2009) demonstrated more positive staff attitudes, following a 10-week story-telling program and this translated into better quality staff interactions with residents. However this was a poor study methodologically, without means or numbers of residents, and with no follow-up. As further evidence of confusion, improvements in attitudes were seen in Chang *et al.* (d=.473, 2005) but not in a sister paper of the same study (Chang *et al.*, 2006).

Similarly, of the four studies that measured improved staff knowledge post-intervention, McCallion *et al.* (1999) and Bourgeous *et al.* (2004) showed no effects. Following their feeding intervention Chang *et al.* (2005; 2006) found large effect sizes for improved knowledge (post-training d=1.87, 4 weeks post-training=2.172) and this translated into improved techniques such as taking more time with feeding, or washing hands before feeding, though it had no measureable effect on food intake. The study by van der Kooij *et al.* (2013) showed long-term improvement in knowledge about communication (baseline to 7 months knowledge of residents d=.7) and this translated into more sensitive and skilled communication with residents. There was no effort to determine whether it had any effect on residents.

Summary of analysis

Interventions examining physical restraint, pain/discomfort, and staff interactions with residents in personal care were generally effective. A higher proportion of restraint studies had longer-term follow-up but all the staff interaction studies which provided

follow up also produced maintained improvement. No pain study had follow-up. Falls studies had equivocal results. Few studies showed reductions in psychotropic medication. A majority of interventions with challenging behaviour produced no effects on behaviour but a significant minority did, including a few with maintained effects. Interventions for mood had widely divergent results so their effectiveness is doubtful. Dementia-specific quality of life scales were ineffective as outcome measures; measures of specific physical or psychosocial states were more useful. Many studies had generic but high quality education with multiple outcomes assessed but more direct interventions tended to be more effective, especially restraint and care interactions. A disappointing proportion of otherwise excellent studies failed to measure whether results were maintained and of those that did, overall results show that results were not usually maintained (again with the exception of restraint and intimate personal care). Interventions where within-staff personal variables such as attitude were assessed rarely produced significant change for residents.

It is impossible to determine the most effective intervention because, in general, level of intervention tended to depend on the target. For outcomes like restraint use, relatively straight-forward structured education sessions with some additional support appeared adequate. Programs to reduce pain required more support. For complicated issues like challenging behaviour, including reducing aggression and increasing co-operation in showering, detailed, long-term, supportive, on-site interventions are required.

Discussion

We searched the peer reviewed literature from the last 20 years for methodologically and clinically sound studies whereby direct care staff in long-term dementia facilities are educated, emotionally supported or otherwise changed in their own practice, with the aim of improving and maintaining quality of care and thereby physical and emotional well-being for the resident over time. This included some with relatively low numbers and was not confined to RCTs. We defined quality of care as anything done to or with the resident. Commonly used proxies for quality of care (Beerens *et al.*, 2014) such as depression or pain, were treated as aspects of quality of life – something experienced by the resident.

Some major studies used generic named interventions such as Dementia Care Mapping (DCM), Person Centred Care (PCC) but many others were more target-specific. We believe it is the clinical components of all programs which are important. Most interventions were sufficiently well-described to enable replication. Even where there was no long-term follow-up, techniques are described that show how change can be made as long as the intervention lasts. However, only a minimum of several months follow-up enables conclusions about whether changed staff practice can be maintained independently and therefore be worth the cost and effort of the intervention. Unfortunately, many studies had no or minimal (e.g. two weeks) follow-up after the intervention. For the studies which did tackle the attrition problems of longer-term follow-up with this fragile population, some produced lasting effects and in Gulpers *et al.* (2013) they even generalised at two years to staff who had not received the intervention. However, in the majority of these studies, effects did not last.

The focus on interventions explicitly aimed at providing care staff with tools to continue to deliver improved care after the project team withdraws, means we have had to exclude a number of otherwise potentially useful studies. These include, in particular, interventions delivered to residents direct by an external clinical team for BPSD (e.g. Bird *et al.*, 2007; Cohen-Mansfield *et al.*, 2007), even though staff will be providing information and be otherwise involved. Cohen-Mansfield notes that improvements often decline precisely because staff have not received generalisable training and support during an externally delivered intervention. Connell and McConnell (2000) raise concerns about the internal validity of studies where staff rather than researchers deliver interventions but we contend that, to be clinically useful in the longer term, the intervention must be delivered to and through staff. Though there are facilities with on-site specialist medical and allied health as well as senior nursing staff to keep interventions alive - the case in many included studies - we need to know how improvements can be made and maintained in the many facilities (perhaps the majority in some countries) with barely adequate resources and where existing hands-on staff are the only available medium for change.

Quality of studies

Judgements in Appendix A show varied levels of quality but our results confirm that psychosocial studies with this unique population are showing increasing sophistication allied to clinical realism in controlling for bias (Woods and Russell, 2014). This ranges from careful stratification in random selection of facilities to recruiting assessors who know nothing about the study. An example of clinical realism is acceptance that it is it is impossible for a clinician delivering a psychosocial intervention not to know what it is. Conversely, non-

blinding of the person with more than mild dementia is low risk because, even if they sign a consent form, by definition they are likely to forget they are part of a study. It is possible in well-resourced studies for researchers assessing outcome to be blind to condition or even ignorant about dementia, though not if outcome requires skilled observation, nor if conversations with staff are part of assessment. They nearly always know what has been delivered, even though theoretically blinded to condition (Woods and Russell, 2014).

Not all studies have controlled for attrition or, remarkably, even mentioned it (e.g. Bouwen *et al.*, 2008; Fritsch *et al.*, 2009), despite the fact that at least 30-45% of this frail population will be lost to medium or longer term follow-up (e.g. Beer *et al.*, 2011; Testad *et al.*, 2010) due to death, residents moving, being medically unstable, staff turnover, or researchers running out of money. Some studies over-sample in order to cover this, but then have to deal with different baseline characteristics amongst survivors. Some studies recruited new residents and staff as subjects died or withdrew even between Times 2 and 3 (e.g. Pellfolk *et al.*, 2010; van de Ven *et al.*, 2013) but this practice is only justifiable if they are in the sample for at least two time-points, have received the intervention, and are reported as a separate sample rather than merged into the population as if they had been in the study at the start. Some studies with follow-up used the more authentic method with this heterogeneous population of reporting only on the survivors or using survivor results to authenticate the results of their intention to treat analysis (e.g. Burack *et al.*, 2012; Finnema *et al.*, 2005). Without such authentication, studies trying to impute quality of life for the relatively large proportion of their starting sample who are now dead must be treated with extreme caution.

Comment on measures

Many studies used straight clinical data like frequency of falls, or standardised measures, or reported validity when they invented new measures. Nevertheless there remained enough inconsistency in choice of measure, or idiosyncratic adaption of well-known measures like the CMAI (e.g. Burack *et al.*, 2012), to preclude meta-analysis for many outcomes.

The adequacy of generic dementia-specific QOL measures is doubtful. Most showed no effect and the 25% that did produced widely variable results. They may be too broad, justifying our decision to concentrate on what residents are actually experiencing, rather than an ill-defined general entity. There is also the problem that measurement of internal states for people with dementia consistently shows that proxy report by staff or family assesses residents as worse than they themselves report, that family and staff differ (e.g. Clare *et al.*, 2013), and that different factors are involved for each group (Crespo *et al.*, 2013). Unfortunately, given the level of deteriorating impairment of this population, self-report is often impossible, especially at follow-up (Chenoweth et al., 2014; Wenborn et al. 2013). Based on these factors, our results, and a comparable finding in our associated paper on predictors of well-being (Anderson *et al.*, 2016), we cannot recommend use of scales like the QOL-AD as an outcome measure.

There are questions about other outcome measures. For example, there is the problem of different instruments purportedly measuring the same disorder but obtaining different results (e.g. depression in Verkaik *et al.*, 2011), or different informant groups producing the same phenomenon. Similar problems apply where measures of internal staff states such as attitude, knowledge, or stress are assessed post-intervention. They tend not to improve

even when quality of care or resident quality of life does change. This presents a major problem for those deciding what to target with staff in future interventions.

Measurement of quality of care

As the most important mediating factor in this review, we were particularly interested in what good care looks like and its measurement. Aspects of QOC like frequency of physical restraint are easy to measure. Psychotropic use is also easy to measure if the responses are simply dichotomous. This is the rather primitive method used in most included articles, so we can deduce nothing about dosages. It may be that converting to equivalent doses with this heavily medicated population, often subject to frequent adjustments, is too complex. Thus, most studies settled for either the number of people on anti-psychotics/other psychotropics, or the mean number of such drugs residents were taking.

Measuring psychosocial care adequately can be more complex but some standard measures are presented in these studies for example the Multidimensional Observation Scale for Elderly Subjects (MOSES) used in McCallion *et al.* (1999). Others take proxy measures such as the length of time spent on showering or eating (e.g. Chang and Lin, 2005; Chang *et al.*, 2006; Sloane *et al.*, 2004) under the assumption that a relaxed approach is more effective with people with severe dementia. Others look at the frequency of use of pain instruments (e.g. Fuchs-Lacelle *et al.*, 2008), or changes to the way bathing is done (e.g. Gozalo *et al.*, 2014).

Direct observation of quality of care is increasing, even in larger studies (e.g. Fritsch *et al.*, 2009), using sophisticated time sampling or video recording with assessment by blinded observers (e.g. Bourgeois *et al.*, 2004; Sloane *et al.*, 2004). They produce analysable data by reporting frequency of actions commonly regarded as beneficial in dementia care, for example how often during care tasks each staff member gently issues short guidance messages and then waits in order to give the resident time to respond. Others are frequency of arguing with residents, or frequency of positive messages during bathing (e.g. Burgio *et al.*, 2002). We believe that direct observation merits more attention. It has the great advantage of measuring what staff actually do instead of some necessarily abstract and subjective measure but the disadvantage of taking much more time and being more expensive than a general questionnaire.

Statistical findings

There were severe limitations in the number of meta-analyses we could undertake because of differences in time frames, idiosyncratic measurement, differences in education delivery, key data missing, and idiosyncratic analysis. Nevertheless, there are enough good studies to provide some useful information.

As noted, dementia-specific quality of life scales proved inadequate as an outcome measure.

Challenging behaviour was the explicit or secondary target in half the studies (n = 23) but only 10 produced changes in behaviour, a disappointing result given that some unsuccessful

studies had large samples and were of high quality (e.g. Chenoweth *et al.*, 2014; Wenborn *et al.*, 2013). Nevertheless, the studies which did produce results are worth examining individually, some showing effects at 4-6 month follow-up and one (Burack *et al.*, 2012) at two years. Nevertheless, the meta-analyses suggest that obtaining long-term effects is not the norm. Studies which received education plus on-going mentoring had sufficient coherence for meta-analysis to show low to medium effect sizes immediately post-intervention but a comparable analysis looking at 3-4 months follow-up showed relapse to baseline.

Mood was an outcome in a quarter of studies, mostly as part of a suite of potential outcomes in larger studies. Our results suggest that the overall value of these interventions is doubtful. Meta-analysis for education plus mentoring at both short and medium-term follow-up shows huge variability. It is unclear why, though the study by Verkaik *et al.* (2011) which found effects on one depression measure but not on the highly regarded Cornell, suggests that measurement issues merit further investigation.

All five studies investigating pain and discomfort found improvement with medium to large effects. Those that paid more attention to on-site implementation tended to have stronger effects. Meta-analysis was not possible but the consistency of these findings in themselves show that pain can be relieved during an intervention. Unfortunately, none of the studies assessed follow-up, making it impossible to determine the utility of training staff to deliver long-term improvement in pain management without ongoing support.

Falls were investigated directly in one study or as secondary outcomes in 7 others. Only two produced change. No positive conclusions about falls programs can be drawn from these meagre results. The most interesting finding is from three restraint programs which had falls as a secondary outcome and confirm previous research (Capezuti *et al.*, 1996; Capezuti *et al.*, 1999; Evans *et al.*, 1997; Neufeld *et al.*, 1999) that reducing restraint does not increase falls or related injuries.

Quality of care outcomes

As with QOL scales, generic quality of care scales showed minimal utility. In two studies where quality of care was tested as a mediating factor between intervention and resident outcome, there was no effect (Clare *et al.*, 2013; Davison *et al.*, 2007).

Restraint reduction is one of the two most encouraging quality of care findings of this review, with positive results over the medium or even long-term for 75% of studies, and obtained mainly by basic education plus mentoring or similar support. Our associated review showed multiple sequelae of restraint including increased pain, psychotropic medication and excess disability (Anderson *et al.*, 2016; Lin *et al.*, 2011; Miu and Chan, 2014; Sloane *et al.*, 1998). The additional evidence here confirming it does not increase falls makes expansion of restraint reduction programs the most obvious clinical target following this review.

There is little good news about chemical restraint; psychotropic use declined in only two studies, though both are noteworthy. The multi-facetted case-specific intervention by Fossey *et al.* (2006) was the most comprehensive, with effects still apparent at 12 months.

The study by Gozalo *et al.* (2014) is clinically interesting because it followed a *Bathing without a Battle* intervention, presumably because increased skill reduced resistance in personal care – the situation where aggression is most common (Teri *et al.*, 1988).

The second highly promising finding was from the 13 studies attempting to improve communication and more humane interactions between staff and residents. They cover several bases but all produced positive results. Some tackled the intimate personal care experience, usually morning care, for both residents and staff and best encapsulated by the *Bathing without a Battle* label. A feature of these studies is extensive on-site emotional and practical support while staff learn to care more effectively for their own residents. Other studies attempt to improve general responsiveness to residents' individual needs and difficulties, including challenging behaviour (e.g. Chenoweth *et al.*, 2009). Others attempt to improve general communication with residents (Boettcher *et al.*, 2004). Humane and responsive care would fit under the PCC label and it would be almost impossible to find an RACF in English-speaking countries that does not claim to provide it, whatever the facts on the ground. Studies like these, however, show that practical hands-on techniques have to be learned as well as total attitude change.

Given these results, and the finding from our associated predictor study that the skills of staff interacting with residents and the provision of more humane care is predictive of better resident mood (Anderson *et al.*, 2016), it is disappointing that only three of these studies had follow-up, and that not all investigated whether these mediating factors had any effect on resident well-being. The attainment of better care was seen as sufficient outcome

in itself (e.g. Boettcher *et al.*, 2004; Bourgeois *et al.*, 2004; Hoeffer *et al.*, 2006; Sidani *et al.*, 2009).

Only two studies examined whether interventions reduced acute hospital admissions (Chenoweth *et al.*, 2009; Deudon *et al.*, 2009). Given the expense and poor consequences for people with dementia, we would have expected more use of this outcome measure.

What kind of intervention?

Intervention level required for a successful intervention tended to vary depending on the clinical target. For example, successful interventions around restraint use were mostly didactic with experiential education or other support. This was true for some pain studies but others required mentoring and more on-site support. For complicated issues like challenging behaviour, including aggression in showering, more detailed long-term on-site interventions appear necessary.

Concordance with Figure 1

Though a small majority of studies had all three components of the model, 20% made no attempt to determine whether an intervention has improved life for the person with dementia, presumably the object of the exercise. They show only a measure of quality of care after the intervention, most commonly easy to measure variables like restraint or psychotropic use, though there are several aimed at improving the way personal care or other interactions with residents is accomplished. These studies apparently make the

assumption that this automatically improves resident quality of life, a plausible belief for, say, restraint, but not necessarily for more complex presentations. Our results show that when both are measured, only half the studies showed improved QOC translating to measurable improvement in resident QOL. This is conclusive evidence that no intervention study aimed at improving life for the resident can credibly claim to have done so unless they have measured it.

A further 20% of studies took the black box approach and had no measures of change at the care level required in order to achieve the outcome. This makes it impossible to determine what staff are doing differently, and which practices need to be targeted in future interventions. This especially the case because, in the studies where both are measured, improvement in quality of care tended to translate into improved quality of life.
The utility of measuring within-staff personal variables like attitude or job satisfaction is uncertain, unless the overt goal is to improve QOL for staff – a legitimate aim given the difficulties of the work. For our purposes, of the two thirds of studies which used such measures, only five found effects and there was little connection with resident QOC/QOL. For example, Davison *et al.* (2007) and Visser *et al.* (2008) found within-staff effects following an intervention but no effects for residents. Conversely, more studies found no effect on within-staff personal variables but effects for residents.

It is plausible to expect that personal change will occur within staff as part of an intervention, at the very least improved knowledge or understanding, and that addressing such variables should form part of future programs. Unfortunately, if anything is changing within individual staff, it is too diffuse or our existing instruments are too insensitive to

detect it. Measuring within-staff personal variables is likely to be a waste of time until we have adequate tools; this presents a major problem for those deciding what to target with staff in future interventions.

It remains our contention that the minimum outcome measures for intervention studies with this population are: a valid measure of quality of care – preferably using direct observation because we need to know what staff actually do; the effects on the resident; and, whether effects are maintained at least 3-4 months post-intervention.

Limitations and Caveats

There are a number of limitations which make our conclusions tentative. The main one is the relative paucity of studies that fit our criteria. Limiting this review to interventions in long-term dementia care meant that many pain, pressure sore, and feeding difficulty studies were excluded because the sample was general or less than 80% dementia. We chose the 80% criterion to permit us to include mixed sample studies where it was clear that the bulk of the population had dementia; without it we would have had even fewer studies to include. We acknowledge that diagnosis can be problematical (most studies used a screening test – the MMSE) but we contend that a cut-off of more than three-quarters makes it highly likely that the most of the residents in this review had dementia.

The need for interventions delivered ultimately by staff rather than by outside clinicians, so they can be sustained post-project, also limited eligible studies. Finally, the need to fit Figure 1 limited eligible studies. We do need to know at the very least whether an intervention

changes the behaviour of staff - quality of care - but ultimately whether it makes any difference to residents' lives.

A second potential caveat is that effects may have been weak because mainly hands-on staff received the intervention, and that absence of management engagement may be the reason effects were not maintained. It is true that senior RNs were involved in most studies and, in many, senior management were engaged. We retain our belief that interventions must be good enough to be effective in the many facilities with minimal resources. Many, for example in Holland, have access to on-site medical and allied health and extensive management support but, for many others, the only resource for change is the staff on the ground. However, none of the studies measured management engagement or organisational readiness for change. Given that care staff have very little autonomy in how and when they provide care and that managers have ultimate responsibility for the care culture and whether staff are released for training and supported in changes to care, the role of management support for care staff interventions is a gap in the literature. Future studies need to include level and nature of management support in the analysis.

Thirdly, only some studies provided adequate control conditions, for example wait-list controls, or ensuring that control residents or staff received the same number of visits and the same amount of engagement as the experimental group. A majority of studies used 'usual care' as a control. It is therefore impossible to determine whether the effect in these studies, if any, could be due to the fact that there *is* an intervention rather than the content of the intervention, especially given that usual care is often poor and that staff rarely

receive the kind of support available during an intervention. Until researchers start addressing this critical point, any conclusions remain tentative.

The fourth caveat is that there are some assumptions in these studies with which we concur but which are unproven, for example that more staff interacting socially with residents, or accomplishing bathing over a longer time, are positive changes. We accept that they remain subjective.

A final caveat is that we have not contacted authors about results, or done searches of work in progress or for works that are refused publication due to non-significant results and we did not check the published trial papers against the corresponding information in trial registers. We have only looked at what was available to any researcher in the literature over the last 20 years. We think that their published results should stand by themselves.

General conclusions

There need to be more interventions aimed at teaching staff to provide better care for their residents and thereby improve states which cause or are reflective of suffering, such that they are able to maintain these effects over time. Aiming at a specific target such as mood or restraint or psychotropic medication may be more useful than more generic interventions (e.g. PCC) which sample a large suite of potential outcomes. Didactic education alone will be useless and staff need at least mentoring or similar added support for restraint reduction. For complex interventions with challenging behaviour or intimate care, staff will also need a period of on-site support and practice with their own residents. These studies need to

measure, at a minimum, changes several months post-intervention in care practices and effects on the resident. Failure to determine whether life improves for the resident misses the point of the intervention. Our results show that you cannot conclude that improved care will make any measurable difference to those receiving it, even less if you only measure within-staff variables –as many excluded studies did. If within-staff internal variables such as attitude are included they are unlikely to show effects so may be a waste of time unless measures become more sensitive.

These projects will be expensive because they need relatively large samples, including over-sampling - and sophisticated design to minimise bias while remaining clinically realistic. They also need sensitive measurement, including direct observation of quality of care as well as detailed subjective measures, and consortia of researchers need to agree on the best measures to be used across multiple studies so that meta-analysis is possible. Inventing measures for individual studies clouds the picture and raises suspicion that they may have been invented to reflect the data. Generic dementia-specific quality of life measures are unlikely to show effects; measures applicable to the clinical target should be used. The purpose of training the staff is to enable them to maintain effects after the intervention team withdraws, so these studies will be largely useless if medium to longer term follow-up is not measured. There will be substantial attrition, so decisions need to be made about whether only survivors are analysed, or the applicability of ITT techniques if 30-40% or more of the sample (staff and residents) is lost.

The small number of studies reviewed here suggest that reducing restraint, improving staff interactions with residents and reducing pain are the most promising clinical targets, though

no pain study had follow-up. Challenging behaviour shows some promise though follow-up results are poor. The value of interventions with other targets is equivocal or poor. Turnover in residential care possibly means that interventions with staff will never be enough, and that direct delivery of interventions (e.g. Bird *et al.*, 2007; Cohen-Mansfield *et al.*, 2007) may always be required at some level. A large number of well conducted staff training studies may improve the picture but, at the current state of play, we can only conclude that, apart from restraint and interactions in personal care, interventions with staff are only intermittently effective and either do not maintain to follow-up, or have not had follow-up assessed.

Conflict of Interest

None.

Description of authors' roles

M.Bird and K.Anderson contributed equally to this work. M.Bird identified the need for this review and its basic outline. K.Anderson and M.Bird developed the search protocol, reviewed articles for inclusion, extracted data, and wrote and revised this manuscript. K.Anderson also undertook the literature search, developed the Eppi-reviewer 4 form, and conducted the statistical analysis. S.MacPherson was involved in the original screening of abstracts, searched for and collated all included articles, and conducted a final check of the facts and figures. A.Blair was involved in the initiation and conceptualisation of this review and revised the manuscript

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Table 1. Search Terms

Main Concept	Search Terms
Dementia	Dementia OR semantic dementia OR senile dementia OR HIV associated dementia OR Clinical Dementia Rating OR dementia OR frontotemporal dementia OR Cornell Scale for Depression in Dementia OR multi-infarct dementia OR frontal variant frontotemporal dementia OR presenile dementia OR Pick presenile dementia OR Alzheimer's OR Binswangers OR Lewy Body OR **Cognitive** impairment/decline/deterioration /deficit/degeneration/loss /disturbance /complaint OR **Memory** impairment/decline/deterioration /deficit/degeneration/loss /disturbance /complaint OR **Mental** impairment/decline/deterioration /deficit/degeneration/loss /disturbance /complaint OR **Cerebral** impairment/decline/deterioration /deficit/degeneration/loss /disturbance /complaint OR Chronic cerebrovascular OR Korsakoff OR delirium.
Residential Facilities	Residential Facilities OR residential OR care institutions OR long term care OR homes for the aged OR elder care OR nursing homes OR assisted living OR care homes OR special care units OR SCU.
Staff or Facility Variables	**Staff** morale/burnout/stress /strain/satisfaction /education/training/ratios/numbers/turnover /retention /attitude OR personality OR skills OR knowledge OR literacy OR experience OR resilience OR age OR sex OR gender OR ethnicity OR autonomy OR supervision OR support OR innovation OR rural OR metropolitan OR country OR philosophy of care.
Quality of Care	Quality of Care OR bed sores OR loneliness OR anti-psychotic OR neuroleptic OR benzodiazepine or sedating or sedation OR hypnotic or antidepressant OR analgesic OR pain relief OR quality of health care OR quality assurance, health care OR morning care OR **quality** care/assurance /improvement/indicators/health OR standard of care OR communication OR restraint OR clinical assessment or outcomes OR symptom resolution OR psychotropic OR poly-pharmacy OR PRN OR side effects OR patient-centred OR person-centred OR social OR isolation OR psychosocial OR competence OR evaluation OR practical OR aids OR attitude OR behaviour OR knowledge OR skill/s OR **pain** assessment/management/control/medication OR experience OR satisfaction OR interactions OR perception OR management OR adverse OR complaint OR litigation OR reporting OR choice OR medication.
Quality of Life	Behaviour OR quality of life OR psychological health OR anxiety OR depression OR mood OR wellbeing OR enjoyment OR pleasure OR engagement OR self-esteem OR loneliness OR BPSD OR challenging behaviour OR agitation OR Complication OR medical intervention OR morbidity OR mortality OR falls OR side effects OR activities of daily living OR ADLs OR dependency OR self-care OR self-efficacy OR life satisfaction OR social activity OR cost OR physiological OR emotion.

Table 2: Criteria for exclusion of studies

Code	Reason for exclusion	Total N excluded
A	Reviews without data, opinion pieces, general articles, tips, editorials, comments about articles, conference abstracts	1059
B	Clinical guidelines, consensus positions or statements	39
C	Studies describing instruments or measures or methods concerning any of our primary variables (staff – QOC[a] - QOL[b]) but which do not have intervention or correlational outcome data. Includes discussions on difficulty operating in RACFs and methods to maximise compliance	131
D	Group comparison articles which are entirely qualitative or have a total *n* of less than 24	132
E	Focus groups or questionnaires soliciting qualitative staff opinions about our primary variables	50
F	Studies without validated/plausible or objective outcome measures, including: outcome based on staff or family perception unless: (a) in a validated instrument (e.g. proxy report on Cornell depression scale, staff-completed NPI); (b) confirmed by objective observation. Vignettes or simulations also excluded; outcomes must involve actual residents under their care.	16
G	Interventions delivered by outside clinicians or researchers to the resident, without staff training to deliver it themselves *during measurement period*, even if staff are peripherally involved (e.g. helping with assessment). Ranges from drug withdrawal studies to complex psycho-social interventions.	412
H	Predictor or intervention studies where only one of our primary variables is part of the comparison (e.g. staff interventions assessed by staff measures, OR resident depression predicting QOL). Must be statistically (or with credible qualitative measures) linked to at least one other primary variable.	589
I	Intervention studies which do not look at interventions with staff variables impinging on QOC and/or QOL and predictor comparisons or comparison of interventions at a facility level, e.g. rural vs metropolitan, that is fixed and cannot be changed	97
J	Studies looking solely at predictors of success or prognosis after an intervention. Also demographic studies on prevalence of primary variables without data on relevant (i.e. staff or QOC variables).	121
K	Not residential care, or mainly about family carers	458
L	Not English	65
M	Announcing a trial but not completed yet	43
N	Pre 1995 publications	221
P	Article has predictors of QOC/QOL, but none that are relevant to this study	291
Qualitative	Qualitative data and analysis only.	76
Review/ CG	Existing reviews (though reviews scoured for references)	879
Other	Unable to be located, even after contacting author	1
Total		**4680**

Table 3. Précis intervention results

Study	Intervention for staff	Staff change and/or change in Quality of Care	Change in Resident QOL
Beer *et al.* (2011) Code=4[1] Quality=++[2]	Education on identifying individual learning needs of the staff and practical ways of meeting their needs and the needs of the residents.	QOC: Frequency pain documentation and case conferencing increase maintained at six month follow-up. No effect restraint Staff: No effect on staff distress	There is an increase in reported pain and case conferencing relative to controls. No effect BPSD, QOL scale
Boettcher *et al.* (2004) Code=4 Quality=+	PCC program involving staff education and a nurse-mentor model. Individual on-the-job coaching was incorporated.	Staff: Nonverbal initiation of PCC, assisting residents with independence-oriented tasks, verbal conversation, and using unique details of the resident's life in conversation showed significant improvements No QOC measures	No QOL measures
Bourgeois *et al.* (2004) Code=4 Quality=++	Training staff in skills and communication during personal care with the aid of memory books and mentored during intervention	QOC: Improvement maintained 3 month follow-up in use of a number of effective communication strategies in personal care, more positive statements, and longer verbal interactions during care. Staff: No staff measures	No QOL measures
Bouwen *et al.* (2008) Code=1 Quality=++	Education on risk factors/ways of ameliorating falls. Experimental group undertakes more detailed assessment than controls	No QOC/Staff measures	50% reduction in falls for both groups over six months so simple education sufficient. No other measure
Burack *et al.* (2012) Code=6 Quality=+	Education in culture change and practical application of PCC, team-building, changing shifts, more autonomy, learning resident preferences etc.	No QOC/Staff measures	BPSD measured on CMAI (3 factors) has improved at 2 year follow-up relative to controls on 2 factors. No other measures
Burgio *et al.* (2002) Code=3 Quality=+	Training in depth in behaviour management with hands-on on-site support. One group gets extra motivation in form of supervisor feedback and gifts for success. Also received training on importance of motivation, clear description of behavioural skills and self-monitoring.	QOC: Improvement both groups in not using ineffective behaviour skills and using a number of effective ones. Number of skills greater for the extra motivation group Staff: No staff measures	Reduced resident agitation during care interactions
Chang *et al.* (2005) Code=2 Quality=+	Feeding skills training program that included 3 hours of in-service classes and 1 hour of hands-on training	Staff: Intervention staff more knowledgeable, more positive attitude and better feeding behaviours	QOL: The experimental has more feeding difficulty and sig longer feeding time than

			controls at post-program (but they are nearly 10 years older). No difference in food intake
Chang *et al.* (2006) Code=2 Quality=+	As Above	Staff: Knowledge better for intervention group staff; no difference in attitude, behaviour control, but intention frequency superior for intervention, but no diff in belief whether it's necessary. QOC: Observed feeding behaviour by staff improves for the intervention group, not for controls, and they take more time over it.	No QOL measures
Charras and Gzil (2013) Code=5 Quality=++	They simply compare what happened to QoL-AD if staff wear their street clothes for all care (other than hands on care) and whether they wear uniforms.	No QOC/Staff measures	QOL: Wearing street clothes leads to better global QoL-AD scores
Chenoweth *et al.* (2009) Code=2 and 5 Quality=++	Trained in-depth in PCC, or DCM, both supported by hands-on help at outreach visits, plus usual care group	QOC: No effect any group on quality of care interactions, use restraint, use psychotropics. Staff: No staff measures reported	CMAI agitation reduced at 4 month follow-up in PCC and DCM groups. Fewer falls in DCM. More falls in PCC. No effects on QOL scale, medical incidents, behavioural incidents, hospitalisations
Chenoweth *et al.* (2014) Code=2 Quality=++	Trained in-depth in PCC, compared with adjustments to environment (PCE), compared with PCE+PCC, with usual care	QOC: Quality of care interactions improve for PCC+PCE but not maintained at 8 months. No effect on psychotropics. Staff: No staff variable measured	CMAI agitation and QOL scale improves for PCC and PCE over time but unclear if maintained. QOL but not agitation improved for PCC+PCE. Improvement in emotional expression for PCC alone. No effect on Depression
Clare *et al.* (2013) Code=3 Quality=++	Trained in recognising awareness in people with severe dementia using a tool. Some hands-on support. Control usual care	QOC: No effect on QOC instrument (DCPA) Staff: No effect on burnout, attitude, psychological distress. Staff report qualitative approval	Effects on QOL scale (family rating and incomplete data), not when staff rate QOL. No effect on well-being, behaviour
Davison *et al.* (2007) Code=3 Quality=+	Extensive training in dementia care including experiential on-site learning versus a group getting peer support as well versus usual care	QOC: No effect nursing performance scale Staff: Maintained effect for active groups for self-efficacy to 6 months	No effect for any group on agitation (CMAI). No other measures
Deudon *et al.* (2009) Code=3 Quality=+	Specific training in managing BPSD including extensive hands-on guidance on-site versus usual care	No QOC/Staff measures	Maintained decrease in agitation to 20 week follow-up on three separate instruments. No effect QOL, psychotropics, hospitalisations

Dijkstra *et al.* (2002) Code=4 Quality=++	Package of communication strategies, including the use of memory books, didactic and hands on education	QOC: Increase in staff use of facilitators, such as cues and encouragement Staff: No staff data	Increase in coherence, decrease in empty phrase for residents the treatment group
Finnema *et al.* (2005) Code=6 Quality=++	Train the trainer for selected staff in emotional oriented care with some on-site support versus usual care	QOC: No QOC measures Staff: Improvements relative to control on GHQ-28 (stress reactions)	Effects for PWD only for those with mild to moderate dementia: Maintaining an emotional balance, and preserving and positive self-image.
Fossey *et al.* (2006) Code=3 Quality=+	Extensive Training (10 months) in BPSD using case-specific approach as well as addressing systemic causes of behaviour versus usual care. Includes on-site support	QOC: At 12 months reduction relative to controls taking psychotropics Staff: No staff data	No effect on CMAI agitation, well-being, falls % time withdrawn or asleep
Fritsch *et al.* (2009) Code=4 Quality=+	Trained over 10 weeks to engage residents in story-telling to improve overall communications with on-site support versus usual care	QOC: Experimental staff more social interaction with residents two weeks after intervention and more positive attitudes to residents Staff: No effect staff job satisfaction and burnout	Experimental residents more socially engaged and alert than controls but also higher anxiety and sadness. No long-term follow-up and questionable analysis.
Fuchs-Lacelle *et al.* (2008) Code=2 Quality=+	Trained to use pain behaviour assessment method and encouraged to use it every shift with on-site support versus a credible control group rather than usual care	QOC: After 3 months increase in use of analgesics against controls plus Staff: Reduced nursing distress and burnout	Pain behaviour reduced v controls No long term follow-up
Goyder *et al.* (2012) Code=2 Quality=+	Training in multiple aspects of dementia care on-site with subsequent individual supervision versus usual care	QOC: No measure Staff: Overall sense of competence did not increase, but there was improvement in 'building relationships' subscale and more hopeful (using ADQ) attitudes	Improvement in BPSD and depression. No effect anxiety or QOL scale. No other measures
Gozalo *et al.* (2014) Code=4 Quality=+	Trained in bathing with minimum distress using communication and alternative methods of washing. Control group gets same but delayed	QOC: 2-4 months post-intervention reduction in bathing duration overall, less showers, increase bed-washes, and each takes less time. Reduced anti-psychotics Staff: No staff measures but improved skill inferred	Reduction in verbal and physical aggression and agitation.
Gulpers *et al.* (2011) Code=6 Quality=++	Mandatory reduction restraint, then wide-ranging education on topic including alternatives with on-site support against usual care	QOC: At 8 months 50% reduction in use belt restraint and wheelchair restraint (no change in control). Sig reduction in use of sleep suits and full enclosure bedrails for intervention but not control. No effect psychotropic use Staff: No staff measures	No effect on falls and injuries

Gulpers *et al.* (2013) Code=6 Quality=++	As Gulpers 2011 but now control homes get the education component of program	QOC: At 24 months experimental survivors continue advantage over controls (no change) and with reduction in restraint. Reduction generalised to residents not in original sample Staff: No staff measures	No QOL measures
Hoeffer *et al.* (2006) Code=4 Quality=+	Group and 1 to 1 education in person-centred showering and towel bath, including on-site support against usual care	QOC: At end of program improvements in gentleness, verbal support and ease of bathing against controls but no difference in hassles Staff: No staff measures	No QOL measures
Huizing *et al.* (2006) Code=2 Quality=+	Restraint educational program combined with consultation with a nurse specialist	Residents in the control group were more likely to experience increased restraint use than residents in the experimental group.	No QOL measures
Jeon *et al.* (2013) Code=2 Quality=+	General and person-specific training in PCC with special attention to BPSD including dementia care including care planning with some 1 to 1 training. No controls	QOC: At 13 wk post-intervention nobody using a care plan Staff: No measures	No effect on BPSD, wandering, depression. No other measures
Kovach *et al.* (1999) Code=6 Quality=+	Training in pain recognition and assessment using standardised instrument and psychosocial/drug management protocol for severe dementia. No control	QOC: At 7 days (no long term follow-up), increase in use of regular analgesics and psychosocial measures but no change in psychotropics, PRN analgesics Staff: No staff measures	Decrease in resident discomfort
Kovach *et al.* (2006) Code=3 Quality=+	Trained in the use of a clinical protocol including some on-site 1 to 1 in recognition of resident discomfort and associated behaviour and in a protocol for systematic assessment of needs. Control gets education and supervision around common care practices.	QOC: At 4 wks post intervention group superior in assessing needs and use analgesic but not psychosocial methods	Discomfort /pain reduced in experimental group. No effect on challenging behaviour using BEHAVE-AD
Leone *et al.* (2013) Code=2 Quality=+	Training recognition/psychosocial management of depression and apathy and BPSD, including hands-on on site. Against usual care controls	QOC: No effect psychotropic drugs. No other measure Staff: No staff measures	3 months post-intervention: Improvement emotional blunting on apathy scale; in transferring and toileting in ADLS (Control group worse on toileting ADLs). No effect at follow-up for BPSD.
Magai *et al.* (2002) Code=2	Training to recognise distress from facial/bodily expression versus genuine placebo (equal amount of	QOC: No measure	Improvement in experimental group at 12 wk follow-up in positive emotion measured by facial

Quality=0	contact) versus wait-list control. No evidence on-site support	Staff: Caregiver BSI (depression, anxiety, somatic symptoms) declined over time in all groups, with no effect of treatment.	expression. No effects BPSD (CMAI and BEHAVE-AD), depression
Matthews *et al.* (1996) Code=6 Quality=+	Staff in one NH learn what task-oriented care is and do it for 8 weeks, then learn how to do PCC – supported on-site, and do that. They are their own controls	No QOC/Staff measures	After change to PCC CMAI verbal agitation drops, no change in aggression factors but 'other agitation' increases. Daytime sleep increases but then returns to baseline. No other measures
McCallion *et al.* (1999) Code=2 Quality=+	Trained to communicate aimed at BPSD with multi-facetted program incl. memory aids for residents. Includes 1 to 1 when problems often occur. Wait list control	After 6 months: No group differences in psychotropics or restraint Staff: Reduced turnover at 6 months, no significant effects for knowledge	Improvement in mood and 2 of 3 CMAI factors. Unclear well-being results
Pellfolk *et al.* (2010) Code=1 Quality=++	Train the trainer education on dementia plus restraint, psychotropic and falls knowledge and skills	QOC: Reduce restraint after one moth (no long term f-up). No effect psychotropics Staff: Improve attitude (less likely to use restraint)	No increase in falls
Robison *et al.* (2007) Code=2 Quality=++	Train staff and family members concurrently on sharing info, getting along, conflict resolution, setting shared goals plus dementia care skills. Usual care control	QOC: At six month follow-up staff behave better to residents (family report) Staff: Some effects on burnout for RNs but not CNAs. No effect job satisfaction, staff depression	Reduction on five of fourteen behaviours on the CMAI but results poorly presented so validity of results unclear
Schrijnemaekers *et al.* (2002) Code=4 Quality=++	Training in emotion-centred care over 8 months, from basic dementia info to in-depth looking at way residents experience the world. Some 1 to 1. Usual care control	QOC. At six and 12 month, no change in psychotropics Staff: No staff measures	At six and 12 month almost no effects on challenging behaviour and of those that do, mixed effects with controls superior in some.
Sidani *et al.* (2009) Code=1 Quality=+	2 hr training in verbal and non-verbal communication and other practical skills in morning care to help residents retain abilities. No control	QOC: Staff improve their skills at 1 month follow-up but back to baseline at 3 months Staff: No staff measures	No QOL measures
Sidani *et al.* (2012) Code=1 Quality=+	As above. No control	QOC: Improvement in skills after 1 month. No three month follow-up Staff: No staff measures	No effect on agitation, participation in care and physical or psychosocial functioning
Sloane *et al.* (2004) Code=2 Quality=+	Training in 'bathing without a battle/person-centred bathing', with trainer working alongside CNA. Two crossover intervention groups + usual care control	QOC: Improved technique and longer time taken over showering (but not bed-bath). Measures taken at end of program – no long-term follow-up	Reduction resident discomfort, aggression, agitation against controls, and improved skin condition

		Staff: No staff measures	
Smith *et al.* (2005) Code=2 Quality=+	10 x 1 hr group participatory education on multiple aspects of caring, including understanding needs, medical/physical problems, grief etc. No control.	QOC: At conclusion of training improvement in standard of care measure but and there is no long-term follow-up Staff: No staff measures	No QOL measures
Testad *et al.* (2010) Code=3 Quality=0	Training in 'relation-related' care for reducing agitation and restraint. Some on-site support and access to extra resources. Usual care control	QOC: Reduction on restraint to six months at end of support period but not maintained to 12 month. Psychotropics unchanged Staff: No staff measures	Maintained reduction in CMAI agitation to 12 months. No other measures
Van de Ven *et al.* (2013) Code=6 Quality=0	Selected staff trained to be DCM certified, then all staff have DCM orientation. Certified staff then do at least two DCM cycles and consequent action plans for residents work with	QOC: Regular DCM reviews but poor compliance Staff: GHQ mental health improves for both groups. Intervention staff report fewer negative and more positive emotional reactions to work Staff: No effects job satisfaction	Four months post intervention no effect on CMAI agitation. Mixed effects for NPI-BPSD. QOL scales decline for both groups
van der Kooij *et al*. (2013) Code=4 Quality=++	Both control and intervention get training in minimum standards of care for six months. Intervention: 9 further months where caregivers learned to apply IEOC through training courses and on-the-job training. Also, a coach-consultant acted as the 'change agent'. Usual care control	QOC: Intervention superiors to the controls in expertise, and knowledge of resident. Intervention more empathic, more sensitive to what resident saying and feeling, ask more frequently what they wanted. More addressing residents on individual level, more non-verbal contact, more use of what they know about residents.	No QOL measures
Verkaik *et al.* (2011) Code=6 Quality=++	Training recognition depression using nursing guideline and working in groups to provide tailored activities and other pleasant events to depressed residents	No QOC/Staff measures	Improvement relative to control in one (from 3) depression measure maintained to 10-12 week follow-up
Visser *et al.* (2008) Code=3 Quality=++	Two groups get education on BPSD and development strategies to manage or prevent. One group also gets peer support	QOC: no measure Staff: No effect burnout. Improvement in 'skills and knowledge' from attitude scale for peer support alone	No effect at 3 and 6 months on QOL, CMAI agitation
Wells *et al.* (2000) Code=1 Quality=+	5 (20-30mins) session educational program about the abilities-focused morning care program. Reinforcement sessions every two weeks 3 months	QOC: Increased caregivers' interaction behaviours Staff: No staff effects	Residents have more interaction behaviours with caregivers, with higher scores on personal attending, and calm/functional. Also a decline in

			agitation and improvements in overall functioning. Results maintained at 6 months
Wenborn *et al.* (2013) Code=6 Quality=++	Assessment of the care home physical environment; education program; education sessions; work-based learning tasks; one-to-one coaching sessions	No QOC/Staff measures	QOL-AD gets worse for the homes which got the intervention and is maintained to final follow-up. No other effects

[1] 1. Didactic education only; 2. Didactic plus experiential education such as discussing typical case examples; 3. Education with ongoing group or individual supervision sessions; 4. Education with a concerted effort to embed the intervention within the facility, such as through a change champion/mentor on-site; 5. A change in practice; 6. All components.

[2] ++ high quality, + acceptable, 0 unacceptable

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Appendix Table (*B. risk of bias*)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Beer *et al.* (2011)	+	+	-	+	-	+	+	N/A	+	+	N/A	+	+	+	+	++
Boettcher *et al.* (2004)	-	-	-	-	?	?	-	N/A	?	+	N/A	-	-	+	?	+
Bourgeois *et al.* (2004)	?	-	-	-	+	?	?	-	+	+	N/A	-	+	+	+	++
Bouwen, *et al.* (2008)	+	+	-	-	+	+	-	N/A	+	+	-	+	+	+	+	++
Burack *et al.* (2012)	-	-	-	-	+	-	+	N/A	-	+	N/A	-	+	+	?	+
Burgio *et al.* (2002)	+	-	?	-	+	-	+	+	+	-	+	-	+	+	-	+
Chang and Lin (2005)	-	-	-	-	+	+	+	+	+	+	N/A	+	+	+	+	+
Chang *et al.* (2006)	-	-	-	-	+	+	+	+	+	+	N/A	+	+	+	+	+
Charras and Gzil (2013)	-	-	-	+	?	?	+	+	+	+	N/A	+	+	+	+	++
Chenoweth *et al.* (2009)	+	+	-	+	+	+	+	N/A	+	+	N/A	-	+	+	?	++
Chenoweth *et al.* (2014)	+	+	-	+	-	+	+	N/A	?	+	N/A	+	+	+	+	++
Clare *et al.* (2013)	+	+	-	+	+	+	+	N/A	+	?	N/A	-	+	+	+	++
Davison *et al.* (2007)	?	+	-	-	-	+	-	N/A	-	+	N/A	-	+	+	+	+
Deudon *et al.* (2009)	+	+	+	+	+	?	-	N/A	+	+	N/A	-	+	+	+	+
Dijkstra *et al.* (2002)	+	-	-	+	+	?	+	N/A	+	?	N/A	-	+	+	+	++
Finnema *et al.* (2005)	+	+	+	-	+	+	+	N/A	+	?	N/A	-	+	+	+	++
Fossey *et al.* (2006)	+	+	-	+	?	+	+	N/A	+	+	N/A	-	+	+	?	+
Fritsch *et al.* (2009)	?	-	-	-	-	?	+	N/A	-	+	-	-	+	+	-	+
Fuchs-Lacelle *et al.* (2008)	-	?	+	+	+	+	+	N/A	+	+	N/A	-	+	+	+	+
Goyder *et al.* (2012)	-	-	-	-	+	+	-	N/A	+	-	-	-	+	+	+	+
Gozalo *et al.* (2014)	+	?	-	+	-	+	+	N/A	+	-	N/A	-	+	+	+	+
Gulpers *et al.* (2011)	-	-	-	+	+	+	+	N/A	-	+	N/A	+	+	+	+	++
Gulpers *et al.* (2013)	-	-	-	+	+	+	+	N/A	-	+	N/A	+	+	+	+	++
Hoeffer *et al.* (2006)	-	-	-	-	+	+	+	+	+	+	N/A	-	+	+	+	+
Huizing *et al.* (2006)	-	-	-	+	+	+	+	N/A	?	-	N/A	-	+	+	+	+
Jeon *et al.* (2013)	-	-	-	-	+	+	+	N/A	+	-	N/A	-	+	+	-	+
Kovach *et al.* (1999)	-	-	-	-	+	+	+	N/A	+	+	N/A	-	+	+	?	+
Kovach *et al.* (2006)	+	+	+	+	+	?	+	N/A	+	+	-	-	+	+	+	+
Leone *et al.* (2013)	?	?	+	+	+	+	+	N/A	+	+	N/A	-	+	+	?	+
Magai *et al.* (2002)	?	-	+	+	+	-	+	N/A	+	+	N/A	-	+	+	+	0
Matthews *et al.* (1996)	-	-	-	-	+	?	+	N/A	?	+	N/A	-	+	+	+	+
McCallion *et al.* (1999)	+	-	-	+	?	+	+	N/A	+	+	+	-	+	+	+	+
Pellfolk *et al.* (2010)	+	?	+	?	+	+	+	N/A	+	-	N/A	-	+	+	+	++
Robison *et al.* (2007)	+	?	-	-	+	+	?	N/A	?	+	N/A	-	+	+	+	++
Schrijnemaekers *et al.* (2002)	-	+	-	-	+	+	+	N/A	+	+	N/A	+	+	+	+	++
Sidani *et al.* (2009)	-	-	-	-	-	-	-	N/A	-	+	-	-	-	-	-	+
Sidani *et al.* (2012)	-	-	-	-	-	-	-	N/A	+	?	?	-	+	-	?	+
Sloane *et al.* (2004)	+	+	+	+	+	+	-	+	+	+	N/A	+	+	+	+	+
Smith *et al.* (2005)	-	-	-	-	+	+	?	N/A	?	+	?	-	+	+	?	+
Testad *et al.* (2010)	-	-	-	+	-	+	-	N/A	+	+	N/A	-	+	+	-	0
van de Ven (2013)	+	+	-	?	-	+	+	N/A	+	+	N/A	-	+	+	-	0
van der Kooij *et al.* (2013)	+	+	-	-	+	+	+	+	+	+	N/A	+	+	+	+	++
Verkaik *et al.* (2011)	+	+	-	+	+	+	+	N/A	+	+	+	-	+	+	+	++
Visser *et al.* (2008)	+	?	-	-	-	+	?	N/A	-	+	N/A	-	+	+	-	++
Wells *et al.* (2000)	+	-	-	+	+	+	-	N/A	+	+	N/A	-	+	+	?	+
Wenborn *et al.* (2013)	+	+	-	+	+	+	+	N/A	+	+	N/A	+	+	+	+	++

L=Low Risk, U=Unclear, H=High Risk. 1. Random sequence generation; 2. Allocation sequence concealment; 3. Blinding of personnel/care providers; 4. Blinding of outcome assessor; 5. Incomplete outcome data; 6. Selective Reporting; 7. Group similarity at baseline#; 8. Co-interventions#; 9. Intention-to-treat-analysis; 10. Timing of outcome assessments#; 11.

Other Bias; 12. Blinding of participants; 13. Is the study design appropriate to the research objective?; 14. Has the intervention been implemented properly?; 15. Compliance#; 16. Critical appraisal (quality).

Appendix Table (*B. summary of studies*)

Design	Population	Intervention (Intervention Code)	Outcomes measured and key results
Beer *et al.* (2011). Quality=++; Comment. Education tailored to staff needs to improve multiple aspects of QOL for residents. Adequate methodology and analysis but poor attendance at education and very low return of staff questionnaires, possibly due to low staff engagement.			
Cluster RCT 39 facilities clustered in 4 conditions (staff education, GP education, staff + GP education, normal care control). Baseline (T1), follow-up at four weeks (T2), then six months after education finished (T3).	Residents: Group 1 Time 1=62, Time 3=41; Grp 2 T1=58, T3=41; Grp 3 T1=99, T3=74; Grp 4 T1=132, T3=95. Between 73% and 78% female; M age between 84.4 (SD=8.1) and 86.4 (SD=6.6). MMSE median between 10 (range 4-17) & 16 (range 8-20). Staff: Overall sample size of 450 at baseline and 398 post-intervention. Not reported by condition. Low proportion who completed the attitude/knowledge survey, median age from 46 to 55, and mainly care assistants. Attrition: Attrition fully described. Mostly due to resident death, more often male, took more medications and had lower QOL at baseline. Baseline and these differences controlled for in analysis.	Staff in nursing homes and GPs servicing them identify their primary dementia education needs. Used to devise an education package, comprising 30 min. modules which can be arranged to meet the needs identified and can be of varying lengths as required. Education delivered in groups to staff and face-to-face or by self-directed learning for GPs. Topics included: communication, personal care and activities, positive values, behaviours of concern, pain management, the 3 D's (dementia, delirium, depression), and working between GPs and nurses. Concurrently, a dementia champion was recruited in each facility to help encourage change. Mean number of sessions provided unclear. **(4)**	Resident QOL: Self rated (QOL-AD) and staff/family rated (QOL-AD, ADRQL). Challenging behaviours: NPI-NH and associated staff distress (NPI Distress scale). Pain: Brief Pain Inventory, PAINAD. QOC: Restraint: Frequency of any physical restraint. Staff: Survey of attitude, knowledge, skills and care practice devised by research team. Increase in pain documentation in intervention groups but shows increased pain. Increased documentation of case conferencing in intervention groups. Mixed results in QOL for facilities with better attendance but no consistent effect on any other variable for intervention staff.
Boettcher *et al.* (2004). Quality=+; Comment. Looking at the impact of PCC training (including ongoing support) on staff behaviours towards residents. Appears to be a convenience sample, with no control group. Statistics are satisfactory but there is a lack of follow-up.			
Uncontrolled before and after Baseline (T1), 2 months post-training (T2).	Intervention residents: n=50. Intervention staff: Certified Nursing Assistants (CNA) n=46; Nurses n=38; 93% female; 32% older than 40. Attrition: No mention of attrition.	PCC education delivered to CNAs and nurse-mentors over 5 sessions and included such areas as communication skills and skills for individualising care plans. 4 further mentoring sessions covering observation, feedback, goal-setting, and problem-solving. Homework, role-plays and on-the-job coaching were included, as were giving mentors the tools and skills to support CNAs. CNAs and nurse-mentors also received individual coaching. **(4)**	Staff behaviour: Observation of staff/resident interactions on 7 domains (Behaviourally Anchored Rating Scales developed by researchers. Domains: Nonverbal initiation of person centred interaction; assistance with independence oriented tasks; conversation; interacting with residents using unique details of their lives; initiating lifestyle activities; responding to need-driven behaviours; person-centered interaction with family). Significant improvements in 4 of 7 PCC domains: nonverbal initiation of PCC; assisting residents with independence-oriented tasks; verbal conversation; and using unique details of the resident's life.
Bourgeois et al.(2004). Quality=++. Comment. Practical attempt to improve communication in personal care but no resident outcomes.			

Cluster controlled before and after 7 facilities which each have separate wings for intervention control groups. Baseline (T1) lasting 4 weeks; after training lasting 2-3 weeks at about 4 weeks (T2), and three months later (T3).	Residents: Intervention=63, 81% female, age 84.17 (SD=6.57), MMSE 11.79 (SD=6.52); Control=62, 79% female, age 84.75 (SD=7.19), MMSE 11.73 (SD=6.73) Attrition: No mention of attrition. Staff: Intervention=57, 93% female, M age 35.5 (SD=7.70), 14.12 years education, 23 Licensed Practical Nurses (LPNs); Control=69, 88% female, M age 33.76 (SD=8.19), 14.83 years education.	Initially: One hour didactic lecture on effective communication skills during personal care and use of memory books. 12 page memory books produced were about residents' life including photos and also responses to problem behaviours which had helped staff. The memory book was an aid to both resident and staff. Staff were then mentored 1:1 during care interactions with their resident (M no. of sessions=8.35, range 3-15) until they showed use of the techniques required to criterion, including memory book. Finally, a 'staff management system' comprising daily self-monitoring forms, monitoring by trained LPNs and a staff motivation system (e.g. public posting of training progress). **(4)**	Knowledge: Test 1 hour and 1 week after didactic training. Care interaction skills: Observation using computerised program. Looking for effective communication skills, effective instructions and ineffective instructions. No difference between groups on knowledge. All skills and effective instructions improved at T2. No effect for ineffective instructions. Skills maintained to T3: Announce ADL, wait 5 seconds before helping, clear instructions, and positive feedback. Use of the memory book declined to almost nothing.
Bouwen et al. (2008). Quality=++. Comment. Good study targeting falls. Controlled as much as possible for bias except that, in three facilities, they have both conditions			
Cluster RCT 10 wards from 7 facilities randomised in control (5 wards) and intervention (5 wards). 6 months preceding education (T1) and 6 months following education (T2).	Intervention Residents: N=210; 74.76% female; M Age=83.12 (SD=9.2); 152 score < 23 on the MMSE; 73.13% showed impaired mobility on TUGT. Control Residents: N=169; 75.74% female; M Age=84.3 (SD=8.0); 99 score < 23 on the MMSE; 67.92% showed impaired mobility on TUGT. *Means scores not reported but authors suggest no differences in MMSE, nor mobility but do suggest difference in falls. Attrition: attrition acknowledged but no details.	After a six month review of medical files undertaken by outside research staff and of which staff are unaware, staff received 'multi-facetted' training over six weeks on risk factors for falls and possible environmental or behaviour changes that could reduce risk. During the intervention nurses were also required to keep a fall diary, recording each fall, risk factors and possible interventions. **(1)**	Falls: From medical records, no. of falls pre-intervention (over 6 months) and post-intervention (over 6 months). Only falls with medical consequences were noted (e.g. nursing/doctor examination, medication, stitches). No difference between intervention and control group in no. of falls. There was a 50% reduction in no. of people who have at least one fall post intervention.
Burack et al. (2012). Quality=+; Comment. This multi-faceted trial is clinically very impressive but did not address risk of bias. Despite a focus on improving QOC, the only outcome is CMAI, no staff measures. Only overall F-values are shown. Non-significant p-values are not shown unless approaching significance.			
Cluster non-randomised 7 facilities taken from 3 campuses comprise the treatment group,	Intervention Residents: Descriptive data only reported for residents remaining at T2: N=50; 62% female; M Age=83.84 (SD=8.8); M MDS-CPS=2.8 (SD=1.91). Control Residents: N=51; 67% female; M Age=83.47 (SD=9.8); M MDS-CPS=3.18 (SD=2.15).	Multifaceted intervention to create a culture of PCC: 1) Community coordinator positions. Education included: leadership, administration, human resources, investigations of incidents and accidents, environmental and social services, resident rights, and PCC. 2) Staff	Challenging Behaviours: CMAI categories forceful behaviours (physical aggression), physical agitation (physically nonaggressive behaviour) and verbal agitation. Changes in challenging behaviours at 24 months.

and 6 facilities from the same campuses comprise controls. Baseline (T1) and 2 years later (T2).	* Baseline Imbalances: ADL (control group more impaired) and ethnic mix (more white residents in intervention group). Differences in ADL scores were controlled for in outcome analysis. No differences between groups on other factors like no. of co-morbid disease diagnoses. Attrition: Attrition fully described. 100 died, were moved, could not be interviewed, or could no longer give consent (nobody to sign for them) by T2, leaving an overall sample of 101 with data at both time points. No sig differences between those who dropped out and those who remained.	education about culture change and PCC. Education included: team-building; didactic customer service training, focusing on PCC and included trips to other facilities already implementing the culture change model. 3) Organisational and community structure changes. Flattening of the organisational framework. Department heads utilised as discipline specific experts. 4) Meaningful activities. Increased focus on implementing activities that reflected resident preferences and encouraging community based activities and staff participation. 5) Family involvement. Family members were educated about the culture change process, and were asked to participate. 6) Community coordinators and staff members participated in a flexible staff-scheduling process to reduce floating and promote consistent staffing. 7) Environmental changes were implemented, with a focus on person-centered needs. **(6)**	Intervention group maintained baseline levels of physical agitation and forceful behaviours, while control showed significant increase two years later. No significant finding for verbal agitation.
Burgio et al. (2002). Quality=+; Comment. Good study both clinically as well as methodologically. Examines the effect of education, plus different intensities of supervision on a ranges of QOC, Staff and QOL of life factors. It has all three components of the model and explores whether or not motivation makes a difference. Some selective reporting of results.			
Cluster and controlled before and after Two groups: Formal staff management (FSM: involving extensive training plus staff motivational system), Control conventional staff management (CSM: received the same	Intervention Residents: n=47; 85.11% female; M Age=82.17 (SD=10.10); M MMSE=6.69 (SD=9.17), M Barthel (ADL scale)=3.10 (SD=0.72), M CDR=2.55 (SD=0.79); Medications %: cardiovascular 32.14; analgesic 60.71; anticonvulsant 21.43; antidepressant 23.21; tranquilizing 21.43; anxiolytic 39.29. Intervention Staff: N=46; 93.33% female; M Age=40.19 (SD=9.73); All CNAs; M months working CNA=126.43 (SD=90.72), M months at facility=99.43 (SD=79.12), M yrs. education=13.07 (SD=1.26). Control Residents: n=32; 65.63% female; M Age=77.4 (SD=11.73); M MMSE=6.59 (SD=7.59), M Barthel (ADL scale)=3.00 (SD=0.78), M CDR=2.52 (SD=0.69);	All staff (CNAs, LPNs) received 4 weeks of behaviour management training comprising: 5-hrs of in-service training over 3 consecutive days during Week 1. Topics included: identifying environmental factors that could affect resident behaviour, communication skills and behaviour management techniques. Weeks 2-4 provided hands-on training in behavioural skills on the unit. CNAs were observed during care interactions and provided with feedback. After the training period CSM units continued their normal supervision routine without additional training or feedback. FSM units	Knowledge: Test immediately after education training. Challenging Behaviour: CMAI. One item in CABOS: Resident agitation. Two separate ways of measuring: proportion of time % during personal care, and during observations through the day. QOC: Observation of staff behaviour using 1) BMSC: Effective and ineffective behaviour skills occurrence per care session and communication skills (rate per hour): Effective communication skills (announcing single activities, positive statements, prompting single activities, delayed physical assistance following announcement, and after a verbal prompt); ineffective skills (announcing multiple activities, prompting multiple activities). 2)

training but not the motivational system spread) Baseline (T1), post-intervention (T2), follow-up after three months (T3) and six months (T4).	Medications %: cardiovascular 42.42; analgesic 63.64; anticonvulsant 21.21; antidepressant 21.21; tranquilizing 21.21; anxiolytic 45.45. Control Staff: N=39; 89.47% female; M Age=39.44.19 (SD=10.27); All CNAs; M months working CNA=129.35 (SD=99.77), M months at facility=92.35 (SD=77.94), M yrs. education=13.11 (SD=1.33). *Imbalance to do with the different sizes of units - thus larger units allocated to FSM tend to have more admissions and this is a rolling study. Sig. more females in FSM treatment. Attrition: Attrition described in some detail. 9 of the 88 residents withdrew between T1 and T2. Exact number remaining at 2 month follow-up and 6 month follow up are not reported. 25 staff withdrew between T1 and T2 due to moving units. No difference between those who withdraw and those who did not in length of time working a CNA, length of time they've worked in facility, education, gender, ethnicity, age.	implement the FSM system from intervention outset. This included: (1) clear and specific description of behavioural skills; (2) CNA self-monitoring; (3) LPN monitoring of CNA skills; (4) verbal and written performance feedback; (5) Incentives. Training in the FSM model was provided to staff and Supervisors received 2 hrs of in-service training and an average of two short, hands-on training sessions. **(3)**	CABOT: positive statements (per hour), verbal prompts (per hour) and physical assistance to resident (% time) by CNAs during care interaction and during observations throughout the day. Significant improvement in knowledge for both FSM and CSM post training. BMSC post training: Both groups show sig decrease in ineffective behaviour management but no difference between conditions. This was not maintained at 3 or 6 month. No time or group effects for effective behaviour management skills. Communication skills: For both groups, sig. improvement pre and post-training for 5 of the 7 effective strategies and the ability to delay physical assistance during care. Counterintuitively, announcing multiple activities sig. increased between pre and post-training. Announcing single activity both maintain improvement to 3 months but FSM superior at 6 months, CSM stays the same. There was no difference in delaying physical assistance after announcement at post-training but FSM significantly better at 6 months. FSM superior at 3 and approached significance at six months for verbal prompting of multiple activities. There is a general training effect for reduced resident agitation during care and increased positive statements both during care and during the day but no FSM effects and no other effect at 3 and 6 months. 3 month increases in positive statements during care were maintained, but still no difference between groups. Positive statements through day declined back to baseline at 3 and 6 months with no group differences. CSM staff interact with residents during day much more at 6 months than FSM group.
Chang and Lin (2005)[1] Quality=+; Comment. Comprehensive feeding program, with a number of staff-related, QOC and QOL measures. Small sample size and no details about residents. Same study as below and large overlap in the papers.			

[1] Chang et al. 2005 and Chang et al 2006 are from the same study.

Controlled before and after Baseline (T1), post program (T2).	Intervention Staff: n=31; 100% female; M yrs. Experience=3.6 (SD=3.2); All Nursing Aids (NAs). Control Staff: n=36; 94.40% female; M yrs. Experience=5.2 (SD=2.5); All NAs. No details around residents, except to say that residents in the intervention group were older. M Age: Intervention=84.2 (SD=4.0); control=72 (SD=5.8). *Baseline diffs in staff experience between conditions. Controlled for in analysis. Attrition acknowledged with few details: 1 staff member left from control group after T2 due to family emergency.	Intervention group participated in a feeding skills training program. Training included 3 hours of didactic education, plus 1 hour of hands-on training. Topics covered areas like an overview of dementia and managing feeding problems. The protocol contained: instructions on preparing the mealtime environment, resident-staff interactions, and skills to deal with food refusal. Staff received a written manual on feeding skills. Class was followed by a 1-hour 1:1 hands-on training. **(2)**	QOL: EdFED; eating time; food intake Staff: The Formal Caregivers' Knowledge of Feeding Dementia Patients Questionnaire; Formal Caregivers' Attitude toward Feeding Dementia Patients Questionnaire; Formal Caregivers' Behaviors toward Feeding Dementia Patients Observation Checklist. Measures developed by principal investigator. At T2, compared to the control group intervention staff more knowledgeable, more positive attitude and better feeding behaviours. Residents in treatment group had longer eating time and higher EdFED scores (i.e. greater feeding difficulty). No significant difference on food intake.
Chang et al. (2006). Quality=+; Comment. As above. Same study and almost identical paper, though the quality of life measures were not reported here. Slightly longer follow-up.			
Controlled before and after Baseline (T1), post program (T2), and 4 weeks after that (T3).	Intervention Residents: n=20 (no other details). Intervention Staff: n=20; 100% female; M Age=44.7 (SD=5.7); M yrs. Experience=3.6; M yrs. in current psn=1.7; All NAs Control Resident: n=16 (No other details). Control Staff: n=16; 87.50% female; M Age=40 (SD=9.3); M yrs. Experience=5.2; M yrs. in current psn=3.3; All NAs *Baseline diffs (Intervention nurses older, less experienced, been in current position fewer years and higher attitude scores) but controls for this in analysis. Attrition acknowledged with few details: 1 staff member left from control group after T2 due to family emergency.	As Above. **(2)**	Staff: The Formal Caregivers' Knowledge of Feeding Dementia Patients Questionnaire; Formal Caregivers' Attitude toward Feeding Dementia Patients Questionnaire; Perceived Behavior Control Scale; Intention Scale=2 item visual analog; Formal Caregivers' Behaviors in Feeding Dementia Patients Observation Checklist. Measures developed by principal investigator. Knowledge better for intervention group staff; no difference in attitude, perceived behaviour control. Intention to feed frequency superior for intervention staff, but no diff in belief whether new feeding skills necessary compared to control. QOC: Observed feeding behaviour by staff improves for the intervention group, not for controls, eg allowing more time and dealing with feeding problems.
Charras and Gzil (2013). Quality=++; Comment. Nice, simple and practical intervention looking at the effects of staff wearing street clothes of residents QOL.			
Cluster and controlled before and after	Total N=35; 97% female. Intervention Residents: n=13; M Age=84.08 (SD=6.55); M MMSE=7.85 (SD=5.87).	Examined QoL-AD when staff wear street clothes for all care (other than hands on body care) and whether they wear uniforms. They did it for three months. Whether to be a	QOL: QoL-AD. T1 to T2 show that wearing street clothes leads to better global QoL-AD scores and items concerning ability to do

4 units (2 control, 2 intervention) Baseline (T1) and 3 month follow-up (T2).	Control Residents: n=14; M Age=80.78 (SD=9.86); M MMSE=9.37 (SD=6.39). NB: not all able to take MMSE, so severity underrated. Attrition acknowledged but limited details: Between Baseline and Time 2, 7 die and one is transferred.	uniform facility (2 SCUs) or a street-clothes facility (2 control SCUs) was decided by the staff themselves. **(5)**	chores around the house, family and self as a whole. Qualitative assessment suggests that it helps. Recognition of carers, more engagement in everyday activities, families after a time are in favour, caregivers feel more comfortable and engage more, and it's more hygienic not to have uniform on all the time. Only advantage of uniform is that residents quicker to recognise that it is time to get up than when staff have street clothes.
Chenoweth et al. (2009). Quality=++; Comment. Impact of DCM vs PCC vs control on a range of QOC and QOL variables. Enormous attention paid to cover most sources of bias, including assessor bias, as well as careful recruiting, using good instruments to make samples as matched as possible.			
Cluster RCT 3 clusters (Dementia care mapping, person centred care, usual care) -5 facilities each Baseline (T1), 4 months after intervention (T2) and 4 month follow-up (T3).	DCM Residents: n=109; 83% female; M Age=83.00 (SD=7.6); Dementia Severity classification scale total score=76.0 (SD=7.0), GDS=5.6 (SD=1.3); Comorbid diseases=2.2 (SD=.94). PCC Residents: n=98; 76% female; M Age=84.00 (SD=6.40); Dementia Severity classification scale total score=81.5 (SD=8.2), GDS=5.6 (SD=0.73); Comorbid diseases=2.0 (SD=1.1). Control Residents: n=82; 73% female; M Age=85.00 (SD=6.6); Dementia Severity classification scale total score=75.8 (SD=8.0), GDS=5.3 (SD=1.1) Comorbid diseases=2.4 (SD=0.86). * PCC intervention groups have lower TESS-NH safety, and PCC sites had more QUIS social interactions and care interactions. Resident characteristics: PCC sites had higher proportion with Resident Classification Scale (RCS) level 1 (High needs). Usual care sites have less severe dementia and more comorbid illness. Baseline differences were controlled for in analysis. Attrition acknowledged with some detail: 18% lost, 236 remain in the study. Those lost have same CMAI and NPI as survivors. But survivors have lower QUALID.	Person centred care (PCC): 2-day training sessions in PCC for 2 care staff from each site. Topics included things like viewing behaviour as communication. Also explored how staff actions can contribute to behaviours and highlighted the importance of social interactions. Staff assisted to develop and implement PCC care practices for approx 1/3 of participating residents. Two visits to each site and regular telephone contact over the 4-month intervention period supported staff to change practices to include person-centred care for all residents.**(5)** Dementia Care Mapping (DCM): Two care staff at each of 5 sites were trained by a Bradford-trained expert did mapping with DCM qualified researchers for 6 h per day for 2 days, to identify factors related to resident wellbeing. Staff then assisted to develop individualised care plans using the individuals' histories, needs, and preferences. Trained staff helped others to implement PCC plans. Regular telephone support provided. **(2 and 5)**	Challenging Behaviour: CMAI, NPI-NH. Psychotropic use: From records: Converted into equivalents. QOL: QUALID. QOC: Observation of staff behaviour using QUIS; falls, fractures, lacerations, bruises, medication mistakes, behavioural incidents, and admissions to hospital over 3 month period. Restraint: Number, type, duration of use of restraint during observations. CMAI score was lower in sites providing mapping and person-centred care, compared with usual care. Fewer falls were recorded in sites that used mapping but there were more falls with person-centred care compared with usual care. There were no significant effects in any other variables.
Chenoweth et al. (2014). Quality=++; Comment. PC and PCE on QOL and QOC, including costs. Combination of interventions used to tease out the key elements.			
Cluster RCT Four conditions: 1)	Intervention Residents:	Two main interventions assessed separately and together: Person-Centred Care (PCC) and	Challenging Behaviours: CMAI.

Usual care + usual environment (UC+HE): 8 homes; 2) PCC: 10 homes; 3) Person centred environment (PCE): 10 homes; 4) PCC + PCE: 10 homes Baseline (T1), four months post intervention (T2), and 8 month follow-up (T3).	PCC: n=155; 67% female; M Age=84 (SD=8.0); GDS=90% severe/very severe; 51% >3 medical/physical comorbidities; 58% receiving antipsychotics. PCE: n=154; 66% female; M Age=84 (SD=8.0); GDS=82% severe/very severe; 35% >3 medical/physical comorbidities; 49% receiving antipsychotics. PCC+PCE= n=150; 70% female; M Age=84 (SD=7.0); GDS=85% severe/very severe; 55% >3 medical/physical comorbidities; 38% receiving antipsychotics. Intervention Staff: 5 recruited at each of the 19 homes getting PCC (i.e. PCC and PCC + PCE and train them in PCC (n=95); 19 Care Managers, 19 RNs, 38 ENs/assistants in nursing, and 19 Diversional Therapists. Usual Care + Usual Environment (UC+HE): n=142; 77% female; M Age=86 (SD=7.0); GDS=88% severe/very severe; 68% >3 medical/physical comorbidities; 35% receiving antipsychotics. * Residents in PCC and PCE homes have more antipsychotic meds and people in control homes have more co-morbid medical conditions, and they are least prevalent in PCE homes. Differences are controlled for in analysis Care service quality scores showing less room for improvement tended to be in PCC condition. * Completers and non-completers had similar characteristics and pre-intervention CMAI scores, DemQOL proxy scores, ERIC ratings and for all other outcomes. Attrition fully described: 185 residents gone by Time 2, mostly died but two homes withdrew. Sample by condition at Time 2: UC+HE: 7 homes, n=95; PCC: 9 homes, n=98; PCE: 10 homes, n=105; PCC + PCE: 10 homes, n=118. Total of 305 gone by Time 3, leaving 296. Cause mostly death, but some moved or now too sick. UC+HE: 7	Person-centred Dementia Care Environment (PCE). PCC: Five staff (care manager, RN, 2 ENs, AIN, diversional therapist) from each of the 19 PCC homes were trained using experiential and adult learning approaches. 32 hours of off-site training including things like paying attention to residents' feelings when they are agitated. This was followed by on-site supervision and telephone support. PCE: Two experts in PCE planned and supervised the implementation of PCE interventions with AUD$10,000 per home in the 10 PCE alone homes and in 6 of 10 PCE and PCC homes. Prior to implementing PCE the Environmental Audit Tool (EAT) scores identified features in each home that could be improved. **(2)**	Mood/Affect: Cornell, ERIC (Emotional Responses, % positive interactions). QOL: DemQOL proxy. QOC: Care practice quality (QUIS, % positive interactions) COSTS: It cost $AUS 136, 220 to deliver PCC to 19 homes=$7,169 per home. It cost $13, 964 total per home to deliver PCE (because not all homes did anything). There are small but significant effects on QOL which improves over time for all the intervention sites but it is not clear whether it had occurred by T2 or T3. Significant small decline in agitation or PCC and PCE homes but not usual care and PCC + PCE. Improvement for the ERIC for the PCC + PCE condition. Cornell no effect. Improvements for the QOC Interactions for the PCC + PCE conditions up to T2 but it disappears again at T3. In summary, only the PCC + PCE condition flowed through to QOC and thence to improved ERIC but the QOC didn't last.

	homes, n=64; PCC: 9 homes, n=64; PCE: 10 homes, n=79; PCC + PCE: 10 homes, n=89.		
Clare et al. (2013). Quality=++; Comment. QOL and QOC impact from staff education and supervision around residents' awareness. High quality, with careful methodology, including controlling for assessor blinding.			
Cluster RCT Two clusters: 1) AwareCare, 2) Control, each 4 facilities Baseline (T1) and follow-up (T2; time not specified but appears to be directly after).	Intervention Residents: n=32; 78.13% female; M Age=82.30 (SD=7.4); all severe dementia. Intervention Staff: n=32; 75.86% female; M Age=38.90 (SD=9.8); Level of Training: 5 no qualifications, National Vocational Qualification (NVQ) Level 1=2, Level 2=9, Level 3=9, RN=4. Control Resident: n=33; 78.79% female; M Age=84.36 (SD=8.5); all severe dementia. Control Staff: n=33; 82.14% female; M Age=38.80 (SD=9.9) Level of Training: 6 no qualifications, NVQ level 1=0. Level 2=9, Level 3=11, RN=2. * Intervention group more impaired on FAST. This was controlled for in analysis. Attrition acknowledged with some details: No residents lost to follow-up but 3 Intervention staff left before T2; four control staff left facility and one on maternity leave.	Intervention took place over an 8-week period. In weeks 1 and 2, care staff participated in 2 x 90-minute training sessions covering: the nature of residents' awareness, the AwareCare observational measure of awareness in severe dementia, and communication skills with severely impaired residents. For the second session, staff were each given an individualised schedule for observing 6 residents for a 10-minute period during weeks 3 to 8 and to participate in fortnightly group supervision sessions. Individual support was offered weekly between sessions and where staff members were unable to attend scheduled group supervision. **(3)**	QOL: QUALID, wellbeing (PRS). Behaviour: Self-care, sensory ability and mobility (BASOLL). QOC: Maslach, GHQ, ADQ, DCPA. There was a significant improvement in QUALID for intervention residents when rated by family members but not when rated by staff. Staff scores considered more valid because family scores collected for only half the sample. There were no other effects. Qualitative findings revealed 3 themes; 1. The intervention was informative and made staff feel more effective; 2. It was beneficial to spend more time with residents because it helped staff understand them better; and 3. They realised that residents more aware and responsive.
Davison et al. (2007), Quality=+; Comment. Well planned and executed intervention involving staff education and peer support but have not dealt with many sources of bias, like baseline imbalances - or even giving baseline characteristics.			
Cluster RCT Three clusters: 1) Dementia training, 2) Dementia training + support, 3) Control - each with 2 facilities Baseline (T1), post-training (T2) and 6-month follow up (T3).	(Participants characteristics only reported for those who remained at follow-up) Training + Peer Support Residents: n=35. Training Alone Residents: n=46. Whole resident sample (not reported by condition): 81.42% female; M Age=85 (SD=9). Dementia Severity not reported. Training + Peer Support Staff: n=29. Training Alone Staff: n=35. Whole staff sample (not reported by condition): 90% female; M Age=45 (SD=11); 44 RN, 46 PCAs. Control Residents: n=32.	Facilities received a dementia training program consisting of eight 60–90 min sessions, using both didactic and experiential learning. It focused on skills for caring for residents with challenging behaviours. Staff identified topics for five peer support sessions (30-60mins, researcher facilitated). Enabled staff to discuss challenging behaviours and their emotional reactions to the behaviours and coping with work-related stress. **(3)**	Challenging Behaviour: CMAI. QOC: Staff interactions with residents (Scale of Nursing Performance -adapted), Maslach, Staff nursing performance (The Self-Efficacy of Dementia Care). No results on CMAI, Maslach, by 2 month follow-up and maintained at 6 month. Effect of training compared to control group from T1 to T2 was maintained at T3. However the effect is for training overall over controls. Having additional peer support makes no difference.

	Control Staff: n=26. Attrition acknowledged with some details: 12 residents died and 42 staff withdrew (More from training without peer support than training +support or control).		
Deudon et al. (2009). Quality=+; Comment. Exceptional attention paid in this practical staff education and supervision program. Significant baseline differences on key outcome measures.			
Cluster RCT Two clusters: 1) Intervention, 2) Control, 8 facilities each Baseline (T1), post-intervention at 8 weeks (T2) and 20 week follow-up (T3).	Intervention Residents: n=174; 77% Female; M Age=86.5 (SD=7.6); M MMSE=9.2 (SD=6.8) Control Residents: n=132; 78.8% Female; M Age=86 (SD=6.7); M MMSE=12.1 (SD=6.0) *Control had more hospitalisations pre intervention than intervention. Intervention higher on CMAI global, physical aggression, physical non-aggress, and verbal non-aggress, NPI, and CMAI OS scores. Attempted to control for difference in some statistical tests. Attrition acknowledged with some details: 2 residents lost for each group at T2; 16 lost from the intervention group at T3; 18 lost from the control by T3. Attrition mostly due to death.	Firstly, a 90-min teaching session on dementia, BPSD and the use of 4 instruction cards for staff, outlining practical ways of dealing with BPSD: 1) general guidelines on what to do/what to avoid with different behaviours. 2) How to act during the day to avoid or to decrease behaviours. 3) & 4) recommendations and examples of on non-pharmacological interventions to deal with individual instances of BPSD. The rest of the program consisted of individual and interactive sessions, with personalised, constructive advice and feedback. The importance of using the instruction cards in daily practice was reinforced. Trainers worked with each staff member for 2 hours, twice a week during the first month, and then once a week during the second month. The total training time was 24 h. **(3)**	Challenging Behaviour: CMAI, observation of challenging behaviour (CMAI-OS, frequency of 25 specific behaviours over 3 min period), NPI-NH (Psychotic and hyperactivity subgroup). QOC: Psychotropic use, hospitalisations. QOL: Measurement is unclear. As analysed using Mixed Linear Models, the intervention led to improvement in challenging behaviour as measured by: the CMAI Global Score, the Physical non-aggression factor (PNA), and Verbal non-aggression (VNA) between T1 and T2, and T3; the CMAI OS, and one subscale of the NPI: The Hyperactivity Scale (which has most agitation). No change in the control group. No effect on hospitalisations, psychotropic use, and QOL.
Dijkstra et al. (2002). Quality=++; Comment. Targeted intervention looking at enhancing communication strategies for staff use with residents. Data collection points are not clearly defined.			
Randomised Controlled before and after 7 homes. Residents randomly assigned to intervention or control Baseline (T1) and post treatment (T2).	Residents (not split by group): N=66; 83% Female; Early Stage Dementia: MMSE=20.9 (SD=2.7), M Age=83 (SD=5.6). Middle Stage Dementia MMSE=13.3 (SD=2.1), M Age=86.5 (SD=6.5). Late Stage Dementia: MMSE=5.3 (SD=2.8), M Age=85.6 (SD=6.1). There were 33 in each group with an even spread of early, mid to late dementia. Intervention Staff: n=21; 85.71% female; M Age=36 (SD=7.7); Education M Yrs=13.2 (SD=2.2). Control Staff: n=19; 84.21% female; M Age=36 (SD=7.1); Education M Yrs=14.2 (SD=0.9).	Communication enhancing strategies: 1. Personalised memory books. Staff were trained in use them as visual prompt and tool to reduce problem behaviours. 2. 1 hour didactic lecture and 2 - 4 week hands-on training around effective communication techniques during care routines (e.g. use of short sentences, postive feedback to residents, giving sufficient time to respond to an instruction). Support continues until staff reached a certain criterion on an assessment scale. **(4)**	QOC: from transcripts of conversations, discourse characteristics of staff. QOL: from transcripts of conversations, discourse characteristics of residents. Increase in coherence, decrease in empty phrase for residents the treatment group. Increase in staff use of facilitators, such as cues and encouragement.

	*More females in resident treatment group. No mention of attrition.		
Finnema et al. (2005). Quality=++; Comment. Good clinical attempt to institute emotion-oriented care. Sound methodologically.			
Cluster RCT Two clusters: 1) Emotion-oriented care, 2) Control - 8 facilities each Baseline (T1), 7 month follow-up (T2) (additional data also collected after 3 months to check for confounders).	(Participants characteristics only reported for those who remained at follow-up) Intervention Residents: n=100; 81% female; M Age=83.8 (SD=5.3); GDS Scores: Moderate to Severe=43%; Severe to Very Severe=54%; all within the facility for >1 yr. Intervention Staff: n=58; 87% female; M Age=30.8 (SD=8.0); 40 Nursing assistant; M Yrs Experience in Aged Care=6.64 (SD=5.6). Control Residents: n=94; 81% female; M Age=83.6 (SD=5.8); GDS Scores: Moderate to Severe=51%; Severe to Very Severe=43%; all within the facility for >1 yr. Control Staff: n=58; 87% female; M Age=30.2 (SD=7.4); 44 Nursing assistant; M Yrs Experience in Aged Care=6.72 (SD=4.1). * More of the intervention group had a global dementia diagnosis, and fewer Alzheimer's and Vascular. Baseline staff differences were controlled for. Attrition fully described: The final resident sample at T2 with usable data is 67 Intervention, 79 control. Attrition due to death (33), transfer (14) or discharge home (1). 25 staff not available at follow-up due to sickness (11), pregnancy (2), transfer (9), lost questionnaires (3). Final staff sample with usable data is 46 intervention, 53 control. No difference between dropouts and survivors.	Model-care plan training: In all facilities, two half-day modules covering approaching one's work methodically, and developing individualised care plans. Agreements reached in the multidisciplinary groups were monitored. Aimed to align with the normal functioning of the unit. One staff member per unit became an adviser. Supervision: Advisers received a minimum of 3 x half-day supervision on the floor and participated in three x one-day network meetings. Intervention group: In addition to Model-Care plan training and supervision, training and supervision in the application of integrated emotion-oriented care. 1) Basic emotion-oriented care training for all staff members involved in care: Two day course on-site addressing staff members' own experience, the phases of ego-experience of residents with dementia, and the application of non-verbal empathic skills. Training included an intermediary period of two weeks for homework. 2) 5 staff from each ward attended a course on 'emotion-oriented care worker' (team leader/head of ward, psychologist and 2-3 nursing assistants). Seven days of training over 7-8 months. Range of issues covered (e.g. how to make a life history, acknowledging resident's experiences). 3) 'Adviser emotion-oriented care' training course for one motivated staff member per ward, who was then responsible for the implementation on	Challenging Behaviour: BIP; BOP/ASEP; CMAI. Mood/affect: Cornell. Other behaviours: Geriatric Resident Goal Scale, Philadelphia Geriatric Center Morale Scale. Staff: Organization and Stress Scale; GHQ-28; Jalowiec Coping Scale; Nursing Skills in Handling Dementing Elderly *Resident measures were used to develop composite scores for: Maintaining an Emotional Balance; Coping with invalidity; Agitation; Maintaining positive self-image; Developing and maintaining social relationships; Preparing for an uncertain future; Coping with nursing home environment. Effects for resident only for those with mild to moderate dementia: Maintaining an emotional balance (less anxiety), and preserving a positive self-image (less dissatisfaction). For staff there are improvements relative to control on GHQ-28 (stress reactions).

		their ward. Course was for 10 days over 9 months. Prior to implementation, they attended the basic and worker courses and learned to facilitate an emotion-oriented group for residents. 4 x one-day visits to wards to providing supervision on applying the approach in daily care and care forms, using empathic skills, and to give feedback around the multidisciplinary consultation group and the emotion-oriented group. **(6)**	
Fossey et al. (2006). Quality=+; Comment. A comprehensive multi-targeted, case-specific intervention. Brevity of the article means that it is lacking some details.			
Cluster RCT 2 clusters (intervention and control) 6 facilities each Baseline (T1) and 12 month follow-up (T2).	Intervention Residents: n=181; 35% female; M Age=82 (Range 60 to 98); 58% CDR Severe, 27% CDR moderate, 15% CDR None, Questionable, Mild. Control Residents: n=168; 39% female; M Age=82 (Range 53 to 101); 58% CDR Severe, 20% CDR moderate, 23% CDR None, Questionable, Mild. *No baseline imbalances. Attrition acknowledged with some details: Intervention – 69 lost to follow-up. Control – 54 lost to follow-up. Attrition mostly due to death. * Intention to Treat used in analysis, so 176 included for intervention and 170 for control.	Intervention included initial skills training (covering areas like the philosophy and application of person centred care and communication strategies), behavioural management techniques (including the Cohen-Mansfield approach), and weekly group supervision, supplemented by individual case supervision and supervision around issues requiring organisational change. A systematic consultation approach was employed to ensure that "whole home" issues (e.g. care practice) were addressed. **(3)**	Challenging Behaviour: CMAI, episode of aggression in past 12 months. QOC: Psychotropic Use: percentage taking neuroleptics. Mean dose neuroleptics converted to Chlorpromazine equivalents, percentage taking other psychotropic. Falls. QOL: DCM - Mean wellbeing; % of time asleep, and % of time withdrawn. At 12 months follow-up, fewer people in intervention homes taking neuroleptics than controls. No other behavioural or QOL measure changed.
Fritsch et al. (2009). Quality=+; Comment. A worthwhile clinical QOC topic, covered obvious biases including baseline balance - though they do not report what the balance items were nor provide numbers residents and only minimal staff data. Genuine attempt to embed this into the facilities.			
Cluster and controlled before and after 2 Clusters (Intervention, Control), 10 units per condition Baseline (T1), two weeks after the ten week intervention	No Resident information provided. Staff were the participants. Staff: (Descriptives are not split by condition). Overall N=192 participated; Age Range 26 to 45 years; >90% female; 67% nursing assistants, 18% activity staff; yrs. of experience: 66% employed at the facility for >3 yrs., 18% >10 yrs. 17% were new to the facilities, having been employed for 1 year or less. *They report no differences between conditions but do not give specific values.	Train-the-trainer intervention: Staff volunteered for a one-day workshop and a 9-week on-site training with TimeSlip-certified trainers. Onsite training comprised a weekly visit for 8 weeks to model and then observe and comment on the storytelling process. Staff, with trainer assistance, arranged the creation of books of stories for use by storytellers and facilitators. Highly structured training program and certification process to promote	Mood/affect: Philadelphia Geriatric Center Affect Rating scale (Pleasure, Anger, Fear/Anxiety, General Alertness, Other/Neutral, Sadness). Staff interactions with residents: QUIS observational scale: No. and quality of staff initiated interactions with residents (social, care, neutral, protective, oppressive). Staff: Attitude to PWD, job satisfaction, Maslach. QOL: Engagement on four resident engagement domains (social engagement, non-social engagement, disengaged, and challenging behaviour).

(T2)	Attrition: No mention of attrition.	consistency across sites. Program content: TimeSlips storytelling groups, with 10 – 12 residents meeting for one hour every week for 10 weeks. Facilitators -nurses ' aides, social workers, and/or activity directors —handed out a playful theatrical picture to serve as the basis for the story and asked open-ended questions about the picture and recorded residents ' responses. Facilitators then wove the responses into a story, periodically reading it back to the participants as it progressed. The story was later transcribed and, together with the picture, displayed in the residents' unit. Stories were often included in a facility's newsletter or collated into books for families. **(4)**	Higher levels of engagement in intervention facilities, and higher levels of disengagement in control facilities. Intervention facilities showed more frequent alertness, but also more frequent challenging behaviours, sadness and fear/ anxiety. Control group demonstrated more neutral affect. For QOC, observations show more staff initiated interactions for the intervention group with residents and a greater proportion of social interactions. Intervention group demonstrated more social eye contact, touch and verbal communication. Control facility staff demonstrated more care-related touch, and care-verbal interactions. Good outcome also for attitude with intervention group showing less devaluing residents and a more positive view of them than both control group and those that did not attend education. No effect on job satisfaction or burnout.
Fuchs-Lacelle et al. (2008). Quality=+; Comment. Good pain study, covering all the elements with good attention to randomisation, blinding, recruitment. Considers relevant staff variables.			
Cluster RCT 2 clusters (Intervention, Control), 21 units in all. Not clear if intervention gets 11 and control gets 10 Baseline (T1), at the end of 1 month (T2), month 2 (T3) and 3 month (T4).	Intervention Residents: n=89; 70.79% Female; M Age=84.89 (SD=6.54); Present Functioning Questionnaire=38.99 (SD=7.80); Physical limitations of residents: 2.25% none; 4.49% minimal (sight, coordination problems); 31.36% moderate (limited independent mobility or self-care); 43.82% severe (completely dependent on others for movement/self-care). Intervention Staff: n=32; 100% Female; M Age=44.13 (SD=11.42); RN=12; Registered psychiatric nurse=6; Licensed practical nurse=5; Special care aide=9; M yrs. of experience=18.77 (SD=12.23). Control Residents: n=84; 88.1% Female; M Age=85.39 (SD=7.0); Present Functioning Questionnaire=38.86 (SD=7.20); Physical limitations of residents: 0% none; 4.76% minimal (sight, coordination problems; 19.05% moderate (limited independent mobility or self-care);	Intervention: Participating staff were instructed in the use the PACSLAC. During the study period (3 months after initial instructions), staff were asked to complete the PACSLAC at least 3 times/wk. They also used an interpretation sheet to help decide if a score was high compared to typical residents. Staff were instructed to review PACSLAC results during their shift and participating staff were provided with action guidelines. Supervision: Research personnel visited weekly to allow staff to ask questions. Where staff experienced difficulties completing assessments, meetings were arranged to help. Nursing staff in the control group completed an activity log at the same frequency as the intervention group completed the PACSLAC. Introduced during a meeting with the	Pain: 1. PASLAC – Observation measure of Pain behaviours. 2) Medication Quantification Scale (MQS), PRN. Staff: Nursing Stress Scale; Maslach Burnout Inventory. Regular PACSLAC use improved pain management practices, with increased analgesic medications in the intervention group compared to the control. As pain interventions increased, observable pain behaviours decreased. Nurses who used the PACSLAC reported decreased distress and burnout. No reduction in observed PACSLAC scores (by independent researcher) in intervention when compared to control.

	76.19% severe (completely dependent on others for movement/self-care). Control Staff: n=29; 96.55% Female; M Age=46.00(SD=9.88); RN=18; Registered psychiatric nurse=3; Licensed practical nurse=1; Special care aide=6; M yrs. of experience=22.02 (SD=12.23) *Sig differences between intervention and control residents (more physical impairment in control) at baseline, these were controlled for in analysis. Attrition fully described: Total Residents lost before T1=8; by T2=18, T3=80. Final n=101. Attrition primarily due to death (71) and move to another facility (9). 67% of staff withdrew; Of the 61 enrolled at baseline, n=44 after 4 weeks, n=34 after 8 weeks; only 20 completed. Report no differences between those who drop out and those who remain.	researcher. Weekly outreach visits were arranged by research personnel in a fashion that was analogous to the outreach visits for intervention group. **(2)**	
Goyder et al. (2012). Quality=+; Comment. This is high quality education intervention, low quality methodologically.			
Uncontrolled before and after Baseline (T1) and immediately after 8 weeks training (T2).	Residents (not split by group): n=32; 53% female; M Age=83 (SD=6.2); M MMSE=11.3 (SD=4.7). Inclusion criteria means residents had to have anxiety or depression, as well as challenging behaviour Intervention Staff: n=25; 80% female; M Age=37.6 (SD=10.2); Care assistants=22 (88%); Activity Co-ordinators=3 (12%);no relevant qualifications 14 (56%), NVQ3 4 (16%), NVQ2 3 (12%), non-UK nursing qualification 3 (12%), studying for NVQ2 or above 15 (60%). Attrition described with some details: One resident went to hospital and 2 staff withdrew (1 urgent leave; 1 dismissed).	8 week program with two workshops with a three-week interval in between. The STAR DVD was integral (contains 8 scenes showing staff/resident interactions – challenging behaviours and successful management of those behaviours). Workshops were delivered on-site to groups of 11–14. Content: Understanding dementia and realistic expectations; communicating with and without words; using the ABCs; problem solving: get active; get active with the environment; Increasing pleasant events; team building; families; implementing STAR and preparation for individual training sessions; review of STAR concepts. Workshops were supplemented by individual sessions, delivered in either three or four sessions. **(2)**	Challenging Behaviour: Revised Memory and Behavioural Problem Checklist. Mood/affect: Cornell, RAID (Anxiety). QOL: QOL-AD. Staff: ADQ, SCIDS. Improvements in depression and BPSD for intervention group compared to control but not anxiety nor overall QOL for residents. Overall sense of competence did not increase, but there was improvement in 'building relationships' subscale and more hopeful (using ADQ) attitudes in intervention staff compared to control.
Gozalo et al. (2014). Quality=+; Comment. Great clinical attempt to change the way staff bathe residents. Some details missing, such as which condition residents dropped out of.			

Cluster randomised cross over trial Two clusters 1) Intervention, 2) Delayed intervention (receives intervention after resident outcomes measured at Cluster 1 facilities), 3 facilities each Baseline (T1), after three months (T2), then after a further 2 to 4 months (T3).	Cluster 1 Residents: n=134; Unit 1=84.6% female; Unit 2=31.8% female; Unit 3=44 % female; M Age: Unit 1=90.1 (SD=6.4); Unit 2=72.6 (SD=13.2); Unit 3=82.4 (SD=11.1); M CPS (Dementia severity): Unit 1=4.4 (SD=1.2); Unit 2=4.1 (SD=1.2); Unit 3=3.7 (SD=0.9). Cluster 2 Residents: n=106; Unit 4=80% female; Unit 5=55.6% female; Unit 6=90.2% female; M Age: Unit 4=88.0 (SD=10.1); Unit 5=84.1 (SD=9.9); Unit 6=88.2 (SD=7.1); M CPS (Dementia severity): Unit 4=3.7 (SD=1.5); Unit 5=4.1 (SD=1.5); Unit 6=4.1 (SD=1.2). * Baseline differences in age and gender in two of the facilities as well as incontinence and ADLs. All controlled for in analysis. Attrition described with some detail: 41 drop out by time 2 - primarily deaths but also transfers and refusals. Unclear which cluster they come from. 76 drop-out after T2. Primarily deaths but 35 drop out because the study budget did not enable them to do observations at T3. One Cluster 2 facility did not provide medication information for post-intervention period, precluded from analysis.	The Bathing Without a Battle intervention involves the "use of different techniques designed to make showering, tub bathing, in-room bathing, and hair washing safe and comfortable for the persons receiving and giving care. Employs communication techniques appropriate for the resident's impairment level, views behavioural symptoms as expressions of unmet need, respects the preferences of the resident, and regulates the physical environment with the goal of maximizing resident comfort" (p.798). Intervention used a train-the-trainer model. Each participating facility selected 3-5 staff members including at least one RN and 2-3 experienced CNAs/ENs who went on to train others. They attended a 2-day session covering resident behavioural expressions during baths and ways of preventing and managing distress. Training utilised video examples followed by role-playing and discussions. At the end of the pre-intervention period, trainers used the BWAB training materials to train CNAs working with residents with dementia, including any new CNAs employed during the study period. **(4)**	Challenging Behaviour: By observation: rate of verbal or physical aggression or both during bath time (CAREBA). QOC: Bathing type and duration. Antipsychotic use. Consistent with training, found a significant decline in showers and increase in in-bed bathing. Significant decrease in bathing duration overall. Between T1 and T3, there was a significant decrease in duration for: in-bed baths; bathing in a bathtub; and showers. No change for chair/commode. Significant decline in verbal and physical aggression and agitation during residents' baths. Sig. reduction in calling for help/ protesting. Decline in anti-psychotic use.
Gulpers et al. (2011). Quality=++; Comment. Good intervention targeting restraint use with all essential ingredients. Plenty of attention paid to things like sample size but no reason given why they could not randomise the sample.			
Cluster and controlled before and after 2 clusters: 1) Intervention (6 facilities, 15 wards) 2) control (7 facilities, 11 wards)	(Descriptive data is only reported for those who survived at 8 months) Intervention Residents: n=317; 70% female; M Age=82.1 (SD=8.1). Control Residents: n=201; 77% female; M Age=84.4 (SD=6.2). *Mean age of control group is higher. Controlled for in analysis.	EXBELT Intervention: 4 components: 1) policy change by management, prohibiting new belt use and reduction of current use; 2) staff education program; 3) individual consultation to nurses on the intervention wards; and 4) availability of alternative interventions intended to encourage safe mobility (e.g. sensor mats, exercise). **(6)**	QOC: Restraint: Observed belt restraint and other restraint measured 4 times during a 24 hour period; psychotropic use, falls and injuries. 50% decrease in use of belt restraint and wheelchair restraint at T3 for intervention group – both significant drops from T1. No difference in bed restraints for

Baseline (T1), 4 months (T2) and 8 months (T3).	Attrition fully described: Baseline to T2 (4 month F-UP): Intervention=35 lost (mostly deaths); Control=24 lost (mostly deaths). T2 to T3: Intervention=A further 32 lost (mostly deaths); Control=A further 22 lost (mostly deaths) * More males dropped out. No other differences in drop outs.		intervention group and no change in control group use of any restraint method. There was a sig drop in use of at least one physical restraint device, full-enclosure bedrails and sleeping suits for intervention but not control group. Use of other restraints and alternative methods and psychotropics did not increase. No differences between intervention and control groups in falls and injuries or psychotropic use.
Gulpers et al. (2013). Quality=++; Comment. Great attempt to reduce restraint use and good use of observation			
This is long-term follow-up (24 months) from Gulpers (2011) See Gulpers (2011) for baseline resident characteristics and results to 8 months.	Intervention Residents: n=134; 73% female; M Age=80.9 (SD=8.0). Control Residents: n=91; 84% female; M Age=83.9 (SD=6.6). *Mean age of control group as higher. Controlled for in analysis. They also look at all residents living in both control and intervention homes 24 months after baseline. This is called the survey group (Intervention: n= 374 Control: n=315). They want to find out if the effects have held on for those who got the intervention, but also whether effects have generalised to those not in the intervention.	See description in Gulpers et al (2011). **(6)**	QOC: Restraint use (observation at four time points during a 24 hr period); use of belts; use of other restraints. Residents in control homes, whether or not they had taken part in the original study, continued to use restraint relatively unchanged, despite having had the intensive workshop delivered to the control homes. In Intervention homes, there was a significant drop in use of belts with surviving residents who took part in the original study (65% drop from baseline to 24 months), but also in the home as a whole, suggesting generalisation of effect. Also a drop for both intervention groups in using any other restraint, use of restraints/trays in wheelchairs, and full enclosure bedrails.
Hoeffer et al. (2006). Quality=+; Comment. Good education. Did not randomise facilities to conditions because of a desire to balance for staff and type of facility variables.			
Cluster randomised cross over 3 Clusters 1) PCC in showering, followed by PCC in towel wash, 2)PCC in towel wash followed by PCC in shower, 3) Control, 5 facilities each	Intervention Residents: PCC in showering n=24; PCC in towel wash n=22; 95.7% female. Intervention Staff: n=24. Control Residents: n=23; 73.9% female. Control Staff: n=13. Descriptive for all residents (treatment groups + control): M Age=86.3 (SD=7.8) Dementia Severity – M MMSE=2.2 (SD=2.4); M yrs. in facility=3.4 (SD=2.4). Descriptive for all staff (treatment groups + control): M Age=37.5 (SD=8.1); 94.6% female; All CNAs.	Two person-centred bathing interventions introduced in treatment facilities with either showering or the towel bath. 2 days per week for four weeks: short didactic sessions covering areas like person-centred approaches to bathing; with staff, videotape reviews of staff bathing residents; coaching on person-centred approaches to showering or the towel bath. Process repeated at T3 (apart from didactic sessions) for whichever intervention had not been introduced yet. **(4)**	QOC: Observation of staff interactions with residents during bathing: Gentleness and verbal support (CBBRS); confidence and ease (Care Effectiveness Scale) and hassles (Hassles During Bathing Scale) Improvements for intervention groups against controls in gentleness, verbal support, and ease but not on hassles for staff. However, there were nuances. There was an improvement for ease and hassles for the group as a whole (i.e including controls). For gentleness, verbal support, and ease it made no difference in which order

Baseline (T1) and post-intervention 1 (T2), post-intervention 2 (T3).	* Residents in treatment and control groups did not differ on age, race, education, length of stay, cognitive impairment, or agitated and aggressive behaviours at baseline. However, tended to be more women in treatment group compared to control. *Staff groups did not differ on age, race, gender or years worked in the facility. Attrition acknowledged with few details: 4 residents withdrew due to sickness (not listed by condition).		nurses undertook showering or bathing in this crossover design - they were superior to controls in all three. For confidence however, there was only a treatment effects in the condition where nurses did Towel bathing in the first six weeks. Analysis at the facility level (10 treatment units versus 5 controls), indicated significant treatment effects compared with controls for Towel and bathing conditions combined in gentleness and ease but not for verbal support, confidence, hassles.
Huizing et al. (2006). Quality=+; Comment. Good education program around restraint use but short follow-up.			
Cluster RCT 2 Clusters (Intervention, 3 wards; Control, 2 wards) Baseline (T1) and 1 month post-intervention (T2).	Intervention residents: T1 n=83; T2 n=86; T1 78.3% female; T2 73.3% female; T1 M Age=82.4 (SD=7.6); T2 M Age=81.8 (SD=7.7). Control residents: T1 n=62; T2 n=58; T1 71% female; T2 69% female; T1 M Age=82.3 (SD=6.4); T2 M Age=82.7 (SD=6.6). *At baseline, intervention group were more depressed. Baseline differences were controlled for in analysis. Attrition acknowledged with some details: After baseline 19 residents (8 control; 11 intervention) dropped out while 18 new residents (4 control; 14 intervention) were included. Post intervention, intervention group were more depressed and more cognitively impaired.	Based on an educational program of restraint use in Dutch hospitals and on advice of the Dutch Institute for Healthcare Improvement (CBO) combined with consultation with a nurse specialist. Taught by the nurse specialist and was carried out over a two-month period. Physical restraints discussed during five 2-hr meetings taught by the nurse specialist and carried out over two months. Topics covered things like the effects and consequences of restraint use. Staff were also invited to discuss real-life cases. **(2)**	Most measures from MDS. ADL: MDS-ADL Self-performance Hierarchy. Mood/affect: Depression: MDS-DRS. Social Engagement: SES. Mobility: A mobility scale was developed from 7 MDS items. QOC: Restraint: Prevalence, intensity and type of restraint observed on 4 occasions over 24 hour period; Psycho-active drug use was determined from one item of the MDS; accident registration form was used to determine fall incidence and fall-related injuries. Residents in the control group were more likely to experience increased restraint use than residents in the intervention group and more residents in the control group were restrained at night. Mobility and cognitive status acted as confounding factors in the regression analysis. Control group had a significantly increased use of multiple physical restraints over time compared to no significant changes in the intervention group. There was a significant increase in the mean score of restraint intensity in the control but not the intervention group. Similarly, the control group but not the intervention group showed an increase in the use of sleep suits as restraint

			between T1 and T2 – but there were no other significant findings for other types of restraint.
Jeon et al. (2013). Quality=+; Comment. Basic trial of education around care planning.			
Uncontrolled before and after Pilot Baseline (T1) and 9-13 weeks post intervention (T2).	Intervention Residents: n=52; 84.8% female M Age 65-74: n=13; 75-84: n=31; 91.3% severe (GDS); 9 have either psychosis, depression and/or anxiety. No. of physical/medical co-morbidities range from 1-7 (primarily hypertension, osteoporosis, heart disease and diabetes); Psychotropics: daily average of 1, range 0-5. 15% have psychotropics PRN. Intervention Staff: n=209; 75.6% Assistants in Nursing (AINs), 18.2% RNs; 5.8% Diversional Therapists 0.5% ENs. Attrition mentioned with few details: 6 died or moved.	ACFIiET program: Use resident ACFI-BEH scores to instigate a BPSD care plan from the toolkit and provide resident information to individualise care plans. The toolkit comprised five components, implemented consecutively over 8–12 weeks. Training aimed at different levels (AINs to RNs): 1. Alzheimer's Australia 'Understanding the Brain and Behaviour' DVD; 2. Presentation on dementia (need driven dementia, person centred care); 3. Individual face-to-face staff training for those who do care planning. Focus on BPSD assessment and care plan prevention/management strategies; 4. BPSD management resource cards (A5 size) on: communicating usingPCC; assessment of BPSD; identifying BPSD triggers; and behavioural strategies; 5. Algorithms for management strategies for wandering, aggression and depression. **(2)**	Challenging Behaviour: The RAWS-long-term care version (wandering scores); CMAI, physical and verbal only reported. They appear to have combined the two verbal and two physical components. Mood/affect: Cornell. QOC: Amount of care planning for BPSD. The intervention did not improve depression, BPSD, or wandering compared to baseline, and staff did not use the care plans, which was the object of the exercise.
Kovach et al. (1999) Quality=+; Comment. Multi-facetted intervention attempting to reduce discomfort in residents. Key information is missing, like details around follow-up timeframes.			
Uncontrolled before and after Pilot Baseline (T1) and follow-up (T2, timeframe unspecified). Project lasted 1yr. Nurses collected data prior to instituting the ADD Protocol and 2 weeks after	Residents: n=104; M Age=85 (range 46-100); Inclusion criteria is diagnosis of dementia, signs and symptoms that commonly indicate pain or discomfort and inability to communicate needs (so severe dementia). Staff: n=32; No other details provided. Attrition: No withdrawals.	Education for up to 3 staff from each Residential Aged Care Facility (RACF) ("change agents") on pain management including use of Assessment for Discomfort in Dementia protocol (ADD). First education session (8 hrs – lecture and case-based workshops) covered pain assessment for the cognitively intact resident and analgesic pharmacology. The second session, 3 months later, lasted for 4 hours, and focused on the cognitively impaired resident and incorporating the ADD Protocol into institutional procedures. They were taught how to educate staff in areas like assessing	QOL: Pain Behaviours. QOC: Frequency of analgesics and psychotropic in previous 7 days (scheduled, PRN), use of non-pharmacological comfort interventions. Pain: Discomfort-DAT tool. Introduction of the ADD increased use of scheduled analgesics and non-pharmacological interventions but made no difference to anti-psychotic use and PRN analgesics. Reductions in behavioural symptoms associated with discomfort.

implementing the protocol for a particular resident.		someone who cannot verbally describe their pain. Facility change agents complete an Action Plan including 14 target indicators of institutional commitment to pain management and ADD protocol. Intervention: Introduce ADD protocol to 32 RACF. ADD Protocol started if a resident displayed signs or symptoms of possible discomfort (physical and/or affective). Implementation and documentation was facilitated through the use of the form. Steps included: 1. Assessment for physical causes for discomfort (didactic education and handouts). Where the source of discomfort was identified, interventions or consultation with the appropriate health care providers took place. 2. Resident's history explored, including family consultation. Examine possible links with current symptoms and consult as needed. 3. If source was not identified, nurses were taught to assume that the symptoms could be either physiological or nonphysiological. Nonpharmacological comfort interventions were implemented. 4. If nonpharmacologic interventions were unsuccessful, staff were educated to administer (in conjunction with GP) an "as needed" nonopioid analgesic. If the response was at all positive, request scheduled analgesic. 5. If there was no response to "as needed" analgesics, consultation took place with the advanced practice nurse, medical physician, or geriatric psychiatrist. **(6)**	
Kovach et al. (2006). Quality=+; Comment. Clever way to ensure the capture of data from the time someone starts manifesting pain, and it's actually done by the nurses. No staff data.			
Cluster RCT Two clusters (intervention and control)	Intervention Residents (Descriptives given for Time 2 sample): n=57; 73.68% female; M Age=86.58 (SD=7.05); M MMSE=7.35 (SD=6.13). FAST: Stage 4=3; Stage 5=1;	Intervention training (7 hrs): Nurses educated to use the Serial Trial Intervention (STI) pain and discomfort. Case study exams were used until STI was implemented ≥85% accuracy.	Challenging Behaviour: BEHAVE-AD. Pain: Discomfort-DAT. QOC: QOC process variables: (1) Scope of physical assessment, (2) scope of affective assessment, (3) scope

Baseline (T1),2 wks post-test (T2) & 4 wks post test (T3) (collection of daily logs commenced after staff see the resident in pain – so variable length of time post-training). If there was no evidence of symptoms after 8 weeks, the resident was dropped from the study. Maximum follow-up was 12 weeks.	Stage 6=33; Stage 7=20; M Length of Stay mths=20.18 (SD=18.30). Staff (Descriptive given for both groups combined): n=54; 46 RNs and 8 LPNs. Control Residents (Descriptives given for Time 2 sample): n=57; 77.19% female; M Age=86.53 (SD=6.83); M MMSE=8.26 (SD=6.29); FAST: Stage 4=2; Stage 5=0; Stage 6=29; Stage 7=26; M Length of Stay mths =26.79 (SD=21.43). * No baseline differences in demographics or pain Attrition described with few details: 13 Lost (9 deaths, 4 transfer). Unclear which condition.	Nurses then implemented the STI in response to behavioural symptoms in RACF. Supervision: Twice weekly visits by Advanced Practice Nurse (APN)**.** Protocol compliance check weekly. If agreement < 80%, APN halted data collection and re-educated the treatment group nurses in using the STI. Data collection reintroduced when compliance ≥80%. STI: Identifies behavioural symptoms through an explicit schedule and procedures. When a resident exhibits behaviour changes that are not effectively treated through usual care, the STI starts. It stops when behaviours decrease by ≥50%. Progress through steps is based on assessment results and decreases in symptoms by <50% in specified treatment timeframes. The process is repeated if symptoms continues after all steps. STI steps: 1) Perform physical needs assessment, focus on conditions associated with discomfort. If assessment is suggestive, implement targeted intervention or consult appropriate discipline. 2) Perform affective needs assessment: (a) environmental stress threshold, (b) balance between sensory-stimulating and sensory-calming activities, and (c) meaningful human interaction. If assessment is suggestive, implement targeted intervention or consult appropriate discipline. 3) Administer trial of nonpharmacological comfort treatment(s) tailored to the person and the situation. 4) Trial and monitor analgesics. 5) Consult with other disciplines/practitioners. Trial and monitor psychotropic medications. Control: Nurses spent 7 hours in education session, videotapes	of non-pharma interventions, (4) scope of pharmacological interventions, and (5) persistence of nurse to intervene (staff collected daily logs). Nurses in the intervention group produced superior effects in physical assessment and scope of affective assessment compared to control. In addition, they showed more persistence to intervene. Residents in the intervention group also suffered less pain discomfort, whilst the control group increased pain. No effect on challenging behaviour.

		showed management of common BPSD. Supervision: Twice weekly visits by APN. **(3)**	
Leone et al. (2013). Quality=+; Comment. Simple education on AD and challenging behaviours, covering basic measures.			
Cluster RCT 16 facilities clustered into 2 conditions (intervention and Control) Baseline (T1), 4 weeks post-training (T2) and week 17 (3 months after training, T3).	(Descriptives only given for participants available at T3) Intervention Residents: n=119; 72.3% female; M Age=87.83 (SD=6.8); M MMSE=11.00 (SD=6.7); Antidepressants=46.9%; Anxiolytics=28.8%; Antipsychotic=22.5%. Intervention Staff: n=76. Control Residents: n=111; 87.4% female; M Age=88.82 (SD=5.8); M MMSE=13.90 (SD=5.4). Antidepressants=40.3%; Anxiolytics=36.1%; Antipsychotic=20.2%. Control Staff: n=65. Only state that baseline differences were controlled for in the analysis. Attrition acknowledged with some details: Intervention lost 12 residents (10.1%), mostly due to death (n=10). Control lost 15 residents (13.5%), mostly due to death (n=10).	Intervention group: Firstly, 2-hour didactic training sessions on AD and BPSD. Information was summarised on two types of index cards. The first card provided guidelines and explained how to avoid or decrease behaviours. The second card provided recommendations for non-pharmacological interventions. Secondly, staff received a weekly 4-hour training session for a month, offering methods and practical advice around dealing with apathy and depression. Training program aimed to provide hands-on-advice, training sessions were offered on various days/shifts and attempts were made to integrate learnings within the context of the regular RACF functioning. **(2)**	Challenging Behaviour: NPI- NH: Affective, apathy, hyperactive, psychotic. Mood/affect: Apathy Inventory (AI-C): Emotional blunting, lack of initiative, lack of interest. D) Observation group scale: Emotional blunting, lack of initiative, lack of interest. E) Individual observation: Emotional blunting, lack of initiative, lack of interest. ADL Functioning: Katz ADL Scale (toileting, dressing, go to the toilet, transferring, continence, feeding). QOC: Psychotropic use. For apathy, the only significant improvement was in emotional blunting for the Intervention group (over time but not compared to the control). For the NPI, the Intervention group had higher (i.e. worse) results than controls on affective and psychotic subscales at T2 (Week 4 -post training), but this difference disappeared by T3. For ADLs, the Intervention group had lower (better) Dressing and Transferring scores at Time 2, and lower scores for Transferring andToileting at T3. Control group has lower Go to the toilet and Continence T2 and T3. No sig differences for psychotropic medications.
Magai et al. (2002). Quality=0; Comment. Many aspects of the methodology were diligently done but there is a lack of training around helping staff to respond to the non-verbal cues they were trained to identify. Selective reporting in the results.			
Cluster RCT 3 clusters: 1) Treatment-learning to recognise facial distress, 2) Behavioural placebo, 3) Waitlist control, 1 facility each.	(Descriptives are only given for participants available at follow-up) Intervention Residents: n=41; 92.7% female; M Age=84.6 (SD=8.1); all mid to late stage dementia. Intervention Staff: n=9; 100% female; M Age=42.3 (SD=5.6). Control Residents: n=27; 96.3% female; M Age=86.4 (SD=9.3). Control Staff: n=7; M 100% female; Age=42.6 (SD=7.9).	Intervention group: Received training in nonverbal sensitivity regarding issues of nonverbal communication and emotion expression (10 one-hour lecture/experiential sessions over 2 weeks). Content included areas such as selective perception of emotion and personal emotional triggers. Behavioural placebo group received the same number of training session but the focus was on cognitive	Challenging Behaviour: BEHAVE-AD, CMAI . Mood/affect: MAX: Symptomatology and Positive and Negative emotion; Cornell (no data reported). Staff: BSI (depression, anxiety, somatic symptoms). No effects on resident symptomology. Increase in positive emotion (derived from the MAX) for the intervention group. Decline in negative affect across time for all

Baseline (T1), follow-up at 3 weeks (T2), 6 weeks (T3), 9 weeks (T4) and 12 weeks (T5) post-intervention.	Placebo Residents: n=23; 91.3% female; M Age=87.7 (SD=4.2). Placebo Staff: n=5; 100% female; M Age=38.0(SD=3.2). * Told that baseline imbalances are controlled for. Attrition acknowledged with few details: 8 lost to follow up, but it is unclear at which time point. Attrition due to death (n=6) and relocation (n=2).	and behavioural aspects of dementia, not resident affect. Also had a wait-list control group. **(2)**	groups. Caregiver BSI scores declined over time in all groups, with no effect of treatment. Some statements about the results are provided without data to substantiate.
Matthews et al. (1996). Quality=+; Comment. Good clinically and a novel method for looking at the way that staff approach care but it lacks good methodology.			
Uncontrolled before and after Baseline(T1), then after 8 weeks of task-oriented nursing (T2), then switch to 4 weeks of PCC (T3), then another 4 weeks of PCC continuing (T4). Thus T2 is also a baseline.	Residents: n=40; 63.63% female; M Age=84.2 (SD=7.8); M Brief Cognitive Rating Scale=6.1 (SD=0.8). Attrition acknowledged with few details: 7 lost between baseline and follow-up. Unclear if it was week 2, 3, or 4. Attrition due to death (n=6) and relocation (n=1).	For the first 8 weeks, nurses used a task-oriented approach. For the rest of the project, nurses used a person centred care approach. Staff attended a one day workshop, looking at things like appropriate communication and managing agitation. Journal articles and books were also made available in the nursing station. In the weeks following the workshop, brief educational sessions were provided around aspects of dementia care. **(6)**	Challenging Behaviour: CMAI (aggressive behaviours, non-aggressive physical agitation, verbal agitation, other agitated behaviours). Other: Daytime sleep and night-time sleep (DMAS sleep scale). Decrease in verbal agitation on early morning shift 12 weeks after the PCC introduced. Significant increase in other agitated behaviours in the early shift between T3 and T4. No change to aggressive behaviour or non-aggressive physical agitation. No other effects of PCC: Increase in verbal agitation occurred after introduction of Task-Oriented care between T1 and T2. Daytime sleep increased after the change and then returned to baseline levels after 6 weeks. No change to night time sleep.
McCallion et al. (1999). Quality=+; Comment. Assessing the influence of staff education around communication skills with QOC and QOL outcomes. Wide range of relevant staff and resident variables. Attrition acknowledged but numbers not reported. Used a Random Effects Regression Model to control for drop-outs but without knowing how many.			
Cluster and partial crossover controlled trial This is a cluster trial because 2 units from two separate facilities form one group (Intervention); and 2 units from the	Intervention Residents: n=49; 85.71% female; M Age=84.5 (SD=9.0); M MMSE=6.3 (SD=6.6). GDS: 10.2% mild, 89.8% moderate to severe. Intervention Staff: n=39; 94.9% female; M Age=40.9 (SD=11.9); M Yrs Experience=7.8 (SD=5.8). Control Residents: n=56; 89.28% female; M Age=83.3 (SD=9.0); M MMSE=4.9 (SD=6.0). GDS: all moderate to severe. Control Staff: n=49; 93.9% female; M Age=37.9 (SD=10.1); M Yrs Experience=5.9 (SD=5.5).	Nursing Assistant Communication Skills Program (NACSP): five 45-minute group sessions, plus four 30-minute individual sessions, with a final 1-hour supervision session. Covered areas like communication and ageing, and the progression of dementia. Use role-playing, practice and observation feedback. Introduced memory aids, practiced developing Memory Charts (MCs) and role playing their use and taught to use MCs	Challenging Behaviour: 3 factors of CMAI: aggressive behaviour, physically non-aggressive behaviour, verbally non-aggressive behaviour. Mood/affect: Cornell factors: mood, behavioural disturbance, physical signs, cyclic disturbance, ideational disturbance. QOC: (1). Restraint: A scale rating restraint: daily 2, less than daily 1, not at all 0. (2). Psychotropic Use: No. of days in prior week resident given psychotropics.

same facilities from the other (Wait-list control). Wait list control received the treatment after 6 months. Within 2 weeks of intervention (T1), 3 months (T2), 6 months (T3), then 9 months (T4) for the control group after they've had the intervention.	* Sig more married residents in intervention condition and they had lower GDS scores. Baseline imbalances for residents controlled for. No baseline staff imbalances. Attrition acknowledged but few details: They report no drop-outs/deaths in a one year study but they have used a Random Effects Regression Model (RERM) to control for drop-outs.	consistently and frequently. Also outlined a three-step communications-based approach: (1) find and respond to the need (2) find the memory and (3) ensure safety. Demonstrated the approach with eight different types of behaviours. They also received visits from a trainer once a month for three months after the intervention finished. **(2)**	QOL: Multidimensional Observation Scale for elderly subjects (MOSES) factors are: disorientation, irritability, withdrawal. Staff: Knowledge of dementia (KAT), mental health states (MHQ) and turnover rates. There were significant improvements in intervention group resident depression and BPSD scores. After the Wait list control staff also got the intervention, they too produced much the same improvements for residents. Staff knowledge about caring for people with dementia did not change. No significant effects for psychotropic medications. Reduced staff turnover at 6 months.
Pellfolk et al. (2010). Quality=++; Comment. Well planned lecture program study. Baseline characteristic and attrition rates are unclear.			
Cluster RCT 2 Clusters (Intervention, Control), 20 units each. Baseline (T1) and 6 months follow-up (T2).	Intervention Residents: n=191; 69.1% female; M Age=80.5 (SD=9.1); Gottfries Cognitive score (max=27); Intervention=11.7 (SD=7.5). Moderately Impaired Intervention Staff: (Data only provided for those present at baseline and follow-up): n=184 M Age=43.2 (SD=11.7); 92.3% female; M Yrs in Geriatric Care=15.1 (SD=10). Control Residents: n=162; 78.4% female M Age=83.4 (SD=6.4); Gottfries Cognitive score (max=27); Intervention=10.2 (SD=7.3). Moderately Impaired. Control Staff (Data only provided for those present at baseline and follow-up): n=156 M Age=43.5 (SD=12.8); 93.2% female; M Yrs in Geriatric Care=15.4 (SD=10.5). *Baseline imbalances were controlled for. Attrition acknowledged but few details: 42 residents lost from intervention condition; 23 from the control. No details provided. 28 staff lost from intervention and 29 lost from the control. 36 newly admitted residents were	Intervention education for nursing staff comprised six themes over 6 months: 1) Types of dementia, symptoms, diagnosis, and treatment. 2) Delirium in older people. 3) Falls and fall prevention. 4) Use of physical restraints. 5) Caring for people with dementia. 6) Complications in dementia. Emphasis on the finding the underlying causes of behaviours. Over 2 days, one staff member from each unit attended the whole education program. The rest of the staff undertook the education program through six 30-minute videotaped lectures, plus a clinical vignette. **(1)**	QOC: 1) Restraint: restrained at least once in last three weeks or not restrained; 2) Psychotropic Use: Benzodiazepines and Antipsychotics; 3)Falls: No. of fallers over one month pre and post intervention. Staff: Knowledge and attitudes to restraint (PRUQ) and caring for people with dementia. One month after this relatively low cost intervention (because they gave one staff from each facility the education, and they then took the package back to their own units) there was a significant difference between conditions in use of restraint, and a difference in staff attitude to use of restraint, with staff who receive the intervention less prone to consider using restraint. There was no difference between groups in their knowledge of legislation regulating the use of restraints post-intervention. Both groups increased in their estimated knowledge of dementia care. There was no difference between groups in benzodiazepine and antipsychotic prescription and no difference in falls. That is, reducing restraint didn't increase falls.

	added to the intervention group between T1 and T2, and 26 newly admitted residents added to the control.		
Robison et al. (2007). Quality=++; Comment. High quality study, looking at the impact of staff and family training on challenging behaviours.			
Cluster RCT 2 conditions (intervention and control), 10 facilities each Baseline (T1), and 2 months (T2). Staff and family data was also collected at 6 months (T3).	Intervention Residents: No specific details regarding residents reported but it is one family member per residents so n is likely to be 277. Intervention Staff: n=184; 94% female; M Age=42.2 (SD=12.1); CNAs=134; RNs=50 M Yrs Experience: 11.6 (SD=8.9). Control Residents: No specific details regarding residents reported but it is one family member per residents so n is likely to be 214. Control Staff: n=200; 92.5% female M Age=42.4 (SD=12.4); CNAs=146; RNs=54; M Yrs Experience: 10.7 (SD=8.7). * Control staff higher score on interpersonal conflict scale. No other differences. Attrition acknowledged but few details: Control staff lost to T2 is 17, and total lost between T2 and T3 is 21. Intervention staff lost to T2 is 11. 22 lost between T2 and T3. 87.86% of those remaining at T2 attended the workshops. 87.74% of those at T3 attend the workshops.	Partners in Caregiving in the Special Care Unit Environment: 2 components: 1) parallel training sessions of 4-5 hours provided to both family and staff, to enhance communication and empathy for the other group. Training included: didactic education, case discussions, brainstorming, and role plays; 2) after training, a 1.5- 2 hour meeting with families, staff, and administrators to share learnings, discuss concerns and set goals for the unit and facility. Also, a plan for groups to identify policy and procedural changes was developed with the aim of addressing them as a team. **(2)**	Challenging Behaviours: CMAI- SF. Family: Interpersonal Conflict Scale, Staff Provision to Residents Scale (Pillemer et al, 1998), Staff Behaviors Scale, Staff Empathy Scale, Nursing Home Hassles Scale, Family Involvement Scale, Zarit Burden Interview, CES-D, Easy to talk to staff. Staff: Interpersonal Conflict Scale, CES-D, Family Behaviors Scale, Family Empathy Scale, Maslach, Generic Job Satisfaction Scale, likelihood of leaving job, job stress. Intervention resulted in reduced interpersonal conflict for nurses but reverted to baseline after 6 months, had no significant effect on staff depression, and did reduce burnout for nurses (though not CNAs) for those receiving the intervention while control staff nurses got worse. There were effects on challenging behaviour for intervention residents versus control on five of the fourteen behaviours (cursing or verbal aggression, other aggression, self-abuse or sexual advances, inappropriate dress or disrobing, constant requests for attention or help, wandering) but they have provided no sample size numbers either overall or by groups.
Schrijnemaekers et al. (2002). Quality=++; Comment. Genuine attempt to bring about emotion-oriented care. Biased has been minimised as much as possible. Good follow-up (12 months).			
Cluster RCT 2 clusters (intervention, control), 8 facilities each. Baseline (T1) and after 3 (T2), 6 (T3) and 12 (T4) months of follow-up.	Intervention Residents: n=77; 90% female; M Age=84.3 (SD=5.5); M MMSE=10.8 (SD=5.1). Control Residents: n=74; 89% female; M Age=85.9 (SD=5.6); M MMSE=11.3 (SD=5.1). * No significant baseline differences. Attrition fully described: Intervention group: 8 lost at 3 months, 8 more at 6 months, 13 more at 12 months. Control group: 5 lost at 3 months, 10 more at 6 months,	Emotion-Oriented Care intervention consisted of successive elements spread over 8 months. Firstly, every intervention facility received two 1-hour sessions. All facility staff were invited and were told about the study and the rationale of emotion-oriented care. Secondly, 8 direct care staff from each intervention facility received 6 days of training in emotion-oriented care. The first four training days were provided every two weeks; the last two were four weeks	Challenging Behaviours: 1) GIP: Observation of behaviour frequency (nonsocial behaviour, apathetic behaviour, loss of decorum, rebellious behaviour, restless behaviour, dependent behaviour, anxious behaviour); 2) GIP-28; 3) Communication (GRGS); 4) CMAI-D: (verbal aggression, aggression, physical non-aggression). QOL: Functional status (ADL) Global assessment functioning. QOC: Change in psychotropic drug use.

	14 more at 12 months. Attrition mostly due to death. No difference in attrition rates between groups.	apart. Covered areas like dementia, inequality in the caregiver-resident relationship, and understanding the points of view of the resident. Training utilised various didactic methods: teaching, homework, class assignments and exercises, role-playing and video-presentations. Finally, over a 4 month period, three ½ day sessions were offered to support the implementation. Sessions were tailored to the individual intervention facilities. Control received the training program after the end of the study. **(4)**	Most results non-significant and exact values were not always reported. Compared to the controls: - Intervention facilities with moderate to poor implementation showed less deterioration in non-social and anxious behaviours after 6 months. - Intervention facilities with good implementation had better scores on anxious behaviour at 12 months, but higher (=worse) scores on rebellious behaviours at 6 months. - Intervention group showed less deterioration in anxious behaviour at 6 months. - Intervention group deteriorated more on physical non-aggressive behaviour at 6 months.
Sidani et al. (2009)[2] Quality=+; Comment. 2-hour didactic education session provided by a "trained graduate students". High refusal.			
Uncontrolled before and after 8 facilities Within 1 month before attendance at the session (T1); within 1 month after session attendance (T2); 3-month follow-up (T3).	Staff: n=79; 91% female; M Age=43 (SD=9); Approx 33% RNs, 38% RPNs, 28% Health Care Assistants (HCA) or Personal Support Worker (PSW); M Yrs Experience in Nursing: 17 (SD=10); M Yrs Experience in Current Position: 10 (SD=8). 84 % have formal training in the care of persons with dementia, 90% attended prior education on strategies to provide morning care. Attrition acknowledged with few details: of the 221 eligible staff, 60% consented. Reasons for refusal of consent include too busy (n=23), not interested (n=12) and not comfortable (n=4). Of those (n=133), 54 (41%) staff withdrew because of scheduling differences (n=45), transfer (n=3) and change in employment status (n=5).	Covered the 6 components of abilities-focused approach to morning care: 1. Introduction to resident 2. Conversation with resident 3. Caregiver approach 4. Orientation to resident 5. Use of tools 6. Bathing/dressing/ grooming. Used didactic education, supplemented by audio-visual and written materials and group discussions, with case examples. Education conducted by graduate students. **(1)**	QOC: Checklist of 50 specific interventions that represented the 6 components of the abilities-focused approach to morning care. O if intervention not used, 1 if used. Total No. of interventions used (count) and type of interventions implemented. Only about half of nursing staff members taking part in this study attended the educational session. Attendance at the educational session was effective in enhancing use of specific interventions in day-to-day practice; however, this use was not maintained over time.
Sidani et al. (2012). Quality=+; Comment. As above. In this paper they say that it was provided by "Trained APNs" but in the 2009 paper they say it was provided by a "trained graduate students". This is an obvious inconsistency.			
Uncontrolled before and after 8 Facilities	Data only provided for those present at baseline and follow-up): Residents: N=102; 48.5% female; M Age=83 (SD=8); M MMSE=5.9 (SD=7.7); M No. of psychical/medical	As Above. **(1)**	Challenging Behaviour: Agitation (PAS): aberrant vocalisation; motor agitation; aggressiveness; resistance to care.

[2] Sidani et al 2009 and Sidani et al. 2012 are from the same study.

Within 1 month before attendance at the session (T1); within 1 month after session attendance (T2).	comorbidities=4 (SD=3.1). See Sidani et al (2009) for staff characteristics. Attrition acknowledged with few details: 19 lost to follow-up: Death of natural causes (n=10), changes in residents' health condition (n=6) and (n=3) scheduling issues that prevented observations .		QOL: 1) Participation in morning care (RADL): toileting; washing; grooming; and dressing. 2) Residents' physical and psychosocial functioning on MIBM (personal attending described in terms of interest and involvement; relaxation; flexibility; calmness) and LPRS (mental confusion; physical disability; socially irritating behaviour; disengagement). QOC: Implementation of the AFMC components was assessed with a checklist developed by the investigators. See Sidani et al (2009) for the six components of abilities-focused approach to morning care and scoring. No significant changes in levels of agitation, participation in care and physical and mental functioning after intervention. There was a significant decline in the relaxation and calmness subscale of the MIBM, with a low-moderate effect size. Significant increase in strategies related to abilities-focused morning care components: introduction to resident (though small effect size), caregiver approach, orientation to resident, use of tool and bathing, dressing, grooming.
Sloane et al. (2004). Quality=+; Comment. Well-designed study on experiential and didactic education around bathing. Addressed bias well.			
Cluster RCT with crossover 3 clusters (2 intervention groups based on the order in which treatments were administered, control), five facilities each. Baseline (T1), Post-intervention (T2).	(All statistics reported for intervention groups together) Intervention Residents: n=49; 73.9% female; M Age=86 (SD=8.6); MDS-Cog: very severe=37%; severe=60.9%; moderate=2.2%; Cumulative Illness Rating Scale for Geriatrics morbidity score=1.7 (SD=.4). Control Residents: n=24; 95.7% female M Age=86 (SD=6.1); MDS-Cog: very severe=13%; severe=78.3%; moderate=8.7%; Cumulative Illness Rating Scale for Geriatrics morbidity score=1.9 (SD=.4). * More dementia care units, more often visually impaired, slightly higher cognitive impairment and females in control. Differences were not controlled for.	Bathing Without a Battle intervention, involving didactic sessions, audio-visual materials, hands on supervision during bathing. Trainer worked alongside the CNAs 2 days per week for 4 weeks, introduced the interventions. The focus of person-centred bathing was on areas like resident comfort and preferences, and behaviours as expressions of unmet need. Training in person-centered bathing was also included as a component of towel-bath method (An in-bed method; keeps the resident covered at all times; and cleanses the body using gentle massage). Control: Showering (without person-centered training); Staff received training in	Challenging Behaviour: Observation of agitation, aggressive and resistive behaviours (CAREBA). QOL: Pain: Resident discomfort during bathing using a modification of Discomfort-DAT tool. QOC: Total No. of body parts bathed. Mean duration of bath. Skin condition and cleanliness were evaluated using an adaptation of the Hardy Skin Condition Data Form. Resident discomfort declined significantly in both intervention groups but not in the control group. Significantly less discomfort in the towel-bath group compared to the shower group. Agitation and aggression declined significantly in both intervention groups (with no differences between the two groups) and not the control.

	Attrition acknowledged with few details: 4 residents were omitted because of missing data or the development of acute medical problems.	person-centered bathing after all data collected. **(2)**	Residents receiving the shower intervention spent significantly more time being bathed than those in the control group. There was a smaller difference in duration for residents receiving the towel bath experienced compared to the control and that difference was not statistically significant. Improvements do not come at the expense of skin condition.
Smith et al. (2005a). Quality=+; Comment. Influence of education on a measure of QOC. Converting continuous variables into categories could have masked non-significant results when analysing in conventional ways. Results are not consistently reported. The male/female split makes it difficult to determine things like overall levels of cognitive impairment.			
Uncontrolled before and after 1 facility (all residents and staff on the units participated) Baseline (T1) and post-intervention (T2).	Residents: n=39; 89% female; Age Range: Male=68–98; Female=80–99; Abbreviated Mental Test Scores Male M=8.33 Female M=7.79; Support Needs: 6 low dependency; 27 medium dependency; 6 high dependency. Staff: n=15; 100% female; Age - 4 aged between 25-35; 11 between 36-55; All healthcare assistants; Level of Training: n=3 trained in health related work; n=3 formal healthcare assistant training. Attrition acknowledged with few details: 3 died, 1 admitted to short term care, 1 hospitalised.	Educational program: Based on resident Activities of Daily Living (ADLs) and staff focus groups responses, particularly around wanting to know more about "the everyday challenges faced by residents" (p.3). Ten 1-hour sessions over 5 weeks covering aspects like grief, loss, and adaptation experienced when entering residential care and dignity and independence, as well as things like falls and injury prevention. Used case studies and experiential teaching, as well as visual tools and storytelling. **(2)**	QOC: Observation using Quality Assessment Project (QAP) Scores: QAP1=inadequate and inappropriate, QAP2=inappropriate and adequate, QAP3=appropriate and inadequate, QAP4=appropriate and adequate; Pre=before education program (intervention). A significant increase in the proportion of care that was judged appropriate and adequate provided by healthcare assistants to residents. Similarly a decrease in inappropriate and inadequate care after the program. No significant difference in intermediate grades. Residents with low functional activity scores and moderate cognitive impairment received greatest improvement in QOC. There was a significant increase in inappropriate and inadequate care scores in the most cognitively able.
Testad et al. (2010). Quality=0; Comment. Education plus supervision provided over longer time period. The intervention and control groups differ too much for meaningful analysis.			
Cluster RCT 2 clusters (intervention, control) both with 1 large and one small facility. Baseline (T1), immediately after completion of the intervention at 6 months (T2), and	Intervention Residents: n=75; 74.67% female; M Age=86 (SD=9); median CMAI=38 (SD=17); No. with antipsychotic use=21; No. restrained=49; Restraint types used: 45 structural, 34 interactional (n=75). Intervention Staff: n=104; (demographics for intervention and control staff together at T1): 95.4% female; M Age=43.1 (SD=12.9); 33.5% RN, 54.8% licenced practical nurses, 11.7% certified nurse assistants; Mean Yrs Experience=11.1 (SD=9.1). Control Residents: n=70; M Age=86 (SD=11.25); 72.86% female; median CMAI=33 (SD=14.5); No. with	Relation Related Care education and training program: A two-day seminar and monthly group guidance (6 months) providing a framework for staff to reduce agitation and restraint use. Content delivered in educational lectures; resources to implement new skills (i.e. treatment guideline) and peer support/ feedback (to reinforce education/ skills). **(3)**	Challenging Behaviour: CMAI (Norwegian). QOC: 1) Restraint (Structural and interactional): Proportion of residents who experienced restraint in last seven days. 2) Psychotropic Use: Antipsychotic doses transformed to chlorpromazine equivalents. Initial reduction in the use of restraint in the intervention group (T2) was not sustained at T3. Significant reduction in CMAI in the intervention group, but not in the control at T2, which was maintained at T3. Antipsychotic use was unchanged for both groups.

12 months after baseline (T3).	antipsychotic use=6; No. restrained=25; Restraint types used: 9 structural, 19 interactional (n=70). Control Staff: n=93. * Significant baseline difference in Dementia Severity (p=.002), antipsychotic Use (p=.003) and restraint use (p=.000). Attrition acknowledged with some detail: Intervention Residents: 113 assigned to receive intervention, 75 remain at T2 (27 died, 11 transferred), 44 at T3 (20 died, 11 transferred). Control Residents: 98 assigned to receive intervention, 70 remain at T2 (19 died, 9 transferred), 46 at T3 (18 died, 6 transferred). Control Staff: Staff turnover: 46.2% for intervention; 43% for the control.		
van de Ven et al. (2013). Quality=0; Comment. DCM intervention, carefully conducted but there was low compliance leaving a large amount of missing data.			
Cluster RCT Two clusters (intervention, control). 34 units from 11 care homes/campuses, clustered into: Intervention=13 units; Control=21 units. Baseline (T1), 4 months (T2) and 8 months (T3).	Intervention Residents: n=102; 75% female; M Age=84.6 (SD=6.1). Intervention Staff: n=141; 98.6% Female; M Age 43.6 (SD=10.4); M Yrs in current psn: 10.3 (SD=8.3). Control Residents: n=166; 73.9% female; M Age=83.5 (SD=6.6). Control Staff: n=178; 98.3% Female; M Age 42.6 (SD=11.3); M Yrs in current psn 10.0 (SD=86) *more staff in Intervention condition in permanent positions. No other differences. Baseline imbalances controlled for in analysis. Attrition acknowledged with some details: Intervention residents: 102 with consent, 73 remain at T1; 14 lost to attrition, replaced by 19 others between T1 & T2; 20 lost and replaced by 15 others between T2 & T3. Control residents: 166 with consent, 119 remain at T1; 30 lost to attrition and replaced by 23 others between T1 & T2; 29 lost and replaced by 24 new residents between T2 & T3.	Dementia Care Mapping intervention: Two nurses from each of the five nursing home/campuses (i.e. not one for each of the 13 units in the intervention group) are selected by their managers as competent and interested in becoming certified dementia-care mappers. Staff attended the basic and advanced DCM training. Then the trained mappers were to carry out at least two DCM cycles to their residents. Each DCM cycle consists of three components: systematic observation, feedback to the staff, and action plans (based on the observed actual needs of the resident). **(6)**	Challenging Behaviours: CMAI; NPI-NH. QOL: QUALIDEM; EuroQol-5D. Staff: 1) Stress (GHQ-12); 2) Job experience and satisfaction (QEAW, MJSS-HV). DCM intervention had no significant effect on resident agitation. A sig. interaction effect of group and time was observed for NPI, with lower total score and lower 'delusions' score in the control group but not intervention group over time. Poorer quality of life was reported at T2 and T3 in both groups on both measures. No other sig. resident results. Staff reported fewer stress related symptoms over time in both intervention and control groups. Sig. group by time effect for autonomy and work pleasure "but these differences were not straightforwardly in favour of the intervention group or the control group." (p.6). Intervention staff reported fewer negative emotional reactions and more positive emotional reactions compared to control staff.

	Intervention staff: 178 consented, 141 remain at T1; 16 lost to attrition and replaced by 21 others between T1 and T2; 12 lost and replaced by 13 others at T3. Control staff: 198 consented and 178 remained at T1, 8 lost replaced by 9 others between T1 & T2, 21 lost and 10 newly included between T2 & T3.		
van der Kooij et al. (2013). Quality=++; Seeing if a PCC intervention actually changes what staff do during care. Observation by independent observers, in addition to staff questionnaires, but not blinded. They comment on differences but have not analysed them and note the low numbers.			
Cluster RCT 2 clusters (intervention, control), 8 wards each. Staff skills: Baseline and 7 month follow-up. Observations: Baseline and 4 months after intervention conclusion (4 intervention and 4 control sites). Quality standards: and Time spending analysis: Baseline, 8 months later.	Intervention Staff: n=61; M Age=30.23 (SD=7.9); 90% female; primarily NAs; M yrs Experience in Psychoegeriatrics=6.3 (SD=5.0). Control Staff: n=63; M Age=30.49 (SD=7.1); 83% female; primarily NAs; M yrs Experience in Psychoegeriatrics=6.9 (SD=4.1). *No baseline differences. No resident information. Attrition acknowledged with few details: Intervention: 15 lost to attrition by T2. Control: 10 lost to attrition. No sig. differences between completers and non-completers.	Integrated Emotion-Oriented Care (IEOC). Both control and intervention wards get training in minimum standards of care for six months (e.g. standardised care plan). For the intervention facilities, this was followed by basic IEOC didactic and experiential training, with a large number of staff members and caregivers (from varying disciplines) involved. One in four of those who attend the basic training also received a follow-up advanced IEOC course. For every 15 residents, one nursing caregiver was also trained to act as a change agent. **(4)**	Staff skills in care: ESID (expertise, knowledge, working with a care plan). Quality Standards: developed by researchers based on Dutch model care plan. Staff Time: Self-report time registration (individual resident care, collective resident care, ward-related work, personal time). Staff Interaction: Observation of carer/resident interaction reported. Reports analysed using grounded theory. Intervention group superior to the controls in expertise, and knowledge of resident. No difference in working with or reporting care plan. Observation of what the carers are doing shows that intervention more emotion oriented: empathic, more sensitive to what residents saying and feeling, would ask more frequently what they wanted. Also more addressing residents on individual level, more non-verbal contact, more use of what they know about residents. Effects greatest amongst staff who had taken an advanced IOEC course. No significant difference between the groups on the Dutch Quality standards nor on the time registration.
Verkaik et al. (2011). Quality=++; Comment. Very well designed and thought-out study, looking at the effect of a multi-facetted intervention on mood. Covers for most sources of bias, clever balancing of units so they match on facility characteristics.			
Cluster RCT Two clusters (intervention,	Intervention Residents: n=65; 83.9% female; M Age=83.4 (SD=7.2); GDS: GDS 2=2; GDS 3=1; GDS 4=7; GDS 5=23; GDS 6=22; Missing=7; No. on	Introduction of nursing guidelines: 3 hours of training in the first week, around topics such as individualising activities, and education on	Mood/affect: Depression (Cornell, MDS-DRS); Mood, using a facial observations scale called FACE.

control) of 9 homes/units each. In the two weeks before intervention (T1), in the two weeks post intervention (T2), and 10-12 weeks after intervention (T3).	antidepressants=28; No. on antipsychotics=27; No. on Benzodiazepines=25; No. on ACE-inhibitors/ betablockers=6. Control Residents: n=35; 80% female; M Age=84.1 (SD=7.1); GDS: GDS 2=1; GDS 3=3; GDS 4=1; GDS 5=8; GDS 6=18; Missing=4; No. on antidepressants=9; No. on antipsychotics=22; No. on Benzodiazepines=13; No. on ACE-inhibitors/ betablockers=3. * Controlled for gender, marital status, duration of residence in the nursing home, care dependency, cognitive impairment, and medication use. Attrition fully described: To T2: 6 residents withdrew from intervention, 7 from control. To T3: 8 more residents lost from intervention, no more lost from the control. Attrition due to transfer (n=15) and death (n=8). No sig. differences between completers and non-completers.	person centred care. The groups of 3-5 CNAs the developed a plan for pleasant activities for each resident with a diagnosis of comorbid depression in dementia. Used homework between weeks 2 and 3 (e.g. background information-life history) and in weeks 5 to 10. The plans contained information on things like symptoms, purpose and tailor-made pleasant activities. Activities took place during regular and additional care, and could be conducted by care staff, activities, or family. 6 further training hours: 3 in week 4, where plans were discussed and adjusted accordingly; 3 in week 11 where experiences were discussed and plans for further use of the guidelines were made. Also had a "promotion group" (nursing team manager, activity therapist and two CNAs), who could consult the trainer. **(6)**	There was reasonable compliance with 39 of the 65 residents having a pleasant events program devised by CNAs in their file. Intervention group, but not control, showed a decrease in severity of depression on one depression measure (DRS) but not the Cornell or a facial mood scale. The effect size was moderate.
Visser et al. (2008). Quality=++; Comment. Good multi-component clinical intervention targeting challenging behaviours. Problems with methodology and eliminating bias. Good clinically.			
Cluster RCT Three clusters (education, education plus peer support, control) with 1 facility each. Baseline (T1), post intervention (which lasted 8 weeks, T2) at 3 months (T3) and 6 months (T4).	Education + Peer Support Residents: n=23; 82.60% female; M Age=87.64 (SD=7.67). Education + Peer Support Staff: n=17; 100% female; M age=46.82 (SD=10.97). Education Residents: n=21; 85.71% female; M age=87.15 (SD=4.37). Education Staff: n=10; 80% Female; M age= 42.00 (SD=10.97). Control Residents: n=32; 75% female; M Age=83.13 (SD=6.99). Control Staff: n=25; 96% female; M age=44.52 (SD=9.94). Attrition acknowledged with few details: Resident withdrawals not reported. 15% of Staff lost in the education plus peer support group; 40% of staff in the	Education: consisted of 8 units run twice a week for 1–1½ hours. 3 units were didactic and provided information about dementia and behavioural symptoms; 5 were workshops based on the behavioural model, where staff developed individualised resident care plans. Antecedents and consequences of behaviours were monitored and modified accordingly and discussions and worksheets were used. Peer support program: 30 minute sessions ran after the workshop units and aimed to address staff concerns and covered areas like recognising and managing stress. **(3)**	Challenging Behaviour: CMAI (physically aggressive behaviour, physically non-aggressive behaviour, verbally aggressive behaviour, verbally non-aggressive behaviour). QOL: ADRQL (social interaction, awareness of self, feeling and mood, enjoyment of activities and response to surroundings). Staff: Staff Attitudes Questionnaire designed by researchers (education and personal responsibility, skill and knowledge, barriers to change), Maslach (emotional exhaustion, depersonalisation, personal accomplishment). No effect on behaviour, resident QOL, and staff burnout, but there was improvement for the education plus peer support condition at T2 on one factor (skills and knowledge) of the attitude scale, created specifically for this project. This was maintained up to final follow-up. Also an effect for "Barriers to change" variable but this

	education only group (who were therefore excluded from FU); 14% from the control.		applied both to the education plus support and the control, who reported perceiving more barriers to change at T3 and T4.
Wells et al. (2000). Quality=+; Comment. Short, didactic education around morning care with small sample.			
Cluster RCT Two clusters (intervention, control) of 4 nursing home level cognitive support units in a geriatric care centre; 1 intervention, 3 control. Baseline (T1), 3 months (T2), and 6 months (T3) post-intervention.	Intervention Residents: n=20; 85.2% female; M Age=88.90 (SD=6.26); M MMSE=6.00 (SD=6.26). Intervention Staff: n=16; 100% female; M Age=45 (SD=12); 25.00% RN, 25.00% RPN, 43.8% HCA; 81.3% Fulltime; Mean Yrs long term care=11.34 (SD=7.89); Mean Yrs on the unit=5.73 (SD=4.89). Control Residents: n=20; 82.8% female; M Age=88.35 (SD=5.66); M MMSE=2.90 (SD=4.78). Control Staff: n=28; 92.3% female; M Age=44 (SD=10); 32.2% RN, 21.4% RPN, 46.4% HCA; 50% Fulltime; Mean Yrs long term care=13.31 (SD=9.13); Mean Yrs on the unit=8.45 (SD=9.73). *No sig. baseline differences for resident groups. More nurses in intervention group had completed a degree and more were employed fulltime rather than part-time. Attrition acknowledged with few details: Resident attrition (28.5%) mainly from death related to flu outbreak. Same rate of attrition from intervention, control.	5 educational sessions covering abilities-focused morning care (20-30 minutes each). Areas covered: "a. The effects of dementia on the social and self-care abilities of people with dementia; b. A standardised method of assessment of abilities remaining or lost; c. Various interventions that can maintain abilities or compensate for those that are diminished." (p.444). Reinforcement sessions (20-30 minutes each) took place every second week for 3 months, then monthly. **(1)**	Challenging behaviour: Agitation (PAS and agitated/calm and resistant/cooperative variables on the MIBM). QOL: Level of functioning (LPRS); resident interaction behaviours (MIBM). QOC: Caregiver interaction behaviours (IBM). Staff: Stress (NHUS) and perceived ease of caregiving (visual analogue scale). Residents in the intervention group demonstrated more interaction behaviours with caregivers, with higher scores on personal attending, calm/functional and agitation on MIBM compared to control. Also a decline in level of agitation on the PAS for intervention residents compared to control. Total scores on the LPRD decreased for intervention residents, indicating improvement in their overall level of function compared with residents in control. Residents who received abilities focused care showed a consistent decline in level of socially inappropriate behaviour (social function subscale of LPRS). Program also increased caregivers' interaction behaviours: verbal relevance, personal attending, relaxed and social/flexible behaviours. Results were maintained at 6 months. Lack of program effect on perceived ease of caregiving and caregivers' level of stress.
Wenborn et al. (2013). Quality=++; Comment. High quality intervention, with a genuine attempt to embed the changes in the facilities and good methodology.			
Cluster RCT Two clusters (Intervention, Control), 8 units each. Baseline (T1), 4 weeks after	Intervention Residents: T1 n=104; T2 n=85; T3 n=79; 66% female; M Age=84.20 (SD=7.6); M MMSE=5.80 (SD=5.1); M CDR=3.1 (0.9). Control Residents: T1 n=106; T2 n=81; T3 n=80; 75% female; M Age=84.2 (SD=7.6); M MMSE=5.5 (SD=4.60); M CDR=3.0 (0.8).	16 week intervention consisted of: 1) Assessment of the care home physical environment. 2) Education program: Didactic, group discussions and practical exercises. Five 2-hour sessions covering areas like getting to know a resident's interests and abilities. Staff completed learning tasks between sessions.	QOL: QOL-AD, Functional dependency (CAPE-BRS). Challenging Behaviours: CBS. Mood/affect: Depression (CSDD); Anxiety (RAID). QOL-AD gets worse for the homes which got the intervention and is maintained to final follow-up. No other effects for functional dependency, challenging

intervention (which takes 16 weeks, T2) and 12 weeks post-intervention (T3).	Staff data not reported, only that 52 received intervention. *No baseline differences. Attrition acknowledged but some detail: Intervention residents: 19 residents lost by T2 and a further 11 lost by T3. Control residents: 25 lost before T2 and a further 6 by T3. Attrition largely due to death and hospitalisation. Rate of attrition same in intervention and control. Mean attendance at training sessions was 73%; 81% for the coaching sessions. Some staff attended sessions but did not complete the learning tasks, with most citing a lack of time.	Individual coaching sessions also provided. Care home manager joined the last session to agree on an Activity Action Plan. Progress reviewed at two follow-up sessions. A workbook containing the sessions' content and tools was provided. A Trainers Manual outlined the program content. **(6)**	behaviour, depression or anxiety. Results not affected when they adjust for level of attendance at training.

ADQ=Approaches to Dementia Questionnaire (Zimmerman *et al.*, 2005a; 2005b); **ADL**=Activities of Daily Living scale (Schrijnemaekers and Haveman, 1993); **ADRQL**=The Alzheimer's Disease-Related Quality of Life Scale (Rabins *et al.*, 1999); **AI-C**= Apathy Inventory (Leone *et al.*, 2008); **AwareCare=**observational measure of awareness in severe dementia (Clare *et al.*, 2012); **Barthel**=The Barthel Self-Care Rating Scale (Sherwood *et al.*, 1977); **BASOLL=**Behavioural Assessment Scale of Later Life (Brooker *et al.*, 1993); **BEHAVE-AD=**Behavioral Pathology in Alzheimer's Disease Rating Scale (Reisberg, 1988); **BIP**=Behaviour Rating Scale for Inpatient Psychogeriatrics (Verstraten and van Eekelen, 1987); **Brief Pain Inventory** (modified verbal form: Gibson *et al.*, 2004); **BMSC**=Behavior Management Skills Checklist (Stevens *et al.*, 1998); **BOP/ASEP**=The Beoordelingsschaal voor Oudere Patienten (van der Kam *et al.*, 1971); **BSI=**Brief Symptom Inventory (Derogatis and Spencer, 1982); **CABOS=**Computer-Assisted Behavioral Observation System (Burgio *et al.*, 1994); **CBS**=Challenging Behaviour Scale (Moniz-Cook *et al.*, 2001); **CDR**=Clinical Dementia Rating scale (Hughes *et al.*, 1982); **CAPE-BRS=**Clifton Assessment Procedures for the Elderly-Behaviour Rating Scale (Pattie and Gilleard, 1979); **CAREBA=** Care Recipient Behavior Assessment (Sloane *et al.*, 2004); **Care Effectiveness Scale** (Archbold *et al.*, 1995); **CBBRS**=The Caregiver Bathing Behavior Rating Scale (Hoeffer *et al.*, 2006); **CES-D=**Center for Epidemiologic Studies=Depression (Ross and Mirowsky, 1989); **CMAI**=Cohen Mansfield Agitation Inventory (Cohen-Mansfield (Cohen-Mansfield, 1986; Cohen-Mansfield, 1991); **CMAI-D**=Cohen Mansfield Agitation Inventory (Dutch) (De Jonghe and Kat, 1996); **CMAI–SF**=Cohen Mansfield Agitation Inventory–Short Form (Cohen-Mansfield and Marx, 1989); **CMAI-OS=**Observation Scale to assess behavioural disturbances (Deudon *et al.*, 2009); **Cornell**=Cornell Scale for Depression in Dementia (Alexopoulos *et al.*, 1998); **DCM**=Dementia Care Mapping; **DCPA=**Dementia Care Practitioner's Assessment (Lintern *et al.*, 2000); **DemQOL**: Quality of Life for people with dementia (Smith *et al.*, 2005b); **Discomfort-DAT tool** (Hurley *et al.*, 1992); **DMAS=**Dementia Mood Assessment Scale (Sunderland *et al.*, 1988); **Dutch Work Satisfaction Scale** (Boumans, 1990)**; EAT**= Environmental Assessment Tool (Fleming, 2001)**; EdFED=**Edinburgh Feeding Evaluation in Dementia (Watson, 1994); **ERIC=**Emotional Responses in Care Assessment (Fleming, 2005); **ESID**=Emotion-Oriented skills in the interaction with Elderly (van der Kooij, 2003); **EuroQol-5D=**The (The EuroQOL G., 1990); **FACE** (Volicer *et al.*, 1999); **Family Behaviors Scale** (Pillemer *et al.*, 1998); **Family Empathy Scale** (Pillemer *et al.*, 2003); **Family Involvement Scale** (Holmes *et al.*, 1994); **FAST=**Functional Assessment Staging (Reisberg, 1988); **GDS**=Global Deterioration Scale (Reisberg *et al.*, 1982); **Generic Job Satisfaction Scale** (MacDonald and MacIntyre, 1997); **GRGS/Geriatric Resident Goal Scale** (Lawton, 1975); **GHQ**=General Health Questionnaire (12 Item: Goldberg, 1992; 28 Item: Goldberg and Hillier, 1979); **GIP**=Dutch Behavioral Rating Scale for Psycho-geriatric Inpatients (GIP-28: De Jonghe *et al.*, 1997; Verstraten and van Eekelen, 1987); **Hardy Skin Condition Data Form** (Hardy, 1990)**; Hassles During Bathing Scale** (Kinney and Stephens, 1989); **IBM**= Interaction Behaviour Measure (McCrosky and Wright, 1971); **Interpersonal Conflict Scale** (Pillemer and Moore, 1989); **Jalowiec Coping Scale** (Jalowiec, 1987); **KAT**=Knowledge of Alzheimer's Test (Maas and Buckwater, 1990); **Katz ADL Scale** (Katz, 1983); **LPRS=**London Psychogeriatric Rating Scale (Hersch *et al.*, 1978); **Maslach**=Maslach Burnout Inventory (Maslach *et al.*, 1996); **MAX=**Maximally discriminative facial movement coding system (Izard, 1979); **MDS**=Minimum Data Set (Hawes *et al.*, 1997); **MDS-ADL**=Minimum Data Set– Activities of Daily Living Scale (Morris *et al.*, 1999);

MDS-CPS = Minimum Data Set - Cognitive Performance Scale (Morris *et al.*, 1994); **MDS-COG**=Minimum Data Set - Cognition Scale (Hartmaier *et al.*, 1994); **MDS**-**DRS**=Depression Rating Scale (Burrows *et al.*, 2000); **Medication Quantification Scale** (Masters Steedman *et al.*, 1992); **MHQ**=Penn State Mental Health Questionnaire (Spore *et al.*, 1991); **MIBM**=Modified Interaction Behavior Measure (Burgener *et al.*, 1992); **MJSS-HC** (Landerweerd *et al.*, 1996); **MMSE**=Mini Mental State Examination (Folstein *et al.*, 1975); **MNA-SF**=Mini Nutritional Assessment Screening Form (Rubenstein *et al.*, 2001); **MOSES=**Multidimensional Observation Scale for elderly subjects (Helmes *et al.*, 1987); **NHUS**= Nurses Hassles and Uplifts Scale (Craig, 1995, unpublished data); **NPI-NH**=Neuropsychiatric Inventory: Nursing Home Version (Cummings *et al.*, 1994); **NPI Hyperactivty Scale** (Aalten *et al.*, 2007); **Nursing Home Hassles Scale** (Stephens *et al.*, 1991); **Nursing Skills in Handling Dementing Elderly** (van der Kooij, 1998); **Nursing Stress Scale** (Gray-Toft and Anderson, 1981); **Organization and Stress Scale** (Bergers *et al.*, 1986); **PACSLAC=**Pain Assessment Checklist for Seniors with Limited Ability to Communicate (Fuchs-Lacelle and Hadjistavropoulos, 2004); **PAINAD** =Pain Assessment in Advanced Dementia Scale (Warden *et al.*, 2003); **PAS**= Pittsburgh Agitation Scale (Rosen *et al.*, 1994); **Philadelphia Geriatric Center Affect Rating Scale** (Lawton *et al.*, 1996); **Philadelphia Geriatric Center Morale Scale** (Lawton, 1975); **PRS**= Positive Response Schedule (Perrin, 1997); **PRUQ=**The Perceptions of Restraints Use Questionnaire (Strumph and Evans, 1988); **QAP**=Quality Assessment Project (Norman *et al.*, 1994); **QEAW**=Questionnaire about Experience and Assessment of Work (Van Veldhoven *et al.*, 2002)**; QOL-AD** = Quality of Life-Alzheimer's Disease (Logsdon *et al.*, 1999; Logsdon *et al.*, 2002); **QUALID =** Quality of life in Late-Stage Dementia (Weiner *et al.*, 2000); QUALIDEM=Quality of Life in Dementia Scale (Ettema, 2007); **QUIS**= Quality of Interactions Schedule (Dean *et al.*, 1993); **RADL**=Refined ADL Assessment (Tappen, 1994); **RAWS-Long term care version** (Nelson and Algase, 2007); **RAID**=Rating Anxiety in Dementia Scale (Shankar *et al.*, 1999); **Revised Memory and Behavioral Problem Checklist** (Teri *et al.*, 1992); **RCS=**Australian resident classification scale (Commonwealth of Australia, 1997); **Scale of Nursing Performance (adapted)=**10 item version of The Scale of Nursing Performance 24 item (Battersby and Hemmings, 1991);**SES**=Social Engagement Scale (Mor *et al.*, 1995); **Staff Behaviors Scale** (Pillemer *et al.*, 1998); **Staff Empathy Scale** (Pillemer *et al.*, 2008); **Staff Provision to Residents Scale** (Pillemer *et al.*, 1998); **TESS-NH**=Therapeutic Environmental Screening Scale /Therapeutic Environmental Screening Scale for Nursing Homes (Sloane *et al.*, 2002); **TUGT** =Timed Up and Go Test (Podsiadlo and Richardson, 1991); **The Scale of Nursing Performance** (Battersby and Hemmings, 1991); **The Self-Efficacy of Dementia Care** (Davison *et al.*, 2007); **Zarit Burden Interview** (Zarit *et al.*, 1986).

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