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# What have staff got to do with it? Untangling complex relationships between residential aged care staff, the quality of care they provide, and the quality of life of people with dementia

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ABSTRACT

*Background:* : Despite the integral role residential care staff play in the lives of residents with dementia, the mechanisms for supporting staff to bring about good quality of care (QOC) and quality of life (QOL) are poorly understood. This study focused on establishing the key mechanisms to improve QOC and in turn QOL of residents with dementia.

*Method:* : Over a 10-month period we followed: 247 older adults with dementia from 12 not-for-profit residential care facilities, their families/care partners (n=225), managers (n=12) and staff (n=232). Facilities ranged in size from 10 to 137 beds, located across remote, rural and metropolitan areas of NSW/ACT. Measures included: staff surveys, family member and resident interviews, resident file audits, live resident and staff observations and organisational audits. Multilevel Modelling or Generalised Estimating Equations analyses were conducted for each of the 12 QOC variables, with 22 staff and control variables as the predictors, and for each of the 11 QOL variables, with 20 QOC and control variables as predictors.

*Results:* : Analyses established significant associations between a large number of staff and QOC variables and between QOC and QOL variables.

*Conclusions:* : The quality of the care provided to residents has strong, widespread influences on the QOL of residents. The most promising areas for intervening with staff were: increasing the relevance and applicability of staff training and qualifications, upskilling staff in empathic care provision, communication, and restraint reduction, using a mixture of permanent and rotating shifts, prioritising recreational activity provision by all staff and increasing assistance with meals.

## 1. Introduction

"The capacity, aptitude and capability of the aged care workforce are extremely important given the complexity of the work involved and the responsibility borne by those involved in providing care and support for older people" (Royal Commission into Aged Care Quality and Safety, 2019, p.217).

The Australian Royal Commission into Aged Care Quality and Safety (2020), amongst others, has highlighted the important role that staff play in the lives of aged care residents. Despite this importance, there is wide variation in the quality of staff, who are usually rushed and often poorly paid and supported, accorded low status and have minimal or no qualifications (Beck et al., 1999; Daly & Szebehely, 2012; Edberg et al., 2008).

The impact of staff is particularly potent for people with dementia, who represent over half of all residents in Australian aged care facilities (Australian Institute of Health and Welfare, 2012). For the majority of residents, their level of impairment means that it is often difficult or impossible to understand what is happening and why, and instead of family or friends, they are surrounded by and dependent on care staff (Australian Institute of Health and Welfare, 2012).

Numerous assumptions around the mechanisms and interventions required to improve the quality of the aged care workforce, and in turn the quality of the care they provide, have been perpetuated. There have been frequent and understandable calls for improved staffing and pay levels (Australian Nursing and Midwifery Foundation, 2018) and

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countless wide-ranging training and development opportunities provided. However, such calls have lacked the detail and scientific backing to provide a tangible way forward, apparently assuming that the provision of greater financial resources and action will, in itself, improve care (Australian Nursing and Midwifery Foundation, 2018).

So what *does* work to improve care and consequent quality of life (QOL) for residents with dementia? A recent comprehensive analysis of all the studies in this area showed a lack of high-quality longitudinal studies focusing on potentially adjustable staff variables which predict quality of care or quality of residents' lives (Anderson et al., 2016). There was a strong bias towards including only easily collected variables that are fixed or unlikely to change, such as staff gender, age, or position. Cumulative results of the review suggested that the key ingredients required to work with and support staff to bring about good QOC and QOL are poorly understood and require further investigation.

To truly advance the care of people with dementia in residential care, we need a greater, more detailed understanding of the mechanisms or key ingredients required to work with and support staff to bring about good QOC and, potentially, QOL of those in their care.

### 1.1. Aims

The overall aim of the study is to test the model (See Fig. 1) that staff and organisational variables are associated with QOC and that this translates into the presumed purpose of care: better resident QOL. The specific aims are to:

1. Examine associations between staff and organisation variables, QOC, and broadly defined QOL for residents with dementia.
2. Establish where it is most useful to intervene with staff and in QOC in order to increase QOL for people with dementia.

Preliminary results, using baseline and 6 month data, on the effects of quality of care on quality of life were published previously (Anderson & Blair, 2020). This paper presents final results for the whole model at baseline, 6 months and 10 months.

## 2. Method

### 2.1. Design

An observational, longitudinal study. Older adults in long term, residential care with dementia (n=247), their families/care partners (n=225), managers (n=12) and staff (n=235) of 12 residential aged care facilities were followed over 3 waves (baseline, 6 months and 10 months).

### 2.2. Ethical considerations

Human research ethics approval for the study was provided by the Greater Western Human Research Ethics Committee (HREC/16/GWAHS/160) for NSW and the Australian National University Human Research Ethics Committee (2017/034) for the ACT.

### 2.3. Participants at baseline

#### 2.3.1. Participating facilities

As seen in Table 1, participating facilities are representative of Australian residential aged care facilities in terms of the spread of size and location (AIHW National Aged Care Data Clearinghouse, 2015). However, all 12 facilities were from the not-for-profit sector. An equal number of for-profit organisations were approached but none agreed to participate.

#### 2.3.2. Residents

The inclusion criteria for residents was a diagnosis of (any type of) dementia or a score on the Psychogeriatric Assessment Scales – Cognitive Impairment Scale (PAS; Jorm et al., 1995) which indicated a high probability of dementia (i.e. a score of 5 or more).

247 residents from 12 facilities had written consent to participate in the study at baseline (see Fig. 2 for participant flow details). Family members and care partners were also asked to participate in an interview at each time point. Of the 247 residents enrolled in the study, 225 (91.09%) had a family member or care partner agree to participate also. Family members of residents were predominantly a child of the resident (64.2%) or a spouse (19.3%) with most visiting weekly (52.7%) or daily (31.4%).

Most residents were female (n=167; 67.6%) with an average age of 86.21 years (SD=7.58). Residents were, in the main, living with multiple physical co-morbidities (Charlson Co-morbidity Index (CCI) mean=6.02, SD=1.50. CCI scores >5 predict 100% chance of 1 year mortality (Charlson et al., 1987). Further, 43% had one or more psychiatric diagnoses. Although all met inclusion criteria for cognitive impairment on the PAS (M=9.52, SD=3.66), 25% did not have a formal diagnosis of dementia on record. As seen in Table 2, at baseline, 25% of residents were receiving regular antipsychotic medication and 10% were being physically restrained.

#### 2.3.3. Staff

Staff members involved in direct resident care were included: Personal Care Assistants (PCAs) with minimal training, activities staff, allied health, and Registered Nurses (RNs; nurses with a bachelor degree or equivalent). This also included catering and hospitality staff.

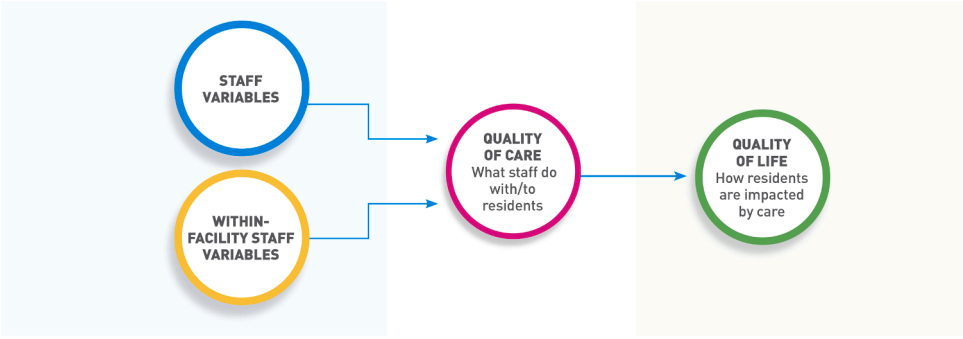


**Fig. 1.** Hypothesised relationship between staff and facility variables, quality of care and quality of life for residents.

**Table 1**
Size and location of participating facilities.

| | Major City (ACT) | Inner Regional (NSW) | Outer Regional (NSW) | Remote (NSW) | Total | Percentage (%) |
|---|---|---|---|---|---|---|
| 0 to 20 | | | 1 | 1 | 2 | 16.70 |
| 21-40 | 1 | | 1 | | 2 | 16.70 |
| 41-60 | | 1 | 1 | | 2 | 16.70 |
| 61-80 | 2 | 1 | | | 3 | 25.00 |
| 81-100 | 1 | | | | 1 | 8.30 |
| 100+ | 1 | 1 | | | 2 | 16.70 |
| Totals | 5 | 3 | 3 | 1 | 12 | |
| Percentage (%) | 41.70 | 25 | 25 | 8.30 | | |

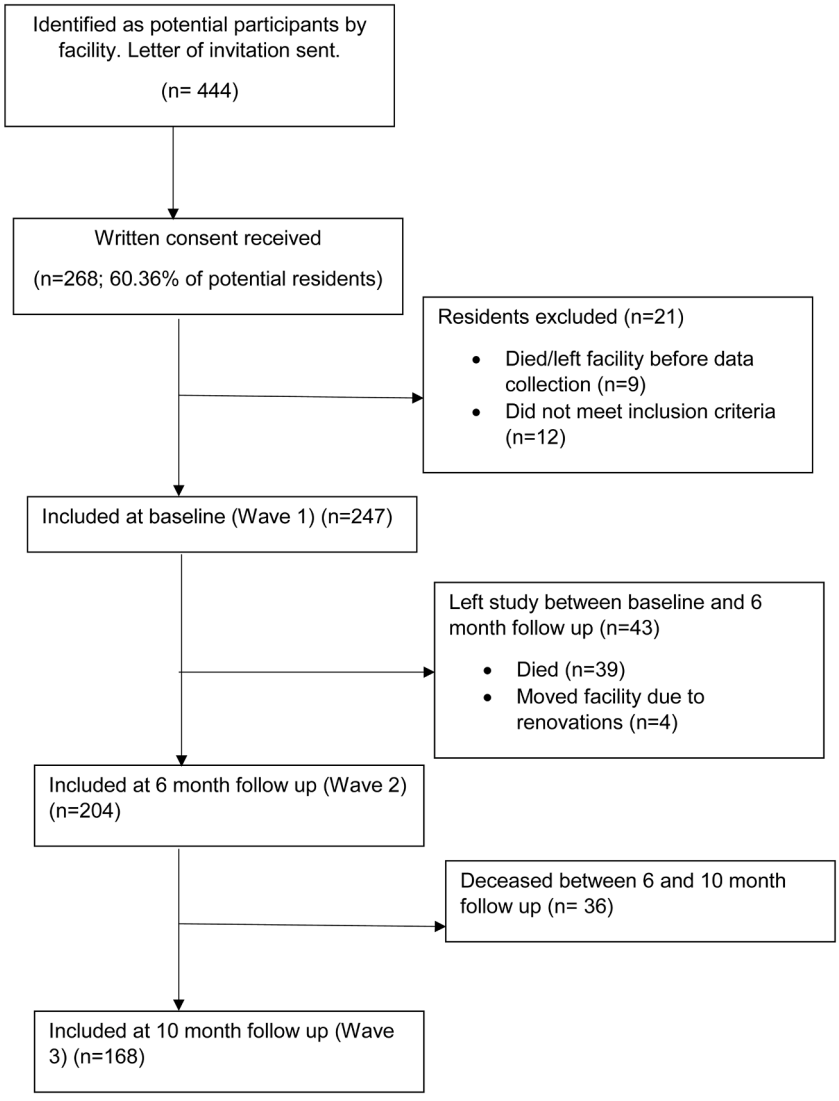


**Fig. 2.** Flow of resident participants through the study.

**Table 2**
Resident baseline characteristics

| | | Number of residents | Percentage (%) |
|---|---|---|---|
| Gender | Female | 167 | 67.6 |
| Location | In Dementia Specific Unit (yes) | 98 | 39.7 |
| Mental Health | Schizophrenia | 4 | 6.0 |
| | Bipolar | 3 | 1.2 |
| | Depression | 89 | 36.2 |
| | Anxiety | 43 | 17.5 |
| Medication use in the previous 2 weeks | Antipsychotics (Regular) (Excluding those with schizophrenia) | 63 | 25.8 |
| | Antipsychotics (PRN) | 6 | 2.4 |
| | Bendodiazepines (Regular) | 33 | 14.6 |
| | Bendodiazepines (PRN) | 18 | 7.3 |
| | Anti-dementia (Cholinesterase Inhibitors and Memantine) | 26 | 10.6 |
| | Antidepressant | 97 | 39.6 |
| | Pain relief (regular) | 152 | 62.3 |
| Adverse incidents in the previous month | One or more falls | 45 | 18.2 |
| | Hospitalised (1 or more days) | 18 | 7.3 |
| | Pressure Ulcer (any stage) | 20 | 8.1 |
| Physical Restraint | Restraint recorded or observed | 27 | 10.9 |
| Pain | Pain recorded in notes | 175 | 70.9 |
| Behaviour change | Responsive behaviours recorded in notes | 179 | 72.5 |

Each facility allowed researchers to approach staff in person or via letter to invite them to participate in the research. The potential number of staff for inclusion identified by facilities was 642. The number of staff consents received was 237. Two staff withdrew during baseline data collection, leaving 235 (36.60% of potential staff).

Most (89%) were female with an average age of 45.45 (SD=13.56). On average they had worked in aged care for 9.28 years (SD=8.06) and in the current facility for 6.36 years (SD=6.30). About two thirds identified as Australian (68.3%), whilst 1.80% identified as Aboriginal (Indigenous Australians).

Almost half the staff who completed the survey were PCAs (49.4%) and 14.0% were RNs. The majority of staff held either a Certificate III (37.3%) or Certificate IV (30.4%) qualification in aged care (Vocational Education and Training qualifications which are higher than secondary schooling but lower than a Bachelor Degree). Only 15.4% had a bachelor degree or higher.

#### 2.3.4. Managers

The twelve managers were on average slightly older than other staff members (M age=51.87 years, SD=8.07) and, whilst two thirds (64.7%) were female, there was a lower percentage of women in management compared to overall staff. On average, they had been at the current facility slightly less time (M years=4.53, SD=5.00) than the average for other staff, but had worked in nursing (M years=23.77, SD=11.15) and aged care for longer (M years=13.20, SD=8.15). Most had university qualifications (82.40%), with backgrounds in nursing/care (82.40%). Three managers (17.6%) had backgrounds in business and finance.

### 2.4. Research measures

Detailed descriptions of all the measures used are displayed in Appendix A. We measured QOC and QOL much more comprehensively than is traditionally the case, reducing reliance on standardised measures, which can be less specific, unreliable or insensitive to change (Chappell & Reid, 2000; Hughes et al., 2019). QOC was broadly defined as anything done to or with the resident by the facility or staff and the circumstances in which it occurred. Accordingly, though we did use the QUALCARE instrument (Phillips et al., 1990) and the Person-Centered Care Assessment Tool (P-CAT: Edvardsson et al., 2010), we mainly sought to measure how staff felt about their work and residents, how their caring was perceived by others, what they actually did in practice and, crucially, how this affected the lives of residents.

We define resident quality of life more broadly than most, with the defining feature being that it represents the resident's standard of health, participation in life and comfort. For resident QOL outcomes, though we did use a dementia-specific QOL scale (QOL-AD: Logsdon et al., 1999, 2002), we mainly assessed a wide range of medical/physical and psychosocial conditions that affect or reflect well-being: for example, pain, depression, social engagement, pressure sores. A broad ranging suite of facility level variables was also used, including how shifts were organised. This extensive approach allowed us to be much more specific about the links between staff, aspects of care and aspects of QOL.

Measures were collected via:

1 Staff Questionnaires: Staff members were asked to complete two types of questionnaires; one about themselves, the other about a particular resident. Questionnaires about themselves covered staff factors, such as education, experience, proportion of face-to-face time with residents, strain, and cultural backgrounds. Questionnaires about residents measured QOL outcomes, such as pain, affect, behaviours, and social functioning. A standard QOL scale was also included. Where possible, 2 staff members were asked to complete the questionnaire on each resident.
2 File Audits: Resident files were audited to measure proxy QOC outcomes (e.g. psychotropic medication use, documented physical restraint, admission assessment) and proxy QOL outcomes (e.g. pressure ulcers, mortality, depression, and falls). Resident demographics were also collected.
3 Observation: Systematic observation of what was actually done to and with the resident by staff (e.g. time spent on care, quality of interactions between staff and residents), plus QOL (e.g. engagement, discomfort, and responsive behaviours).
4 Review of Other Records: Facility records examined within-facility staff variables, such as staffing levels, organisation of shifts, absenteeism, and education provided to staff.
5 Interviews with Family and Residents: Family members, care partners and residents themselves, where possible, reported on aspects of the quality of the care provided and on resident well-being and QOL. Interviews for the project were conducted by the Project Officers (PO), who were nursing and allied health professionals experienced in working with people with dementia, staff and carers.
6 Interviews with Management: Interviews with managers focused on staff, management and organisational factors such as manager qualifications and experience, access to external health professionals, and activities provided.

As seen in Appendix A, composite variables were created, with multiple measures used to assess an overarching construct. As an example, a composite measure for depression was developed from the Geriatric Depression Scale (Kurlowicz & Greenberg, 2007) completed by residents, Cornell Scale for Depression in Dementia (Alexopoulos et al., 1988) completed by staff and families and Philadelphia Geriatric Center Affect Rating Scale (Lawton et al., 1996) collected via observations of the resident. Unless otherwise stated, the scores for all measures within a composite were individually z-scored before combining for the composite, in line with recommendations by Song et al. (2013). All measures were given equal weight in the composite, unless stated otherwise in Appendix A. Where both residents and family members completed the same measure independently, scores were averaged.

## 3. Results

### 3.1. Data analysis

#### 3.1.1. Inter-rater reliability

Inter-rater reliability was assessed on a random sample of 24% of resident observations, 15% of staff observations and 11% of resident file audits using a two-way, mixed, consistency intra-class correlation (Hallgren, 2012). The intra-class correlations (ICCs) were in the moderate range (Cicchetti, 1994) for the resident ($M\rho = 0.71$) and staff observations ($M\rho = 0.73$), and in the good range for the file audits ($M\rho = 0.87$).

#### 3.1.2. Data sets

Two data sets were created: one containing data pertaining to residents and another pertaining to staff. For the purposes of analysing QOC outcomes, the staff file was used with pertinent resident variables averaged by facility and imported into the staff data set. Similarly, the resident data file was used to analyse QOL outcomes, with any variables relating to staff being averaged by facility and imported into the resident file.

#### 3.1.3. Clustering within facilities

To determine if dependency of observations within each facility existed, ICC analyses were calculated for each outcome (Heck et al., 2012; Tabachnick & Fidell, 2007). There were meaningful average differences between facilities (ICC>.10) on nine QOC outcomes. These were: Staff Treatment of Residents (Ratings), Access External Health Professionals, Activities, Adverse Physical Incidents, Assessment and Treatment of Food and Fluid, Psychotropic Medication Use, Overall Quality of Care (QUALCARE), and Restraint Use. Differences between facilities were found on one QOL outcome: Ease/Engagement with Staff. For these outcomes, multilevel modelling (MLM) was required to account for the dependency of observations within a cluster (facility). Thus a 3 level multilevel model was used to analyse data over time (Level 1), for staff or residents (Level 2), nested within facilities (Level 3).

Meaningful differences between facilities were not found for four QOC outcomes: Staff Treatment of Residents (Observed), Assistance with Meals, Communicating about Residents, and Person-Centred Care (P-CAT). There were no meaningful differences for 10 QOL outcomes. These were: Overall Quality of Life, Cognitive/ Physical Frailty, Depression, Pain, Agitated Behaviours, BMI (Body Mass Index), Food Intake, Fluid Intake, Mortality, and Verbal/Physical Expressions. These outcomes were analysed using Generalised Estimating Equations (GEE). Generalized Estimating Equations estimate generalized linear models for cluster or repeated measures data when the observations are possibly correlated within a cluster (facility) but uncorrelated across clusters (facilities). We used an identity link structure to adjust for the correlation between repeated measurements.

#### 3.1.4. Quality of Care analyses

For each of the 12 QOC outcomes, MLM or GEE analyses were conducted with all independent variables being entered simultaneously: Dementia Care Qualifications (yes/no), Education Attainment (Vocational Qualification or lower), Staff Position (RN or other), Staff Experience, Staff Strain, Staff Dementia Knowledge, Restraint Attitudes, Falling and Pain Attitudes, Training in Dementia or Aged Care (staff), Proportion of Face-to-Face Time with Residents, Formal Staff Training Provided by the Facility, PCA Minutes per Resident, RN Minutes per Resident, Shift Organisation (rotating), Job Status (proportion of permanent staff), Manager Experience, Manager Qualifications (RN or not), Structured Activities, and Access External Health Professionals. Control variables entered for each facility included: Proportion of Residents with Formal Dementia Diagnosis, Number of Facility Beds, and Environmental Audit Tool score (Fleming, 2011).

#### 3.1.5. Quality of Life analyses

Similarly, MLM or GEE was conducted for each of the eleven aspects of QOL at all three times (Baseline, 6 months and 10 months) as the dependent variable: Overall Quality of Life, Cognitive and Physical Frailty, Depression, Pain, Agitated Behaviours, BMI, Food Intake, Fluid Intake, Mortality, Positive Verbal/Physical Expressions and Ease/Engagement with Staff.

Predictor variables included Professional Treatment of Food Intake, Professional Treatment of Fluid Intake, Psychotropic Medications, Restraint Use, Staff Treatment of Residents (ratings), Staff Treatment of Residents (observed), Activities, Adverse Physical Incidents, Overall Quality of Care, Assistance with Meals, Communicating about Residents, Person-Centred Care, and Usage Other Health Professionals. Proportion of Residents with Formal Dementia Diagnosis, Number of Facility Beds, Environmental Audit Tool score, Resident Age, Charlson Comorbidity Index (CCI) Score, Time, and Psychiatric Co-morbidities were included as control variables.

#### 3.1.6. Assumptions

The following QOC variables violated normality and were transformed: Staff Treatment of Residents (Observed), Restraint Use, Assessment and Treatment of Food and Fluid, Access to External Health Professionals, RN Minutes per Resident, Falling and Pain Attitudes, and Training in Dementia or Aged Care. Outliers were brought within 3.29 standard deviations to achieve normality for the following variables: Assistance with Meals, Psychotropic Medication Use, Job Status, Staff Experience, Person-Centred Care (P-CAT), and Manager Experience.

The following QOL variables violated normality and were transformed: Pain, Agitated Behaviour, Staff Treatment of Residents (observed), and Assistance with Meals. The following variables were dichotomised due to violations of normality: Physical Restraint, Mortality, Psychotropic Medications, and Psychiatric Comorbidities

The following variables required some outliers to be brought within 3.29 standard deviations to achieve normality: BMI, Ease/Engagement with Staff, Positive Verbal/Physical Expressions, Food Intake, Activities, Usage Other Health Professionals, and Overall Quality of Care.

All other assumptions were met. Multiple imputation through SPSS v26 was used for missing values on scales with less than ten percent of the data missing. All variables were standardised (M=0, SD=1) in order to produce standardised, and therefore comparable, regression coefficients.

**Table 3**
Standardised regression coefficients (β) and standard errors (SE) for MLM with random intercept and GEE: quality of care (Dependent variables), staff and facility factors (independent variables), adjusted for facility characteristics (proportion of residents with dementia, environmental audit, number of beds).

| | Dependent Variables – Quality of Care | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Multilevel Models (Fixed Effects Estimates (SE)) | | | | | | | | Generalised Estimating Equations (SE) | | | |
| | Better Staff Treatment of Residents (Ratings) | Usage Other Health Professionals | Activities | Fewer Adverse Physical Incidents | Assessment/ Treatment of Food and Fluid | Less Psychotropic Medication | Better Quality of Care (QUALCARE) | Lower Restraint Use | Better Staff Treatment of Residents (Observed) | Greater Assistance with Meals | Communicating about Residents | Person-Centred Care (P-CAT) |
| Staff No Dementia Qualifications | .024 (.142) | .000 (.045) | .092 (.094) | .119* (.056) | .029 (.064) | -.062 (.066) | -.164 (.106) | -.091 (.059) | -.050 (.182) | .213 (.207) | .093 (.152) | -.030 (.125) |
| Staff Education (No Vocational Qualification) | .062 (.535) | .070 (.099) | .037 (.179) | .231* (.109) | -.145 (.125) | -.012 (.128) | .070 (.204) | -.124 (.112) | -.426 (.366) | .343 (.466) | -1.105** (.352) | -.065 (.265) |
| Staff Position (Not RN) | .053 (.248) | -.016 (.052) | -.067 (.116) | .017 (.068) | -.029 (.077) | -.094 (.079) | -.071 (.129) | -.041 (.072) | .760* (.341) | .813** (.294) | -.550** (.203) | -.032 (.205) |
| Staff Experience | -.032 (.072) | -.002 (.016) | -.016 (.037) | -.005 (.021) | -.013 (.024) | -.030 (.025) | -.047 (.041) | -.015 (.023) | .082 (.081) | -.088 (.076) | .300** (.074) | .056 (.061) |
| Staff Strain | -.069 (.077) | -.020 (.019) | .066 (.043) | .003 (.025) | .023 (.028) | -.002 (.029) | -.060 (.048) | -.020 (.027) | -.078 (.102) | -.053 (.094) | .001 (.076) | -.639** (.064) |
| Staff Dementia Knowledge | .217** (.072) | .003 (.021) | .017 (.043) | .055 (.026) | -.015 (.029) | -.010 (.030) | -.027 (.048) | -.028 (.027) | -.084 (.085) | -.166 (.094) | .097 (.073) | .026 (.062) |
| Restraint Attitudes | .037 (.065) | -.011 (.018) | -.014 (.040) | .005 (.024) | -.023 (.027) | -.029 (.028) | -.010 (.045) | -.041 (.025) | -.025 (.069) | .013 (.080) | -.011 (.077) | -.013 (.055) |
| Falling and Pain Attitudes | .050 (.089) | -.084 (.050) | -.001 (.065) | .185** (.043) | .082 (.048) | -.150** (.050) | -.356** (.078) | -.357** (.042) | -.119 (.077) | .205* (.093) | .074 (.081) | .120* (.061) |
| Training in Dementia or Aged Care (Staff) | .148* (.068) | -.002 (.021) | .042 (.042) | .040 (.025) | .000 (.029) | -.003 (.029) | -.061 (.047) | -.024 (.026) | -.094 (.090) | .165 (.107) | .011 (.075) | .038 (.048) |
| Time with Residents (Staff) | .035 (.075) | -.003 (.020) | .018 (.042) | .027 (.025) | .002 (.028) | .033 (.029) | .019 (.047) | .002 (.026) | .167 (.100) | .045 (.129) | .038 (.071) | .126** (.049) |
| Formal Staff Training Provided | .152 (.125) | -.101 (.053) | -.060 (.101) | -.536** (.062) | -.334** (.070) | .114 (.072) | .023 (.117) | -.069 (.064) | -.106 (.117) | .116 (.121) | -.010 (.097) | -.029 (.089) |
| PCA minutes per resident | -.266 (.166) | .005 (.077) | -.579** (.144) | -.124 (.090) | .227* (.099) | -.172 (.102) | -.056 (.167) | -.507** (.091) | -.117 (.096) | .211 (.122) | -.036 (.096) | .095 (.063) |
| RN minutes per resident | -.023 (.265) | .728** (.195) | 1.671** (.438) | -3.599** (.325) | -.037 (.240) | .288 (.252) | -4.033** (.556) | 1.935** (.310) | -.533** (.144) | .214 (.128) | -.092 (.103) | -.119 (.087) |
| Staff Shift Rotate | .539 (.415) | -.445 (.192) | 1.700** (.365) | -.428 (.240) | .875** (.243) | .491 (.251) | -1.447** (.435) | .453 (.238) | -.110 (.304) | .766** (.279) | .386 (.247) | -.279 (.187) |
| Staff Job Status – Proportion permanent staff | -.091 (.089) | -.156** (.045) | .133 (.070) | .294** (.045) | -.186** (.050) | -.131* (.051) | .524** (.082) | -.451** (.044) | -.011 (.082) | .014 (.103) | .043 (.081) | -.159** (.060) |
| Manager Experience | .310 (.185) | .025 (.080) | .426** (.145) | .735** (.093) | -.506** (.100) | -.015 (.103) | .366* (.169) | -.099 (.093) | -.457** (.153) | -.124 (.131) | .171 (.143) | .152 (.121) |
| Manager Qualifications (Not RN) | .003 (.174) | .043 (.093) | .244 (.182) | .511** (.121) | -.517** (.116) | -.555** (.120) | .264 (.219) | -1.313** (.120) | -.016 (.149) | .115 (.195) | .071 (.130) | -.224 (.117) |
| Structured activities | -.079 (.139) | .016 (.041) | -.110 (.087) | -.075 (.052) | .017 (.059) | -.010 (.060) | .058 (.098) | .051 (.054) | -.013 (.135) | .061 (.183) | .199 (.124) | .244* (.107) |
| Access to Other Health Professionals | .030 (.089) | .109** (.039) | .139* (.067) | -.231** (.049) | .258** (.045) | -.159** (.047) | -.041 (.081) | -.193** (.045) | .277** (.086) | -.208* (.089) | .030 (.079) | .055 (.058) |
| Proportion of Residents with Dementia | -.021 (.194) | -.226 (.115) | .330 (.196) | .766** (.132) | .559** (.130) | -.360** (.135) | -.126 (.237) | .193 (.129) | .377* (.161) | .071 (.152) | -.109 (.136) | -.079 (.126) |
| | .019 (.322) | .527 (.295) | | | .183 (.362) | -.583 (.386) | 2.112 (1.477) | | .070 (.157) | | .004 (.140) | .061 (.129) |

(*continued on next page*)

**Table 3** (*continued*)

| Dependent Variables – Quality of Care Multilevel Models (Fixed Effects Estimates (SE)) | Generalised Estimating Equations (SE) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Better Staff Treatment of Residents (Ratings) | Usage Other Health Professionals | Activities | Fewer Adverse Physical Incidents | Assessment/ Treatment of Food and Fluid | Less Psychotropic Medication | Better Quality of Care (QUALCARE) | Lower Restraint Use | Better Staff Treatment of Residents (Observed) | Greater Assistance with Meals | Communicating about Residents | Person-Centred Care (P-CAT) |
| Number of Beds in the Facility | | | -1.860 (.915) | 4.614** (1.143) | | | | -3.184** (.902) | | .504** (.151) | | |
| Environmental Audit | -.091 (.150) | .270** (.070) | -.508** (.129) | .681** (.090) | .066 (.086) | .454** (.089) | 1.027** (.155) | -.472** (.086) | .240* (.105) | -.110 (.111) | .025 (.089) | -.070 (.060) |
| Goodness of Fit (Control Only minus Full model) | 506.275** | 121.267** | 1122.396** | 823.287** | 815.285** | 310.371** | 1061.784** | 841.754** | 214.498** | 195.439** | 47.14** | 122.879** |
| N Subjects (MLM), N Observations (GEE) | 108 | 145 | 145 | 145 | 145 | 145 | 145 | 145 | 171 | 143 | 250 | 250 |

* p<.05
** p<.01

### 3.2. GEE and MLM results

The standardized regression coefficients (β), and standard errors (SE) are displayed in Table 3 for the effects of staffing and staff related facility variables on the QOC variables and in Table 4 for the effects of the QOC variables on the QOL variables. In MLM and GEE, standardized regression coefficients (β) represent the change in the dependent variable (measured in Standard Deviations) that would occur if all other independent (predictor) variables are held constant at the Grand Mean. Fig. 3 summarises the significant relationships between staff and facility variables, with quality of care and quality of life variables.

### 3.3. Better Staff Treatment of Residents (Observed and Ratings)

#### 3.3.1. Ratings

Where staff were more knowledgeable about dementia ($\overline{\beta}$=.217) and have received more training in dementia or aged care and rated the training as more useful to their work ($\overline{\beta}$=.148) there was better staff treatment of residents as rated by the trained observers.

In turn, as seen in Fig. 3, better ratings of staff treatment were associated with higher resident BMIs (β=.134) and with residents being more engaged and at ease ($\overline{\beta}$=.205).

#### 3.3.2. Observed

Staff who are not RNs (mostly PCAs) were more likely to display significantly more positive behaviours towards residents ($\beta$=.760). At a facility level, facilities with lower RN minutes per resident ($\beta$=-.533), less experienced managers ($\beta$=-.457), and greater access to other health professionals ($\beta$=.277), were more likely to have staff displaying more positive behaviours towards residents.

More positive behaviours towards residents was associated with less resident pain (β=.-.149), fewer agitated behaviours (β=.091), higher food intake (β=.088) and with residents displaying more positive physical and verbal expressions during resident observations (β=.197) and engagement and ease with staff ($\overline{\beta}$=.161). Residents, however, who were more physically and cognitively frail were more likely to experience positive staff behaviour (β=.102).

### 3.4. Activities

The degree to which residents were actively encouraged to participate in leisure activities, the relevance of activities provided, and their levels of participation and satisfaction (Activity relevance and involvement) significantly increased when the RN minutes per resident were higher ($\overline{\beta}$=1.671), when a manager had more experience ($\overline{\beta}$=.426), when staff had rotating shifts ($\overline{\beta}$=1.700) and greater access to other health professionals ($\overline{\beta}$=.139).

In contrast to the number of RN minutes per resident, having higher PCA minutes per resident contributed to reduced activity relevance and involvement ($\overline{\beta}$=-.579).

In turn, greater activity relevance and involvement was associated with higher overall Quality of Life (QOL-AD scores) (β=.324), less depression (β =-.190), fewer agitated behaviours (β =-.124), and higher food intake (β=.122). However, they were less likely to consume their minimum recommended fluid intake (β=-.504). Residents who were more cognitively and physically frail had greater levels of activity relevance and involvement (β=.122).

### 3.5. Adverse Physical Incidents

At an individual staff level, lower educational attainment ($\overline{\beta}$=.231) and no dementia care qualifications ($\overline{\beta}$=.119), were associated with fewer adverse incidents in a facility. At a facility level, fewer adverse incidents were associated with a higher proportion of permanent staff

**Table 4**
QOC on QOL outcomes: MLM with random intercept and GEE: quality of life (Dependent variables), quality of care (independent variables), adjusted for facility and resident characteristics (proportion of residents with dementia, environmental audit, number of beds, age, CCI, psychiatric co-morbidities, time).

| | Dependent Variables – Quality of Life | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Generalised Estimating Equations (SE) | | | | | | | | | | Multilevel Models (Fixed Effects Estimates (SE)) |
| | QOL-AD | Cognitive/ Physical Frailty | Depression | Pain | Agitated Behaviours | BMI | Food Intake | Fluid intake (over 235mls) | Deceased | Positive verbal/ physical expressions | Ease/ Engagement with staff |
| Not Assessed/ Treated Food | .165 (.178) | .334* (.139) | .026 (.200) | .025 (.168) | -.062 (.164) | .265 (.194) | .095 (.176) | -.077 (.426) | 1.211 (.807) | .164 (.221) | .130 (.156) |
| Not Assessed/ Treated Fluid | -.075 (.209) | .017 (.147) | -.067 (.229) | .028 (.190) | -.123 (.187) | -.125 (.229) | .000 (.181) | -.210 (.461) | -.820 (.856) | .005 (.233) | -.094 (.169) |
| No Psychotropic Medications | .286* (.111) | .143 (.109) | -.525** (.125) | -.248* (.099) | -.444** (.099) | .069 (.123) | .114 (.099) | .213 (.236) | .499 (.567) | .333** (.126) | .111 (.095) |
| No Restraint Use | .292* (.130) | .821** (.130) | -.276* (.120) | -.713** (.136) | .077 (.118) | .420** (.151) | -.061 (.117) | -.713* (.292) | .500 (.551) | .431** (.107) | .216* (.107) |
| Better Staff Treatment of Residents (Ratings) | .122 (.065) | -.053 (.054) | -.060 (.063) | -.002 (.054) | .101 (.060) | .134* (.059) | -.051 (.057) | -.133 (.146) | .243 (.549) | .006 (.060) | .205* (.076) |
| Better Staff Treatment of Residents (Observed) | .048 (.046) | .102** (.034) | -.051 (.039) | -.149** (.037) | -.091* (.043) | -.021 (.044) | .088* (.041) | .034 (.108) | .351 (.362) | .197** (.043) | .161** (.042) |
| Activities | .324** (.053) | .122* (.048) | -.190** (.051) | -.023 (.044) | -.124* (.054) | .041 (.059) | .122* (.050) | -.504** (.144) | .321 (.477) | .070 (.049) | .075 (.046) |
| No Adverse Physical Incidents | .100** (.036) | .098** (.032) | -.034 (.036) | -.037 (.034) | -.172** (.041) | .013 (.042) | -.031 (.035) | .001 (.100) | .146 (.203) | .037 (.031) | .012 (.033) |
| Better Quality of Care (QUALCARE) | .172** (.049) | .167** (.047) | -.155** (.046) | -.100* (.046) | -.051 (.036) | .074 (.050) | .055 (.044) | .122 (.113) | .180 (.343) | .164** (.045) | .118** (.041) |
| Greater Assistance with Meals | .054 (.037) | .137** (.036) | -.030 (.041) | -.144** (.044) | -.058 (.042) | .112** (.042) | -.019 (.040) | -.016 (.093) | -.174 (.358) | .099* (.041) | .065 (.039) |
| Communicating about Residents | .178** (.059) | .105* (.053) | .004 (.052) | -.003 (.040) | -.028 (.048) | .130* (.056) | .006 (.048) | -.108 (.123) | -.123 (.532) | .068 (.042) | -.119* (.052) |
| Person-Centred Care (P-CAT) | -.207** (.066) | -.194** (.054) | .016 (.056) | .081 (.051) | .062 (.051) | .012 (.066) | .064 (.055) | .369* (.144) | -.755 (.584) | -.061 (.051) | .020 (.066) |
| Usage Other Health Professionals | -.088 (.055) | -.092* (.041) | .071 (.052) | .151** (.045) | .070 (.051) | -.030 (.057) | .033 (.048) | .220 (.128) | .111 (.331) | -.132** (.049) | -.041 (.053) |
| Proportion of Residents with Dementia | .132* (.052) | .027 (.050) | -.099* (.050) | .013 (.046) | .068 (.052) | -.083 (.071) | -.099* (.041) | -.091 (.111) | -.269 (.376) | -.052 (.049) | -.044 (.068) |
| Number of Beds in the Facility | .067 (.063) | -.051 (.057) | -.030 (.061) | .115* (.047) | .081 (.058) | .023 (.072) | -.056 (.057) | -.210 (.143) | -.244 (.490) | -.097 (.059) | -.105 (.098) |
| Environmental Audit | .040 (.055) | -.071 (.055) | -.022 (.059) | -.016 (.053) | .102 (.052) | .063 (.061) | .021 (.056) | -.235 (.120) | .514 (.400) | -.078 (.060) | .029 (.053) |
| Resident Age | .026 (.050) | .004 (.053) | -.042 (.058) | -.005 (.050) | -.043 (.046) | -.220** (.074) | -.228** (.049) | .175 (.105) | -.536 (.282) | .096 (.057) | .017 (.048) |
| Charlson Co-morbidity Index score (6-mths) | .056 (.051) | .036 (.044) | -.009 (.053) | -.022 (.048) | .001 (.044) | .067 (.067) | .066 (.042) | -.027 (.108) | .103 (.242) | .021 (.054) | .043 (.048) |
| No Psychiatric Co-morbidities | .125 (.097) | .036 (.085) | -.206* (.101) | -.109 (.083) | -.038 (.093) | -.151 (.127) | -.033 (.089) | -.631** (.191) | .479 (.469) | .265* (.103) | -.025 (.087) |
| Time (0) | .383** (.134) | .158 (.110) | -.089 (.122) | -.094 (.116) | -.167 (.126) | -.270* (.118) | .238 (.125) | -1.243** (.299) | .064 (1.064) | .084 (.111) | .073 (.127) |
| Time (1) | .371** (.111) | .188* (.094) | -.153 (.116) | .028 (.110) | -.040 (.125) | -.224* (.104) | .268* (.116) | -.707** (.267) | -.418 (.942) | .085 (.105) | .058 (.105) |
| Goodness of Fit (Control Only minus Full model) | 187.58** | 228.292** | 59.85** | 142.977** | 106.618** | 73.055** | 195.201** | 7.621 | 302.663** | 40.899** | 21.508 |
| N Observations (GEE), N subjects (MLM) | 484 | 611 | 609 | 611 | 611 | 530 | 484 | 594 | 611 | 611 | 258 |

* $p<.05$
** $p<.01$

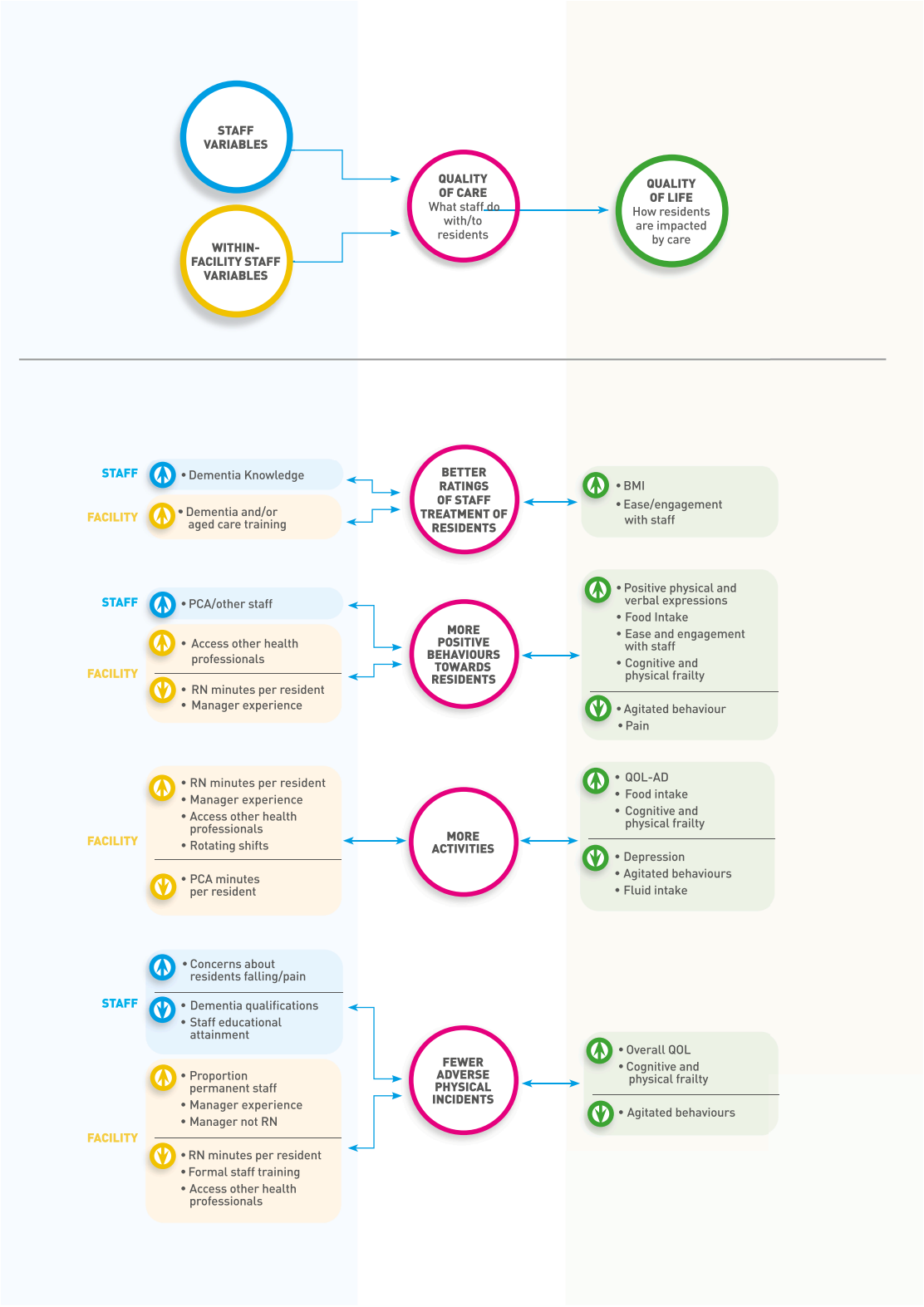


**Fig. 3.** Summary of significant relationships between staff and facility variables, quality of care variables and quality of life outcomes.

($\overline{\beta}$=.294), more experienced managers ($\overline{\beta}$=.735) who were not RNs ($\overline{\beta}$=.511), greater concern amongst staff about residents falling or being in pain ($\overline{\beta}$=.185), lower RN minutes per residents ($\overline{\beta}$=-3.599), less formal staff training ($\overline{\beta}$=-.536), and less access to other health professionals ($\overline{\beta}$=-.231).

Unsurprisingly, residents experiencing fewer adverse physical incidents displayed fewer agitated behaviours (β=-.172) and had better overall QOL (β=.100). They were, however, more frail (β=.098).

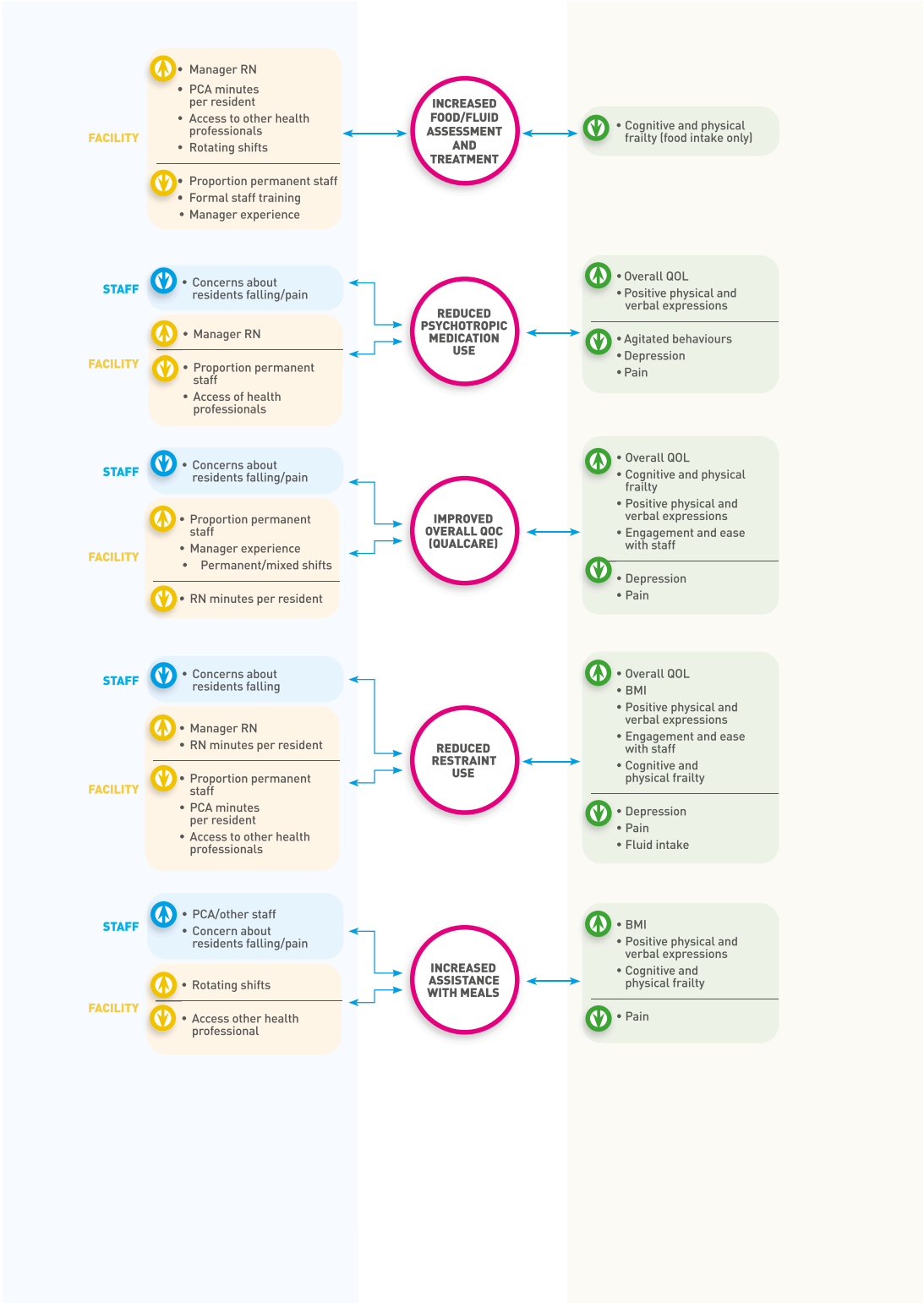


**Fig. 3.** (*continued*).

### 3.6. Assessment and Treatment of Food and Fluid

Higher PCA minutes per resident ($\beta$=.227) and having greater access to other health professionals ($\beta$=.258) contributed to a greater number of assessments and treatment for food and fluid difficulties.

Assessment and treatment for food and fluid intake occurred significantly less frequently when a greater proportion of staff were permanent ($\beta$=-.186), when the manager is not a RN ($\beta$=-.517), with greater provision of formal staff training ($\beta$=-.334), and with more experienced managers ($\beta$=-.506). Assessment and treatment for food and fluid intake occurred more frequently when staff shifts were rotating ($\beta$=.875).

Residents who had not been assessed and/or treated for food intake were more cognitively and physically frail (β=.334). The assessment and/or treatment of fluid intake did not have a significant impact on the

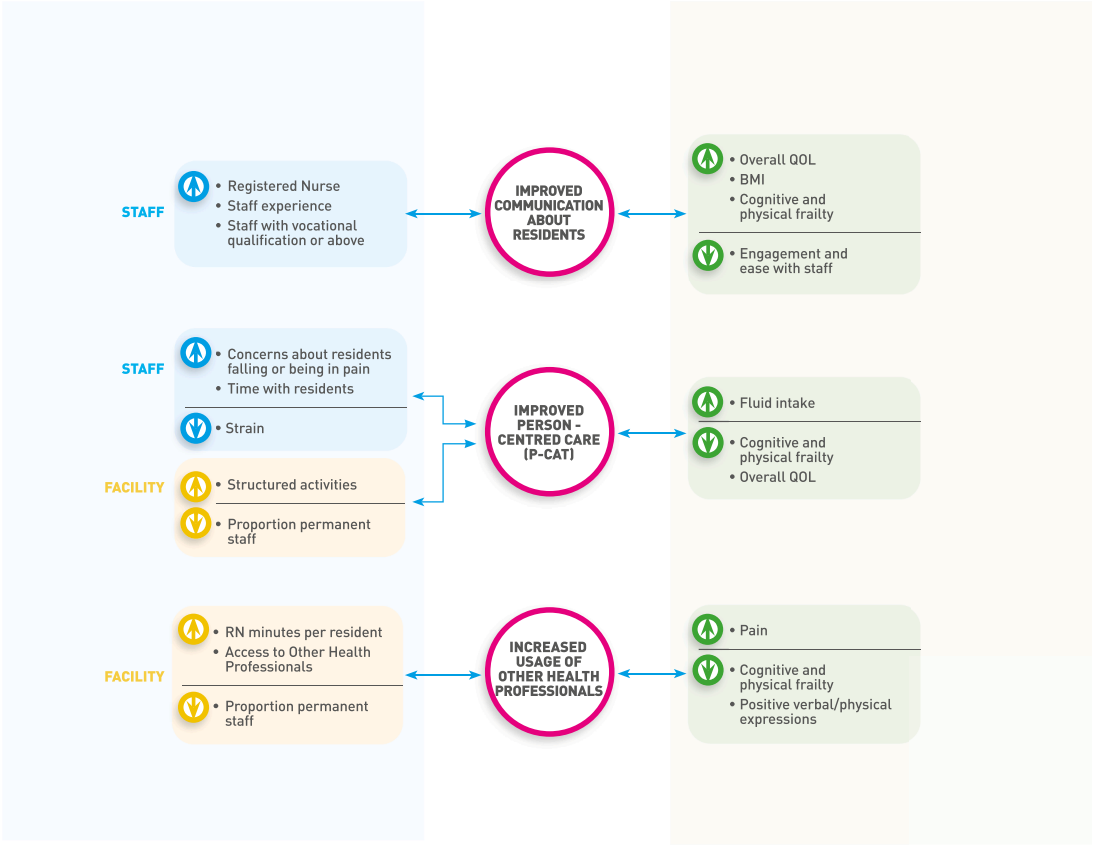


**Fig. 3.** (*continued*).

measures of QOL.

### 3.7. Psychotropic Medication Use

Higher psychotropic medication use was seen where there was a higher proportion of permanent staff ($\overline{\beta}$=-.131), where staff had greater concerns about residents falling or being in pain ($\overline{\beta}$=-.150), having a manger who is not a RN ($\overline{\beta}$=-.555) and with greater access to other health professionals ($\overline{\beta}$=-.159).

Residents who were not taking psychotropic medications had higher overall QOL (β=.286), were less depressed (β =-.525), experienced less pain (β =-.248), displayed fewer agitated behaviours (β=-.444), and displayed more positive physical and verbal expressions (β=.333).

### 3.8. Better Overall Quality of Care (QUALCARE)

A higher proportion of permanent staff ($\overline{\beta}$=.524) and having a manager with more experience ($\overline{\beta}$=.366) contributed to significantly improved QUALCARE scores.

QUALCARE was significantly reduced by having rotating staff shifts ($\overline{\beta}$=-1.447), a higher number of RN minutes per resident ($\overline{\beta}$=-4.033) and staff having concerns about residents falling or being in pain ($\overline{\beta}$=-.356). Improved QUALCARE scores were associated with higher overall QOL (β=.172), lower depression scores (β =-.155), less pain (β =-.100), more frailty (β =.164) and displaying more positive physical and verbal expressions (β=.167) and greater engagement and ease with staff ($\overline{\beta}$ = .118).

### 3.9. Restraint Use

Lower restraint use was seen with lower proportions of permanent staff ($\overline{\beta}$=-.451), lower PCA minutes per resident ($\overline{\beta}$=-.507), with staff having less concern about residents falling or being in pain ($\overline{\beta}$=-.357), having a manager who is a RN ($\overline{\beta}$=-1.313), and having less access to other health professionals ($\overline{\beta}$=-.193).

Restraint use decreased with increases in the RN minutes per resident ($\overline{\beta}$=1.935).

Where restraint was not used, residents had higher Overall QOL (β=.292), were less depressed (β=-.276), in less pain (β=-.713), had higher BMIs (β=.420), were more cognitively and physically frail (β=.821), and displayed more positive physical and verbal expressions (β=.431) and engagement and ease with staff ($\overline{\beta}$ = .216). Use of restraint was associated with higher fluid intake (β=-.713).

### 3.10. Greater Assistance with Meals

At a staff level, RNs were less likely, and PCAs and other staff were more likely, to provide assistance with meals (β=.813). At a facility level, assistance with meals significantly improved with rotating shifts (β=.766) and with greater staff concerns about residents falling or being in pain (β=.205). Meal assistance decreased with greater access to other health professionals (β=-.208).

Providing greater assistance to residents was associated with less pain (β =-.144), higher BMIs (β=.112), and more positive physical and verbal expressions (β=.099). Greater assistance with meals was provided to people who were cognitively and physically frail (β=.137).

### 3.11. Communicating about Residents

Staff who were RNs (β=-.550), more experienced (β=.300) and with greater education (vocational qualifications and above, β=-1.105) were associated with greater communication about residents.

More communication about residents was associated with higher

overall QOL (β=.178), increased frailty (β=.105) and higher BMIs (β=.130). Residents were, however, less engaged and at ease with more staff communication (β=-.119).

### 3.12. Person-Centred Care (P-CAT)

P-CAT scores improved with staff concerns about residents falling or being in pain (β=.120), with staff spending a greater proportion of face-to-face time with residents (β=.126) and with the provision of structured activities (β=.244). Staff strain contributed significantly to reduced P-CAT scores (β=-.639), as did having a greater proportion of permanent staff (β=-.159).

Higher P-CAT scores were associated with less frailty (β=-.194) and increased likelihood of residents consuming their minimum recommended fluid intake (β=-.369) but lower overall QOL (β=-.207).

### 3.13. Usage of Other Health Professionals

Other health professionals were used significantly more often when the proportion of permanent staff was lower ($\overline{\beta}$=-.156), with higher RN minutes per resident ($\overline{\beta}$=.728), and when access to other health professionals was reported as being higher by managers ($\overline{\beta}$=.109).

Other health professionals were utilised more with less frail residents (β=-.092), those who were in more pain (β=.151) and when residents displayed fewer positive physical and verbal expressions (β=-.132).

### 3.14. Deceased

The quality of the care did not significantly impact on mortality.

### 3.15. A comment on control variables

With regards to the control variables, the most consistent finding involved the environmental audit. Significant associations were found between seven of the 12 QOC outcomes, demonstrating a relationship between dementia-friendly environments and better care.

## 4. Discussion

The overarching aim of this longitudinal study was to test the model (See Fig. 1) that staff and organisational facility variables are associated with QOC and consequent resident QOL. To do this we gathered data on a wide range of variables assessing how staff felt and what they knew about their work and residents, how it was organised, and what they actually did in practice. Rather than use only a generic instrument, we attempted a clinically comprehensive sampling of the multi-facetted components that comprise quality of care. Equally, we wanted to determine the outcomes for residents of good care and therefore gathered longitudinal data on an equivalent number of resident QOL measures. Though many studies purport to assess quality of care without measuring QOL outcomes (Anderson et al., 2016), we contend that it is impossible to define quality without measuring, across a wide range of domains, whether it actually benefits the recipients of care - presumably the object of the exercise.

The benefit of assessing relationships between such a wide range of variables (see Fig. 2) informs our second aim: to determine the most useful targets for intervening with staff to improve the QOC they provide.

### 4.1. Quality of Care is integral to Quality of Life

Overall we have affirmed that the quality of the care provided by staff is integral to the quality of residents' lives. It appears to have pervasive and consistent influences on multiple QOL measures, such as pain, depression, agitated behaviours, resident ease and engagement with staff, and overall QOL.

Particularly influential for improving QOL were: greater assistance with meals; minimal or no psychotropic medication use; reduced or no restraint use; more positive physical and verbal behaviour by staff to residents; and, better overall QOC. The assessment and treatment for both food and fluid intake issues, usage of other health professionals and person-centred care (as measured by the P-CAT), were more limited in their impact or, in some cases, had a negative impact.

### 4.2. How do we work with staff to improve the care?

#### 4.2.1. Staff training and qualifications in dementia or aged care

This study measured various facets of staff training and qualifications including: whether staff had any training/qualifications in dementia (from a short online course to a bachelor degree in dementia care); staff knowledge of dementia; level of formal qualifications (ranging from secondary schooling to vocational qualifications or university degrees); staff recollection of any training in aged care or dementia over the last 6 months and the usefulness of this training; and the amount of training in dementia or aged care provided by the facility over the last 6 months.

Being more knowledgeable about dementia, engaging in more training in dementia care and aged care in the last six months and, in particular, rating that training as directly useful to their work was associated with better staff treatment of residents, which in turn was associated with higher BMIs and more ease and engagement between residents and staff. This promising finding demonstrates that more relevant staff training results in increased knowledge of dementia and better dementia care.

Less promising is a finding that staff having any training in dementia, having vocational or higher qualifications and increased levels of training provided by the facility were all associated with more adverse incidents, including falls, hospitalisation, and pressure sores. This in turn has a negative impact on the QOL of the residents leading to lower scores on the QOL-AD and more agitated behaviours.

Unfortunately, in addition to being associated with more adverse incidents, when formal training is provided by the facility itself, it is also associated with increases in adverse incidents, and fewer assessments and treatments for food and fluid intake.

Staff with vocational qualifications (or above) did show higher levels of communication about residents, which was associated with improved QOL and BMI but lower ease and engagement with residents. This mixed picture suggests that, in the current format, vocational qualifications (or above), or even in-house training are not necessarily a prerequisite for good care. Prioritising formal qualifications in dementia, at least in their current form, would not necessarily lead to tangible improvement in the care and therefore the QOL of residents. We contend that the focus, timeliness and quality of the qualifications or training courses need to be scrutinised to ensure that learnings translate into increased knowledge and are integrated in to day-to-day care. The finding that staff ratings of the usefulness of training for their everyday work are associated with better staff treatment of residents, indicates that staff are well placed to tell us what training they require to improve care. Further, it would be helpful if those delivering the education have clinical experience at the care coal face.

#### 4.2.2. Psychological variables: Strain, Attitudes, and Perceptions

Greater staff strain was associated with lower scores on the self-assessed version of the person-centred care scale (P-CAT). The impact was mixed, with higher P-CAT scores associated with lower resident QOL-AD scores but higher fluid intake. These mixed findings suggest that staff strain is not having a substantial influence on the QOL of residents.

Similarly, staff attitudes to restraint had little influence on the QOC they provided and one would reason that, though not directly tested, it does not have an impact on the QOL of the residents. This finding aligns

with literature suggesting that it is not the attitudes of staff so much as the restraint policies of the facilities that determines the level of restraint use (Anderson et al., 2016).

Conversely, we did find that staff perception of residents being in pain or at risk for falls was a decisive motivating factor for staff interventions - for better or worse. Good intentions did not necessarily mean favourable outcomes. Staff concern about pain or falling meant they were more likely to provide assistance with meals and there were fewer adverse incidents. However, there was greater use of psychotropics and restraint. Unrestrained residents were frailer, had better QOL-AD scores, were less depressed, had higher BMI, were more likely to manifest positive behaviours to staff, and had greater ease and engagement with staff. Residents who were not taking psychotropics had higher QOL-AD scores, were less depressed, experienced less pain, displayed less agitation, and manifested more positive behaviours.

It is essential that staff be aware and concerned about residents falling or being in pain but these concerns could be capitalised on, via good education on the dangers of and alternatives to restraint, to assist staff to intervene in the best interests of the residents. Harnessing these concerns and empathy in a more appropriate direction could heighten the potency of other QOC interventions.

### 4.3. Working with facilities to improve care

#### 4.3.1. Structuring of shifts

When shifts are structured so that staff rotate around the facility in cycles, rather than working with the same residents in the same part of the facility for extended periods, staff were more efficacious with activities and provided greater assistance during meals.

However, we also found that having stable staff structures is beneficial. Good care requires nuanced skills and knowledge of and relationships with the residents. Accordingly, finding a balance between invigorating staff with rotating shifts and capitalising on the long-term relationships acquired through stable shifts could be an important consideration when looking to improve the QOL of residents.

#### 4.3.2. Proportion permanent staff

Findings on this variable were mixed. Increases in the proportion of permanent staff saw fewer adverse incidents, and, despite lower self-reports of person-centred care, higher scores on the overall QOC measure. However, increases in the proportion of permanent staff was also associated with more psychotropic medication and restraint use, less use of other health professionals and fewer assessments/treatments for food and fluid intake. This suggests that permanent staff are more likely to view situations as within their control and not requiring outside assistance. This has a positive impact in terms of the overall care but at the cost of increased restraint and psychotropic use.

#### 4.3.3. PCA and RN minutes per resident per day

*RNs minutes per resident per day*. Having a higher number of RN minutes per resident gave mixed results. On the positive side, restraint use was lower and activity levels were higher. On the negative side, more adverse physical incidents occurred and the quality of the care and treatment of the residents were reduced. The association between adverse incidents and more RNs is unexpected but consistent with our finding that it is associated with higher qualifications and more dementia education. With regard to care quality, results already discussed show that PCAs are more likely to provide empathic warm care; RNs may simply be too busy with a myriad of essential medical care tasks.

Higher RN minutes per resident was also associated with greater use of other health professionals, perhaps with RNs feeling more confident with referrals and seeking solutions outside of the facility. Whilst the usage of other health professionals did not have a significant bearing on the QOL of residents, this picture is muddied by the fact that staff would be more likely to seek assistance for residents that are outwardly displaying poorer QOL (e.g., increased pain).

*PCA minutes per residents.* In contrast to RNs, higher restraint use and lower activity levels were associated with higher PCA minutes per resident. The only positive significant relationship between PCA minutes per resident and a QOC variable was more frequent assessment and treatment of eating and drinking problems.

Though results are mixed, on balance these findings suggest that increasing the proportion of RNs to residents is worthwhile way of improving care and QOL in the facility.

#### 4.3.4. RNs and PCA roles

In general, staff who are not RNs (mainly PCAs) display more positive and fewer negative behaviours towards residents and are more likely to provide assistance during meal times. As noted in the previous section, this could be a reflection of the time constraints associated with the additional medical tasks that RNs are concurrently required to undertake, and the tendency to separate task-focused, medical or clinical roles from care roles rather than all roles as contributing to and requiring skills in humane care provision (Aged Care Workforce Strategy Taskforce, 2018). This would appear particularly pertinent given that our results demonstrate that the way staff behave towards residents and the assistance they provide during meals have measurable and diverse impacts on the lives of those in their care.

One area of care that did improve for RNs was increased communication about residents, and this was more marked amongst more experienced staff. It was associated with improved resident QOL and BMIs but reduced ease and engagement with staff, and greater frailty. This was the only significant finding associated with staff experience, suggesting that years of experience has little effect on the QOC they provide.

Combined, these results suggest a two-pronged approach: work with staff that are not RNs (largely PCAs) to increase communication around residents; and, work with RNs and institute structural changes to enhance behaviours towards residents. Whilst recognising that RNs and PCAs do perform different roles, focus should be given to greater recognition of the value of all roles, ensuring that communication exists across roles and that all care tasks involving residents are provided with empathy.

#### 4.3.5. Manager characteristics

*RN Status.* Reliance on restraint use and psychotropic medications appear less prevalent when the manager of a facility is a RN. This is a crucial finding given the comprehensive, negative impacts of restraint use and psychotropic medications found in this study, which align with the literature around restraint (Anderson et al., 2016) and psychotropic use (Harrison et al., 2018). Residents were also more likely to be assessed and treated for food and fluid intake when the facility manager was a RN, though the assessments did not have a significant impact on any of the QOL measures. Those who were not assessed and treated for food intake were more frail.

Conversely, but consistent with our findings on higher RN minutes per resident, and higher level training, having an RN as manager is associated with more adverse incidents. If valid, this is a negative finding about quality of care that merits further investigation in future similar studies. Prevention of falls, pressure sores, and hospitalisations is core nursing business.

*Manager Experience.* Aside from the way other staff were observed to be treating residents, the quality of the care provided to residents broadly improved in line with greater manager experience.

#### 4.3.6. Structured Activities

Engaging residents in recreational activities is equally important as good physical care. Residents who are more engaged in recreational activities have better overall quality of life, less depression, less agitation and higher food intake. A focus on the factors which promote increased recreational activity involvement is therefore warranted. The way facilities are staffed and organised had greatest impact here: more experienced managers, greater access to external health professionals,

rotating shifts, and higher RN minutes per resident but lower PCA minutes per resident all promote more activity engagement. As espoused by various "homelike" models of dementia care which promote activity provision as the responsibility of all staff at all times (Morgan-Brown et al., 2013), having higher levels of dedicated activity staff does not necessarily lead to increased activity involvement for residents.

### 4.4. Limitations

Whilst an equal number of not-for-profit and for-profit organisations were approached to participate, no for-profit organisations agreed to participate. It is expected that the overall finding that good care leads to better outcomes for residents would apply to for-profit facilities but this would need to be confirmed.

This study is like other longitudinal research with this population; attrition through deaths and drop outs occurred, reducing the follow-up sample size. The need for complete data to be gathered from multiple avenues, such as questionnaires from different sources and observations, also reduced the sample size. Given the number of statistical tests involved, and overlap between the tests, consideration needs to be given to possible errors in the results.

Observations of staff and residents were not concealed, which may have altered their behaviour. One could also reason that staff with greater confidence in their abilities would be more likely to agree to participate in a study which involves direct observation of their daily work.

### 4.5. Conclusions

The quality of the care provided by staff is pivotal to the quality of residents' lives; it has pervasive and consistent influences on multiple measures of quality of life. This relationship between improved quality of care and improved quality of life was most evident with: providing greater assistance with meals via higher staff ratios and supervision; reducing psychotropic medication use and physical restraint and increasing positive physical and verbal behaviour by staff to residents.

A nuanced approach is needed to target staff and facility factors to access this improved quality of care. There is a need to look beyond simplified, and isolated solutions, such as solely increasing staff ratios or providing more training. This study provides guidance on the "how" and "what" of effective staff training and the organisational changes which would have greatest effect on quality of life.

How staff are trained is the first critical step. Prioritising formal qualifications in dementia, at least in their current form, would not necessarily lead to tangible improvements in the care, and therefore the quality of life, of residents. To ensure relevance, staff should be consulted about what training would be most useful in their day-to-day work. Training should be provided by those with clinical experience, involve practical placements and observations and it should be evaluated by its ability to be translated into both increased knowledge and more empathic and humane care, which is key to quality of life.

Which staff are trained in what skills is the second training consideration. This research points to the requirement of a multi-pronged approach to upskilling staff, which acknowledges the different training needs of various roles. It is recommended that PCAs and other staff that are not RNs receive training to increase communication around residents; and, RNs receive training and structural changes to enhance empathic behaviours towards residents. All staff need to be aware and concerned about patients falling or being in pain and provided with good education on the dangers of, and alternatives to, restraint, to assist them to intervene in the best interests of the residents.

Key organisational changes that would improve care and quality of life involve how and what staff are deployed to do. Increasing the number of minutes of RN time with residents could be key to improving care. Finding a balance between invigorating staff with rotating shifts and capitalising on the long-term relationships acquired through stable shifts could be another important consideration when looking to improve the quality of life of residents.

We also saw that engaging residents in recreational activities is equally important as good physical care. This study is further endorsement for activity provision being the responsibility of all staff at all times, as espoused by various "homelike" models (Morgan-Brown et al., 2013).

Although not a focus of the current study, the results support the idea that dementia-friendly environments also promote better quality care.

This study has demonstrated that aged care staff are a crucial conduit for improved residents' quality of life, through improved care, and has highlighted the most fruitful areas for working with staff to progress care. Fortunately, there are some good evidence-based interventions in the areas of restraint reduction and empathic care (Bird, Anderson, MacPherson, & Blair, 2016) already available for facilities to begin improving quality of care and quality of life for residents with dementia.

## Author Contributions

KA and AB contributed equally to this work. KA and AB designed the study, gained ethical approval, undertook the statistical analysis and drafted this manuscript. KA conceived of the study and AB oversaw the collection of data. Both authors read and approved the final manuscript.

## Declaration of Competing Interest

None.

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## Appendix A. Research Measures and Method for Anderson, K., & Blair, A. (2020). What have staff got to do with it? Untangling complex relationships between residential aged care staff, the quality of care they provide, and the quality of life of people with dementia. Archives of Gerontology and Geriatrics

| Variable Category | Composite Variables | Variable | Collection and Details |
|---|---|---|---|
| Staff | Staffing Qualifications | Education Attainment (Staff) | **Measure:** Staff education attainment. **Participants:** Staff. **Mode:** Questionnaire. **Details:** Staff asked for their highest level of formal education (Secondary school, Vocational Education (eg.TAFE**), University bachelor degree). Collapsed into two categories: 1. Vocational education or above, 2. Secondary school or lower. |
| | | Dementia Care Qualifications (Staff) | **Measure:** Staff qualifications in dementia care. **Participants:** Staff. **Mode:** Questionnaire. **Details:** Staff listed all their qualifications and training in dementia care. Any training in dementia was included, from brief online course, to vocational qualification to bachelor degree. Collapsed into two categories: 1. Dementia Qualifications, 2. No dementia qualifications. |
| | Staff Experience | Time at Facility (Staff) | **Measure:** Staff time at facility. **Participants:** Staff. **Mode:** Questionnaire. **Details:** Staff asked, "How long have you worked at (insert name of facility here)? __years __months" |
| | | Time in Nursing (Staff) | **Measure:** Staff time in nursing. **Participants:** Staff. **Mode:** Questionnaire. **Details:** Staff asked, "How long have you worked in nursing? __years __months" |
| | | Time in Aged Care (Staff) | **Measure:** Staff time in aged care. **Participants:** Staff. **Mode:** Questionnaire. **Details:** Staff asked, "How long have you worked in aged care? __years __months" |
| | | Time Spent in Dementia Specific Unit (DSU) (Staff) | **Measure:** Staff time spent in DSU (if applicable). **Participants:** Staff. **Mode:** Questionnaire. **Details:** Staff were asked, "If this facility has a Dementia Specific Unit (DSU), how much time have you spent in the DSU during the last 6 months?" Six-item scale (none at all, almost no time (less than 10%), less than half of the time, more than half of the time, almost all of the time (more than 90%)). |
| | Staff Strain | Strain (Staff) | **Measure:** Strains in Dementia Care Scale (Edberg et al., 2015). **Participants:** Staff. **Mode:** Questionnaire. **Details:** Twenty-seven statements for situations and thoughts or feelings that can arise when caring for residents with dementia (e.g. I see other staff behaving towards a resident in a way that shows they do not understand the effects of dementia). Ratings for degree of stress (None/ hardly any, Mild stress, Moderate stress, High stress) and frequency (Never/ rarely, Sometimes, Quite often, Very often). |
| | | Job Satisfaction (Staff)* | **Measure** Generic Job Satisfaction Scale (Macdonald & Maclntyre, 1997). **Participants:** Staff. **Mode:** Questionnaire. **Details:** Twelve statements (e.g. I feel good about working at this facility) for job satisfaction. Ratings from 1 (Strongly Disagree) to 5 (Strongly Agree). |
| | | Job-Related Emotional Exhaustion (Staff) | **Measure:** Maslach Burnout Inventory – Emotional Exhaustion Sub-scale (Maslach et al., 2018; Maslach & Leiter, 2008; McManus et al., 2004) **Participants:** Staff. **Mode:** Questionnaire. **Details:** Frequency for nine statements of job-related feeling (e.g. I feel emotionally drained from my work). Frequency options: Never, a few times a year or less, once a month or less, a few times a month, once a week, a few times a week, every day. |
| | | Quality of Work – Decision Authority and Task Control (Staff)* | **Measure**: Leiden Quality of Work Questionnaire – Decision Authority and Task Subscale (van der Doef & Maes, 1999). **Participants:** Staff. **Mode:** Questionnaire. **Details:** Eight statements (e.g. I can determine my work pace). Four point scale (disagree completely, disagree, agree, and agree completely). |
| | | Overall Turnover (Staff) | **Measure:** Staff turnover. **Participants:** HR. **Mode:** Interview. **Details:** HR provided the number of staff who left the facility in the preceding 6 months. Number of staff who left divided by total number of staff was used to calculate a ratio of staff turnover. |
| | | Absenteeism (Staff) | **Measure** Overall number of hours of staff sick/personal/carers/injury leave. **Participants:** HR. **Mode:** Interview. **Details:** HR provided the overall number of hours of staff sick/personal/carers/injury leave. Hours of leave divided by rostered hours was used to calculate a ratio for absenteeism. |
| | Average Staff Time per Resident per Day | RN minutes per resident | **Measure:** Average RN minutes per resident per day. **Participants:** HR. Mode: Interview. **Details:** HR provided the number of RN minutes for each shift type over the preceding two weeks. This was then divided by the number of days and number of residents to provide number of minutes per resident per day of rostered RN time. |
| | | PCA minutes per resident | **Measure:** Average PCA minutes per resident per day. **Participants:** HR. Mode: Interview. **Details:** HR provided the number of PCA minutes for each shift type over the preceding two weeks. This was then divided by the number of days and number of residents to provide number of minutes per resident per day of rostered PCA time. |
| | Staff Knowledge | Dementia Knowledge (Staff) | **Measure** The Alzheimer's Disease Knowledge Scale (18 – Carpenter et al. 2009). **Participants:** Staff. **Mode:** Questionnaire. **Details:** Staff responded True or False to 30 statements about dementia (e.g. Alzheimer's disease is one type of dementia). |
| | | Self-efficacy in Working with Dementia (Staff) | **Measure** Self-efficacy in Working with Dementia (Davison et al., 2007). **Participants:** Staff. **Mode:** Questionnaire. **Details:** Ratings on seven statements (e.g. I feel satisfied with my current knowledge level regarding dementia) from 1 (Strongly Disagree) to 5 (Strongly Agree). |
| | Structured Activities | Activities Co-ordinator | **Measure:** Activities Co-ordinator on staff. **Participants:** Human Resources (HR) and Management. **Mode:** Interview. **Details:** HR and DON were asked if there is an Activities Co-ordinator on staff. If there was an activities coordinator, the number of minutes per week they are employed for was obtained. This was averaged to give the daily number of minutes. The number of minutes per day was then divided by the number of residents to give the number of minutes per resident per day of rostered activities co-ordinator time. |
| | | Activities Efficacy (Staff) | **Measure:** Efficacy with activities. **Participants:** Staff. **Mode:** Questionnaire. **Details:** Staff indicated how equipped they feel setting-up and helping residents with activities. Five point scale, from not at all equipped to very well equipped. |

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| Variable Category | Composite Variables | Variable | Collection and Details |
|---|---|---|---|
| | Restraint Attitudes | Perceptions of Restraint Use (Staff) | **Measure** Perceptions of Restraint Use (Evans & Strumpf, 1993; Strumpf & Evans, 1988). **Participants:** Staff. **Mode:** Questionnaire. **Details:** Staff told that, "In caring for the older adults, physical restraints are sometimes used". Broad examples of restraints were given. Using a 5-point scale (1=not at all important, 3=somewhat important, 5=most important), staff indicated how important they believe the use of physical restraints are against 17 reasons (e.g. Preventing an older person from wandering). |
| | Falling and Pain Attitudes | Attitudes about Falling and Pain (Staff) | **Measure:** Staff Attitudes about Falling and Pain (Dever Fitzgerald et al., 2009). **Participants:** Staff. **Mode:** Questionnaire. **Details:** Six questions about attitudes to falling and pain for each resident (e.g. Compared to other residents who are *not* in a wheelchair or bed-ridden how afraid are you that this person may experience pain with activity?). Ten point scale with 1 indicating low levels and 10 indicating high levels. |
| | Staff Training | Training in Dementia or Aged Care (Staff) | **Measure** Staff training in dementia or aged care. **Participants:** Staff. **Mode:** Questionnaire. **Details:** Staff asked to complete a table for each training activity in dementia or aged care they had completed during the preceding 6 months. Staff were asked what the training was about, whether it was taught on line, how it was taught and how useful it was to the work they do (5-point scale from not at all to extremely). Training was categorised according to subject, with all training related to "facility systems" excluded (ie. non-clinical topics including mandatory training such as fire/safety/emergency, manual handling, food safety, funding tools, paperwork, and admission and other processes). Number of training sessions summed (minus "facility systems" sessions). |
| Facility | DON Experience | Time in Nursing (DON) | **Measure:** DON time in nursing. **Participants:** Management (If a nurse by background). **Mode:** Interview. **Details:** DON asked, "How long have you worked in nursing? __years __months" |
| | | Time in Aged Care (DON) | **Measure:** DON time in aged care. **Participants:** Management. **Mode:** Interview. **Details:** DON asked, "How long have you worked in aged care? __years __months" |
| | | Time at Facility (DON) | **Measure:** DON time at facility. **Participants:** Management. **Mode:** Interview. **Details:** DON asked, "How long have you worked at (name of facility)? __years __months" |
| | DON Professional Background | Professional Background (DON) | **Measure:** DON professional background. **Participants:** Management. **Mode:** Interview. **Details:** DON asked, "What is your professional background?". Background was collapsed into 2 categories: 1. Registered Nurse 2. Not registered nurse. |
| | DON Management Experience | Management Experience (DON) | **Measure:** DON management Experience. **Participants:** Management. **Mode:** Interview. **Details:** DON asked if they have any other management experience. Dichotomised "No" or "Yes". |
| | Shift Organisation | Shift Organisation (Staff) | **Measure:** Shift organisation for staff. **Participants:** Director of Nursing (DON) or equivalent. **Mode:** Interview conducted by Project Officer (PO). **Details:** DONs asked, "Please describe how staff shifts are organised (rotating, mixed, permanent)". Dichotomised into 1. Rotating 2. Other. |
| | Staff Job Status | Job Status (Staff) | **Measure:** Staff job status. **Participants:** HR. **Mode:** Interview. **Details:** HR provided the job status of staff (i.e. number who are temporary, permanent, casual). Proportion of total staff that are permanent was calculated. |
| | Staff Training | Formal Staff Training Provided | **Measure:** Formal staff training provided by the facility. **Participants:** Management. **Mode:** Interview. **Details:** DON asked to describe all formal staff training over the last six month: the subject of the training (prompt: e.g. feeding, delirium, depression, bathing, setting up activities for residents, palliative care), number of staff trained, whether the training was online, and type of training (prompt: e.g. lecture, role-play, hands on). Training was categorised according to subject, with all training related to "facility systems" excluded (ie. non-clinical topics including mandatory training such as fire/safety/emergency, manual handling, food safety, funding tools, paperwork, and admission and other processes). The total number of training sessions reported by staff was divided by the number of staff in the facility to provide the average number of training sessions per staff member for each facility. |
| | Proportion of Face-to-Face Time with Residents (staff) | Proportion of Face-to-Face Time with Residents (staff) | **Measure:** Proportion of face-to-face time with residents. **Participants:** Staff. **Mode:** Questionnaire. **Details:** Staff asked two questions about how they spent their work time over the preceding fortnight: 1. "How much time per shift would you spend in providing essential physical care to residents (e.g. washing, bathing, feeding, giving out medications)?" 2. "How much time per shift were you able to spare to do things with the residents that were not essential physical care (e.g. just talking to them or taking them for a walk)?" Six-item scale for each question (none at all, almost no time (less than 10%), less than half of the time, more than half of the time, almost all of the time (more than 90%)). Items summed. |
| Quality of Care | Assistance with Meals | Resident to Staff Ratio at Meals | **Measure:** Resident to staff ratio during meals. **Participants:** Staff and Residents. **Mode:** Observation. **Details**: PO noted the resident to staff ratio during meal times. |
| | | Resident Monitored at Meals | **Measure:** Residents monitored by staff at meals. **Participants:** Staff. **Mode:** Observation[%]. **Details**: During meal time observations, the PO counted the number of times the resident was monitored (e.g. staff member comes over to see how the resident is going with the meal). |
| | | Resident Meal Encouragement | **Measure:** Resident encouraged with their meal by staff. **Participants:** Staff. **Mode:** Observation[%]. **Details**: During the observation of meal times, the PO counted the number of times the resident was encouraged with their meal. |
| | | Resident Meal Physical Assistance | **Measure:** Resident provided with physical assistance with meals by staff. **Participants:** Staff. **Mode:** Observation[%]. **Details**: During the observation of meal times, the PO counted the number of times staff provided physical assistance with the meal. |
| | | Resident Fluid Encouragement | **Measure:** Resident encouraged with fluids by staff. **Participants:** Staff. **Mode:** Observation[%]. **Details**: During the observation of meal times, the PO counted the number of times resident was encouraged with fluids. |

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| Variable Category | Composite Variables | Variable | Collection and Details |
|---|---|---|---|
| | | Resident Fluid Physical Assistance | **Measure:** Resident provided with physical assistance with fluids by staff. **Participants:** Staff. **Mode:** Observation[%]. **Details**: During the observation of meal times, the PO counted the number of times staff provided physical assistance with fluids. |
| | | *Composite Details* | The number of times the resident was monitored, encouraged or provided physical assistance with food or fluids was divided by the duration of the observation period. Ratio and other measures all z-scored and combined. |
| | Activities | Activity Relevance | **Measure:** Activity relevance. **Participants:** Staff. **Mode:** Observation[#,%]. **Details**: Directly after each observation episode, PO rated the relevance of activities that were offered to the observed resident (if applicable and known). Five point scale (not at all, a little bit, a moderate amount, quite a bit, completely). |
| | | Residents in Bed 10am and 4pm | **Measure:** Residents in bed 10am and 4pm. **Participants:** Resident. **Mode:** Observation. **Details**: PO noted the number of residents in bed at 10am and at 4pm (though not if simply sleeping in or having an afternoon nap). The proportion of residents out of bed was divided by the total number of residents at the facility. |
| | | Activity Encouragement | **Measure:** Staff encouragement with activities**. Participants:** Staff. **Mode:** Observation[#,%]. **Details:** PO counted each time the staff member encouraged residents to engage in an activity. This number was divided by the duration of the observation period. |
| | | Activities | **Measure:** Activities recorded in file. **Participants:** Residents. **Mode:** File Audit. D**etails**: Number of activities the resident participated in over the preceding month. |
| | | Satisfaction with Recreational and Social Activities | **Measure:** Satisfaction with recreational and social activities. **Participants:** Residents. Family/Friends. **Mode:** Interview. **Details:** Residents and family/friends were each asked to indicate their level of satisfaction with the recreational and social activities provided to the resident, on a 5-point scale from not at all satisfied (1) to very satisfied (5). |
| | Restraint Use | Restraint Use (observed) | **Measure:** Restraint use. **Participants:** Residents. **Mode:** Observation[#,%]. **Details**: Directly after each observation episode, PO responded Yes or No to, "Was the resident restrained (either formally or informally during the observation period)?". If the PO responded "Yes", they noted how the resident was restrained, why they were restrained and an approximate percentage of the observation time the resident was restrained for. The proportion of time the resident was restrained was used. |
| | | Restraint Use (file audit) | **Measure:** Restraint use recorded in file. **Participants:** Residents. **Mode:** File Audit. **Details**: For restraint use in the preceding month, a count of all instances of the intentional restriction of a resident's voluntary movement or behaviour by the use of a device, or removal of mobility aids, or physical force for behavioural purposes (Australian Government Department of Health, 2019). Included any method of restraint such as bedrails, chairs with locked tables, seatbelts other than those used in active transport, shackles, manacles and, safety vests and anything else including concave mattresses and fallout chairs etc. Only counted if they are used for the purpose of restraint (as opposed to a fall out chair for comfort). |
| | Assessment and Treatment of Food and Fluid | Professional Assessment of Food Intake | **Measure:** Professional assessment of food intake. **Participants:** Residents. **Mode:** File Audit. **Details**: PO recorded if a professional assessment for eating difficulties took place in the last six months (Yes or No). |
| | | Professional Assessment of Fluid Intake | **Measure:** Professional assessment of fluid intake. **Participants:** Residents. **Mode:** File Audit. **Details**: PO recorded if a professional assessment for drinking difficulties took place in the last six months (Yes or No). |
| | | Written Food Intake Assessment | **Measure:** Written assessment of food intake. **Participants:** Residents. **Mode:** File Audit. **Details**: PO recorded if a written assessment for eating difficulties took place in the last six months (Yes or No). |
| | | Written Fluid Intake Assessment | **Measure:** Written assessment of fluid intake. **Participants:** Residents. **Mode:** File Audit. **Details**: PO recorded if a written assessment for drinking difficulties took place in the last six months (Yes or No). |
| | | Professional Treatment of Food Intake | **Measure:** Professional treatment of food intake. **Participants:** Residents. **Mode:** File Audit. **Details**: PO recorded if resident was formally treated for eating difficulties by a speech pathologist, dietician or other suitably qualified professional in the last six months (Yes or No). |
| | | Professional Treatment of Fluid Intake | **Measure:** Professional treatment of fluid intake. **Participants:** Residents. **Mode:** File Audit. **Details**: PO recorded if resident was formally treated for drinking difficulties by a speech pathologist, dietician or other suitably qualified professional in the last six months (Yes or No). |
| | | Informal Treatment of Food Intake | **Measure:** Informal treatment of food intake. **Participants:** Residents. **Mode:** File Audit. **Details**: PO recorded if resident was informally treated for eating difficulties in the last six months (Yes or No). |
| | | Informal Treatment of Fluid Intake | **Measure:** Informal treatment of fluid intake. **Participants:** Residents. **Mode:** File Audit. **Details**: PO recorded if resident was informally treated for drinking difficulties in the last six months (Yes or No). |
| | | *Composite Details* | The eight categories in this composite were tallied to create the quality of care outcome "Assessment and treatment of food and fluid".<br>For quality of life analyses, the variables "Professional Treatment of Food Intake" and "Professional Treatment of Food Intake" were used independently, rather than being combined to create a composite score. |
| | Usage Other Health Professionals | GP Visits | **Measure:** Visits by General Practitioners. **Participants:** Residents. **Mode:** File Audit. **Details**: For GP visits in the preceding month, the approximate time of day, reason for the visits and any actions resulting from the visit were recorded. |
| | | Regular Allied Health Visits | **Measure:** Regular allied health visits. **Participants:** Residents. **Mode:** File Audit. **Details**: For regular allied health visits in the preceding month, the number of visits, discipline of the allied health professional and any actions that occurred as result of the visits were noted. |

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| Variable Category | Composite Variables | Variable | Collection and Details |
|---|---|---|---|
| | | As Required Allied Health Visits | **Measure:** Pro re nata (PRN) allied health visits. **Participants:** Residents. **Mode:** File Audit. **Details**: For PRN allied health visits in the preceding month, the date, discipline of the allied health professional and any actions that occurred were noted. |
| | | Other Therapist Visits | **Measure:** Other therapist visits. **Participants:** Residents. **Mode:** File Audit. **Details**: For visits in the preceding month, the date, therapist discipline and any actions that occurred were noted. |
| | | *Composite Details* | Number of visits was used for the composite. The number of GP visits was given equal weight to the combined allied and other health visits. |
| | Staff Treatment of Residents (Observed) | Positive Verbal Behaviour | **Measure:** Positive verbal staff behaviour**. Participants:** Staff. **Mode:** Observation[#,%]. **Details:** PO noted when the staff member produced positive verbal behaviours with the resident (Prompts adapted from Rantz et al., 1998): Announcing single activities, Providing positive statements, Starting a friendly conversation with resident, Calling resident by their name). |
| | | Negative Verbal Behaviour[*] | **Measure:** Negative verbal staff behaviour**. Participants:** Staff. **Mode:** Observation[#,%]. **Details:** PO noted when the staff member produced negative verbal behaviours with the resident (Prompts adapted from Rantz et al., 1998: Announcing multiple activities, berating, confusing/complex instruction). |
| | | Positive Physical Behaviour | **Measure:** Positive physical staff behaviour**. Participants:** Staff. **Mode:** Observation[#,%]. **Details:** PO noted when the staff member displayed positive physical behaviours with the resident (Prompts adapted from Rantz et al., 1998: Delaying physical assistance following announcement, Delaying physical assistance during a verbal prompt, Smiles at resident, Information about the individual resident was used to facilitate care, Prompting single activities). |
| | | Negative Physical Behaviour[*] | **Measure:** Negative physical staff behaviour**. Participants:** Staff. **Mode:** Observation[#,%]. **Details:** PO noted when the staff member displayed negative physical behaviours with the resident (Prompts adapted from Rantz et al., 1998: Prompting multiple activities, rushing, pulling). |
| | | *Composite Details* | For each category of staff behaviours the total number of the behaviour type was divided by the total number of observations. |
| | Staff Treatment of Residents (Ratings) [‡](Adapted from De Roo et al., 2013) | Residents Treated with Dignity | **Measure:** Residents treated with dignity by staff**. Participants:** Staff. **Mode:** Observation[#]. **Details**: Following the observation, PO rated the statement "The resident was treated with dignity" on a 5-point scale (not at all, a little bit, a moderate amount, quite a bit, completely). |
| | | Residents Privacy Respected | **Measure:** Residents privacy respected by staff. **Participants:** Staff. **Mode:** Observation[#]. **Details**: Following each observation episode, PO rated the statement "The resident's privacy was respected" on a 5-point scale (not at all, a little bit, a moderate amount, quite a bit, completely). |
| | | Residents Treated with Respect | **Measure:** Residents treated with respect by staff. **Participants:** Staff. **Mode:** Observation[#]. **Details**: Following each observation episode, PO rated the statement "The resident was treated with respect" on a 5-point scale (not at all, a little bit, a moderate amount, quite a bit, completely). |
| | | Residents Treated with Kindness | **Measure:** Residents treated with kindness by staff. **Participants:** Staff. **Mode:** Observation[#]. **Details**: Following each observation episode, PO rated the statement "The resident was treated with kindness" on a 5-point scale (not at all, a little bit, a moderate amount, quite a bit, completely). |
| | | Staff Interactions Socially-oriented | **Measure:** Staff interactions with residents socially-oriented. **Participants:** Staff. **Mode:** Observation[#]. **Details**: Following each observation episode, PO rated the statement "The interaction was socially-oriented" on a 5-point scale (not at all, a little bit, a moderate amount, quite a bit, completely). |
| | | Sufficiency of Time Taken with Resident | **Measure:** Sufficiency of staff time taken with residents. **Participants:** Staff. **Mode:** Observation[#]. **Details**: Following each observation episode, PO rated the statement "Sufficient time was taken with the resident" on a 5-point scale (not at all, a little bit, a moderate amount, quite a bit, completely). |
| | | Staff Use of Power[*] | **Measure:** Staff use of power with residents. **Participants:** Staff. **Mode:** Observation[#]. **Details** Following each observation episode, PO rated the statement "The staff member used their position of power with the resident" on a 5-point scale (not at all, a little bit, a moderate amount, quite a bit, completely). |
| | | Staff at Ease | **Measure:** Staff at ease with residents. **Participants:** Staff. **Mode:** Observation[#]. **Details**: Following each observation episode, PO rated the statement "The staff member seemed at ease with the resident" on a 5-point scale (not at all, a little bit, a moderate amount, quite a bit, completely). |
| | | Staff Responded to Needs | **Measure:** Staff responded to the needs of residents. **Participants:** Staff. **Mode:** Observation[#]. **Details**: Following each observation episode, PO rated the statement "The staff member responded to the needs of the resident" on a 5-point scale (not at all, a little bit, a moderate amount, quite a bit, completely). |
| | | Personalised Care | **Measure:** Staff personalised the care to the resident. **Participants:** Staff. **Mode:** Observation[#]. **Details**: Following each observation episode, PO rated the statement "The care was personalised to the individual resident" on a 5-point scale (not at all, a little bit, a moderate amount, quite a bit, completely). |
| | | Flexible Care | **Measure:** Flexibility of care provided to resident. **Participants:** Staff. **Mode:** Observation[#]. **Details**: Following each observation episode, PO rated the statement "The care was flexible" on a 5-point scale (not at all, a little bit, a moderate amount, quite a bit, completely). |

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| Variable Category | Composite Variables | Variable | Collection and Details |
|---|---|---|---|
| | | Clear Instructions | **Measure:** Clarity of instructions provided to residents. **Participants:** Staff. **Mode:** Observation[#]. **Details**: Following each observation episode, PO rated the statement "The staff member used clear instructions" on a 5-point scale (not at all, a little bit, a moderate amount, quite a bit, completely). |
| | | Proportion of Time Interacting | **Measure:** Proportion of time interacting. **Participants:** Staff. **Mode:** Observation[#]. **Details**: PO recorded the start and end time of the observation period and the time the staff member spent interacting with the resident/s. Proportion of time interacting was measured by dividing time spent interaction by length of the observation period. |
| | | Interaction Prompts | **Measure:** Interaction prompts. **Participants:** Staff. **Mode:** Observation[#]. **Details**: Following each observation episode, PO recorded if the interaction was started with a prompt from the staff member (Yes or No). Score for each observation summed to create a total score. |
| | Psychotropic Medication Use | As Required Medications | **Measure:** PRN psychotropic medications (antipsychotics and benzodiazepines). **Participants:** Residents. **Mode:** File Audit. **Details**: For all PRN psychotropic medications the medication, dose, side effects and number of times given in the preceding 2 weeks were recorded. Antipsychotics were not counted for residents with a written diagnosis of schizophrenia. Antipsychotics were converted to chlorpromazine equivalents. Benzodiazepines were converted to diazepam equivalents (Inada & Inagaki, 2015; Leucht et al., 2016) |
| | | Regular Medications | **Measure:** Regular psychotropic medications (antipsychotics and benzodiazepines). **Participants:** Residents. **Mode:** File Audit. **Details**: For all regular medications the medication, dose, side effects and number of times given in the preceding 2 weeks were recorded. Antipsychotics were not counted for residents with a written diagnosis of schizophrenia. Antipsychotics were converted to chlorpromazine equivalents. Benzodiazepines were converted to diazepam equivalents (Inada & Inagaki, 2015; Leucht et al., 2016) |
| | | *Composite Details* | As required medication and regular medications were given equal weight in the medication composite. |
| | Adverse Physical Incidents | Falls | **Measure:** Falls. **Participants:** Residents. **Mode:** File Audit. **Details**: For falls that occurred within the preceding month, date, time, reason (if known), injuries resulting from the fall, and further complications (if known) were recorded. |
| | | Hospitalisations | **Measure:** Hospitalisations. **Participants:** Residents. **Mode:** File Audit. **Details**: For hospitalisations in the preceding month, the date of admission, reason for admission and date of discharge were recorded. Emergency Department visits were counted as one day. |
| | | Pressure Ulcers | **Measure:** Pressure ulcers. **Participants:** Residents. **Mode:** File Audit. **Details**: For pressure ulcers in the preceding month, date(s) identified, stage of the ulcer (1-4) and any actions that occurred were recorded. |
| | | *Composite Details* | Number of falls, number of days in hospital and number of pressure ulcers were summed for this composite. |
| | Overall Quality of Care | Overall Quality of Care | **Measure:** QUALCARE (Phillips et al., 1990). **Participants:** Staff. **Mode:** Observation[#]. **Details**: Following all observations, PO rated the 34-items of the QUALCARE (e.g. Elder's value system is respected.) using a 5-point scale (1=worst possible care, 3=average care, 5=best possible care). Subscales: Physical, Medical Maintenance, Psychological and Human Rights. |
| | Person-centred Care | Person-centred Care | **Measure** Person-centered Care Assessment Tool (P-CAT; Edvardsson et al., 2010). **Participants:** Staff. **Mode:** Questionnaire. **Details:** Staff indicated the extent to which 13 statements (e.g. Assessment of residents' needs is undertaken on a daily basis) corresponded to their experiences of the facility as being person-centred, using a 6-point scale (Disagree completely, Disagree, Neither agree or disagree, Agree, Agree completely). |
| Quality of Life | Quality of Life Scale | Quality of Life Scale | **Measure:** Quality of Life-AD (QOL-AD; Logsdon et al., 1999). **Participants:** 1. Staff 2. Family 3. Residents. **Mode:** Questionnaire for staff, interview with families, face-to-face interview with residents. **Details:** Rating as poor, fair, good, or excellent for 13 different aspects of the resident's life (e.g. physical health, mood). Higher scores indicate better quality of life. |
| | Fluid Intake | Fluid Intake | **Measure:** Fluid intake for residents. **Participants:** Residents. **Mode:** Observation during meal time. **Details**: PO noted time and date of the meal and whether more than 1 cup (235mls) of fluids was consumed during the meal (Yes/No). |
| | Food Intake | Food Intake | **Measure:** Food intake for residents. **Participants:** Residents. **Mode:** Weighing of food during meal time. **Details**: PO noted the time and date of the meal and weighed the food before and after the meal (gms). |
| | Cognitive and Physical Frailty | Frailty* | **Measure:** Clinical Frailty Scale (Rockwood et al., 2005). **Participants:** Resident. **Mode:** Questionnaire. **Details:** Towards the end of their time in the facility, PO scored the frailty of the resident using the Clinical Frailty Scale, with a score of 1 being Very Fit through to 9 being Terminally Ill. Specific instructions for dementia. Input gathered from staff as required. |
| | | Social Skills* | **Measure:** Multi-focus Assessment Scale-Revised Social Behaviour Skills (Chappell et al., 2013). **Participants:** Residents. **Mode:** Completed through observations by the PO during face-to-face interview. **Details**: PO observations for 11 items on the resident's social behaviour skills (e.g. any discernible response to greeting) during the interview process. Items assigned as 1=appropriate behaviour or 0=otherwise. |
| | | Cognitive Status* | **Measure:** Psychogeriatric Assessment Scales (Jorm et al., 1995). **Participants:** Residents. **Mode:** Face-to-face interview or File Audit. **Details**: PO administered the Cognitive Impairment Scale to participating residents. If the file already contained a score for |

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| Variable Category | Composite Variables | Variable | Collection and Details |
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| | | | the Cognitive Impairment Scale for the preceding month, this score was noted and the resident was not asked to complete the measure again. Higher scores indicate greater cognitive impairment. |
| | | Activities of Daily Living | **Measure:** Barthel Index of Activities of Daily Living (Collin et al., 1988). **Participants:** Resident. **Mode:** Observation. Verified by staff. **Details**: Activities for Daily Living assessed in 10 areas (Bowels, Bladder, Grooming, Toilet Use, Feeding, Transfer, Mobility, Dressing, Stairs, Bathing). Higher scores indicate better functioning. |
| | | Level of Consciousness* | **Measure:** Confusion Assessment Method (Waszynski, 2002). **Participants:** Resident. **Mode:** Observation. **Details**: After the observation period when the resident was awake and at rest, the PO rated the resident's level of consciousness as Alert (normal), Vigilant (hyperalert), Lethargic (drowsy, easily aroused), Stupor (difficult to arouse) or Coma (unarousable). |
| | | Well-being | **Measure:** Resident Well-being. **Participants:** Residents. **Mode:** Observation[#]. **Details**: PO rated resident well-being immediately after the observation (-5=Extreme distress, anger or upset, -3=Moderate signs of illbeing, upset or agitation, -1=small sign of illbeing, distress or irritation, +1= no signs of well-being or illbeing observable, +3=Moderate levels of well-being, pleasure and enjoyment, +5=extremely high level of well-being, pleasure or happiness). (Adapted from Dementia Care Mapping, Kitwood & Bredin, 1997) |
| | Depression | Depression | **Measure:** Geriatric Depression Scale (Kurlowicz & Greenberg, 2007). **Participants:** Residents. **Mode:** Face-to-face interview. **Details:** Fifteen-items on how the resident felt (e.g. Are you basically satisfied with your life?) over the preceding week (Yes or No). Summed for a total score. Higher scores mean greater depressive symptoms. |
| | | Depression | **Measure:** The Cornell Scale for Depression in Dementia (Alexopoulos et al., 1988). **Participants:** 1. Staff 2. Family. **Mode:** Questionnaire for staff. Interview with families. **Details:** Nineteen items covering mood-related signs and physical signs of depression, behavioural disturbance, cyclic functions, and ideational disturbance. Participants asked to circle if those behaviours were absent, mild or intermittent, or severe during the past week. Able to circle that they were unable to evaluate the behaviour. Summed for a total score. Higher scores mean greater depressive symptoms. |
| | | Affect Scale | **Measure:** Philadelphia Geriatric Center Affect Rating Scale (Lawton et al., 1996). **Participants:** Resident. **Mode:** Observation. **Details**: The PO rated 5 affect states (Pleasure, Anger, Anxiety/Fear, Sadness, Interest) as Never, $< 16$ sec, 15-59 sec, 1-5, and $> 5$ min. Ratings were completed following the observation of a care episode and again after the observation of the resident when they were awake and at rest. Scores for Pleasure and Interest were reversed. Scores summed to create a total score with higher score indicating more negative affect. |
| | Pain | Resident Pain Signs | **Measure:** Frequency of signs of pain. **Participants:** Residents. **Mode:** Observation[#,%]. **Details**: PO were asked to note when the resident displayed signs of pain (e.g. grimace, clenched fists). The total number of symptoms displayed was divided by length of the observation period. |
| | | Resident Pain Scale | **Measure:** Pain Assessment in Advance Dementia (PAINAD) scale (Warden et al., 2003). **Participants:** Resident. **Mode:** Observation. **Details**: Immediately after the observation period, PO scored behaviour in 5 areas indicative of a person's pain state (e.g. facial expression). Scores ranged from 0 to 2 in each area (See Warden et al. 2003 for further details on the scoring matrix). Observations and scoring occurred for 5 minutes each when the resident was at rest and during a care. |
| | | Pain (File Audit) | **Measure:** Pain (File Audit). **Participants:** Residents. **Mode:** File Audit. **Details**: For pain within the preceding month, approximate time of day, symptoms noted, what the resident was doing and staff response were recorded. The number of episodes of pain symptoms was used. |
| | Agitated Behaviours | Agitated Behaviours Scale | **Measure:** Cohen-Mansfield Agitation Inventory (CMAI; Cohen-Mansfield, 1991; Cohen-Mansfield et al., 1989). **Participants:** Staff. **Mode:** Questionnaire. **Details**: Staff rated the frequency of 14 agitated behaviours (e.g. Repetitive sentence, calls, questions or words) over the preceding 2 weeks (1=Never, 2= Less than once a week, 3=Once or Several times a week, 4=Once or Several times a day, 5= A few times an hour or continuous for half an hour or more). |
| | | Behaviours | **Measure:** Behaviours. **Participants:** Residents. **Mode:** File Audit. **Details**: Any behaviours recorded in the file that were indicative of resident distress and occurred in the preceding month were tallied. Prompt for PO: *Record instances of any behaviours that include distress or poor quality of life. This can include overt behaviours such as physical aggression and verbal aggression but examples include withdrawal, apathy, overt physical and verbal aggression, psychological symptoms including anxiety, delusions, boredom, pacing, wandering, refusing to participate in activities, dressing and undressing, packing and unpacking.* Counting rules: *1. If two behaviours occurred at once eg. kicking and yelling; count as one instance and code the most severe eg. Kicking; 2. If it is clear that the behaviour occurred more than once but the exact number is not stated, count as 2 instances of behaviour eg. repeatedly trying to get out of bed throughout the shift = 2 instances.* |
| | BMI | BMI | **Measure:** Body Mass Index. **Participants:** Residents. **Mode:** File Audit. **Details**: Approximate weight and height. |
| | Ease/Engagement with Staff | Ease with Staff | **Measure:** Resident ease with staff. **Participants:** Residents. **Mode:** Observation[#]. **Details**: Following each observation episode, PO rated the statement "The resident seemed at ease with the staff member" on a 5-point scale (not at all, a little bit, a moderate amount, quite a bit, completely). |
| | | Engagement with Staff | **Measure:** Resident engagement with staff. **Participants:** Residents. **Mode:** Observation[#]. **Details**: Following each observation episode, PO rated the statement "The resident seemed engaged with the staff member" on a 5-point scale (not at all, a little bit, a moderate amount, quite a bit, completely). |

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| Variable Category | Composite Variables | Variable | Collection and Details |
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| | | Engagement with Activity | **Measure:** Resident engagement with activity. **Participants:** Residents. **Mode:** Observation[#]. **Details**: Following each observation episode, PO rated the statement "The resident seemed engaged with what they themselves were doing" on a 5-point scale (not at all, a little bit, a moderate amount, quite a bit, completely). |
| | Verbal/Physical expressions | Positive Physical Expression | **Measure:** Frequency of positive physical expression. **Participants:** Residents. **Mode:** Observation[#,%]. **Details**: During each observation episode, PO were asked to note when the resident displayed positive physical expressions (e.g. smiles at the staff member). |
| | | Physical Aggression[*] | **Measure:** Frequency of physical aggression. **Participants:** Residents **Mode:** Observation[#,%]. **Details**: During each observation episode, PO were asked to note when the resident displayed physical aggression (e.g. physical aggression, physical sexual advances, physical aggression to objects). |
| | | Negative Physical Expression[*] | **Measure:** Frequency of negative physical expression. **Participants:** Residents **Mode:** Observation[#,%]. **Details**: During each observation episode, PO were asked to note when the resident displayed negative physical expressions (e.g. pacing, disrobing, repetitive mannerisms, hoarding, hiding, restless, trying to get to another place). |
| | | Positive Verbal Expression | **Measure:** Frequency of positive verbal expression. **Participants:** Residents **Mode:** Observation[#,%]. **Details**: During each observation episode, PO were asked to note when the resident displayed positive verbal expressions. |
| | | Verbal Aggression[*] | **Measure:** Frequency of verbal aggression. **Participants:** Residents **Mode:** Observation[#,%]. **Details**: During each observation episode, PO were asked to note when the resident displayed verbal aggression (e.g. verbal aggression, screaming, verbal sexual advances). |
| | | Negative Verbal Expression[*] | **Measure:** Frequency of negative verbal expression. **Participants:** Residents **Mode:** Observation[#,%]. **Details**: During each observation episode, PO were asked to note when the resident negative verbal expressions (e.g. repetitive questioning, complaining/negativism, strange noises). |
| | | *Composite Details* | For each category for Resident Observation the total number of the expression/behaviour was divided by the total number of observations. Higher scores indicate more positive physical/verbal expressions. |
| Control | | Environmental Audit | **Measure:** The Environmental Audit Tool (Fleming, 2011). **Participants:** Facility. **Mode:** Observation of the Physical Environment. **Details**: 72-items based on 10 principles of environmental design in dementia care (Unobtrusively reduce risks – safety; Provide a human scale – size; Allow people to see and be seen - visual access; Reduce unhelpful stimulation - stimulus reduction features; Optimise helpful stimulation - highlighting useful stimuli; Support movement and engagement - provision for wandering, circulation and access to outside area; Create a familiar space – familiarity; Provide opportunities to be alone or with others - privacy and community; Provide links to the community - community links; Providing opportunities for engagement with ordinary life - domestic activity). See Fleming, 2011 for scoring details. If there was a separate DSU or other distinct units within the facility, The Environmental Audit Tool was completed separately for each unit. For the quality of care analysis, the average scores for all units was used to create a facility score. For the quality of life analysis, the score for the unit in which resident lived was used (unit score). |
| | | Number of Facility Beds | **Measure:** Number of facility beds. **Participants:** Facility. **Mode:** Interview with Management. **Details**: Number of beds at each facility was noted. |
| | | Residents with a Formal Dementia Diagnosis | **Measure:** Proportion of residents with a formal dementia diagnosis. **Participants:** Facility. **Mode:** Interview with Management. **Details**: Manager was asked to provide the overall number of residents with a formal dementia diagnosis. This was divided by the overall number of residents. |
| | | Age | **Measure:** Resident Date of Birth. **Participants:** Residents. **Mode:** File Audit. **Details:** Date of Birth recorded. |
| | | Prognostic Comorbidities | **Measure:** Charlson Comorbidity Index (Charlson et al., 1987). **Participants:** Resident. **Mode:** File Audit. **Details**: Residents rated on a range of comorbid conditions listed in the resident file. For each condition, the score is dependent on risk of dying from that condition within the next year (1, 2, 3 or 6). |
| | | Psychiatric Co-morbidities | **Measure:** Number of Psychiatric Co-morbidities. **Participants:** Residents. **Mode:** File Audit. **Details:** The number of psychiatric co-morbidities listed in the file over the preceding six months. |

[**] TAFE is the Australian term for Vocational Education and Training qualifications which are higher than secondary schooling but lower than a Bachelor Degree

[#] Observations were conducted during a resident leisure activity, during a care episode (involving physical personal hygiene), during a meal, and during a time when the resident was awake and at rest. The start time, end time and location of the observation were recorded. Observations occurred for the duration of the interaction or for ten minutes (whichever was shorter).

[%] PO observed the resident/staff member for 10 seconds, followed by 10 seconds for recording their observations from the preceding 10 seconds. The PO counted it as one when the behaviour was observed in a 10 second period. These tallies were then divided by the duration of the observation period.

[*] Scoring of the scale/item was reversed to align with the direction of the scales/items in the composite.

References

Alexopoulos, G. S., Abrams, R. C., Young, R. C., & Shamoian, C. A. (1988). Cornell scale for depression in dementia. *Biological Psychiatry, 23*(3), 271–284. https://doi.org/10.1016/0006-3223(88)90038-8

Chappell, N. L., Kadlec, H., & Reid, C. (2013). Change and Predictors of Change in Social Skills of Nursing Home Residents With Dementia. *American Journal of Alzheimer's Disease & Other Dementiasr, 29*(1), 23–31. https://doi.org/10.1177/1533317513505129

Charlson, M. E., Pompei, P., Ales, K. L., & MacKenzie, C. R. (1987). A new method of classifying prognostic comorbidity in longitudinal studies: Development and validation. *Journal of Chronic Diseases, 40*(5), 373–383. https://doi.org/10.1016/0021-9681(87)90171-8

Cohen-Mansfield, J. (1991). *Instruction manual for the Cohen-Mansfield agitation inventory (CMAI)*. Research Institute of the Hebrew Home of Greater Washington. https://www.pdx.edu/ioa/sites/www.pdx.edu.ioa/files/CMAI_Manual%20(1).pdf

Cohen-Mansfield, J., Marx, M. S., & Rosenthal, A. S. (1989). A Description of Agitation in a Nursing Home. *Journal of Gerontology, 44*(3), M77–M84. https://doi.org/10.1093/geronj/44.3.M77

Collin, C., Wade, D. T., Davies, S., & Horne, V. (1988). The Barthel ADL Index: A reliability study. *International Disability Studies, 10*(2), 61–63. https://doi.org/10.3109/09638288809164103

Davison, T. E., McCabe, M. P., Visser, S., Hudgson, C., Buchanan, G., & George, K. (2007). Controlled trial of dementia training with a peer support group for aged care staff. *International Journal of Geriatric Psychiatry, 22*(9), 868–873. https://doi.org/10.1002/gps.1754

De Roo, M. L., van der Steen, J. T., Galindo Garre, F., Van Den Noortgate, N., Onwuteaka-Philipsen, B. D., Deliens, L., & Francke, A. L. (2013). When do people with dementia die peacefully? An analysis of data collected prospectively in long-term care settings. *Palliative Medicine, 28*(3), 210–219. https://doi.org/10.1177/0269216313509128

Dever Fitzgerald, T. G., Hadjistavropoulos, T., & MacNab, Y. C. (2009). Caregiver Fear of Falling and Functional Ability among Seniors Residing in Long-Term Care Facilities. *Gerontology, 55*(4), 460–467. https://doi.org/10.1159/000221007

Edberg, A.-K., Anderson, K., Orrung Wallin, A., & Bird, M. (2015). The Development of the strain in dementia care scale (SDCS). *International Psychogeriatrics, 27*(12), 2017–2030. https://doi.org/10.1017/S1041610215000952

Edvardsson, D., Fetherstonhaugh, D., Nay, R., & Gibson, S. (2010). Development and initial testing of the Person-centered Care Assessment Tool (P-CAT). *International Psychogeriatrics, 22*(1), 101–108. https://doi.org/10.1017/S1041610209990688

Evans, L., & Strumpf, N. (1993). Frailty and physical restraint. In H. M. Perrry, J. E. Morley, & R. M. Coe (Eds.), *Aging and musculoskeletal disorders* (pp. 324–333). Springer.

Fleming, R. (2011). An environmental audit tool suitable for use in homelike facilities for people with dementia. *Australasian Journal on Ageing, 30*(3), 108–112. https://doi.org/10.1111/j.1741-6612.2010.00444.x

Inada, T., & Inagaki, A. (2015). Psychotropic dose equivalence in Japan. *Psychiatry and Clinical Neurosciences, 69*(8), 440–447. https://doi.org/10.1111/pcn.12275

Jorm, A. F., MacKinnon, A. J., Henderson, A. S., Scott, R., Christensen, H., Korten, A. E., Cullen, J. S., & Mulligan, R. (1995). The Psychogeriatric Assessment Scales: A multidimensional alternative to categorical diagnoses of dementia and depression in the elderly. *Psychological Medicine, 25*(3), 447–460. https://doi.org/10.1017/S0033291700033377

Kitwood, T., & Bredin, K. (1997). Evaluating dementia care the DCM method. *Bradford, England: Bradford Dementia Research Group, Bradford University*.

Kurlowicz, L., & Greenberg, S. A. (2007). The Geriatric Depression Scale (GDS). *AJN The American Journal of Nursing, 107*(10). https://journals.lww.com/ajnonline/Fulltext/2007/10000/The_Geriatric_Depression_Scale_GDS_.35.aspx

Lawton, M. P., Van Haitsma, K., & Klapper, J. (1996). Observed affect in nursing home residents with Alzheimer's disease. *The Journals of Gerontology: Series B: Psychological Sciences and Social Sciences, 51*(1), P3–P14. https://doi.org/10.1093/geronb/51B.1.P3

Leucht, S., Samara, M., Heres, S., & Davis, J. M. (2016). Dose Equivalents for Antipsychotic Drugs: The DDD Method. *Schizophrenia Bulletin, 42*(suppl_1), S90–S94. https://doi.org/10.1093/schbul/sbv167

Logsdon, R. G., Gibbons, L. E., McCurry, S. M., & Teri, L. (1999). Quality of life in Alzheimer's disease: Patient and caregiver reports. *Journal of Mental Health and Aging, 5*(1), 21–32. https://doi.org/10.1097/00006842-200205000-00016

Macdonald, S., & Maclntyre, P. (1997). The Generic Job Satisfaction Scale. *Employee Assistance Quarterly, 13*(2), 1–16. https://doi.org/10.1300/J022v13n02_01

Maslach, C., Jackson, S. E., & Leiter, M. P. (2018). *Maslach burnout inventory (MBI) Manual* (4th ed.). Mind Garden.

Maslach, C., & Leiter, M. P. (2008). Early predictors of job burnout and engagement. *The Journal of Applied Psychology, 93*(3), 498–512. https://doi.org/10.1037/0021-9010.93.3.498

McManus, I., Keeling, A., & Paice, E. (2004). Stress, burnout and doctors' attitudes to work are determined by personality and learning style: A twelve year longitudinal study of UK medical graduates. *BMC Medicine, 2*(1), 29. https://doi.org/10.1186/1741-7015-2-29

Phillips, L. R., Morrison, E. F., & Chae, Y. M. (1990). The QUALCARE Scale: Developing an instrument to measure quality of home care. *International Journal of Nursing Studies, 27*(1), 61–75. https://doi.org/10.1016/0020-7489(90)90024-D

Rantz, M. J., Mehr, D. R., Popejoy, L., Zwygart-Stauffacher, M., Hicks, L. L., Grando, V., Conn, V. S., Porter, R., Scott, J., & Maas, M. (1998). Nursing Home Care Quality: A Multidimensional Theoretical Model. *Journal of Nursing Care Quality, 12*(3). https://journals.lww.com/jncqjournal/Fulltext/1998/02000/Nursing_Home_Care_Quality__A_Multidimensional.7.aspx

Rockwood, K., Song, X., MacKnight, C., Bergman, H., Hogan, D. B., McDowell, I., & Mitnitski, A. (2005). A global clinical measure of fitness and frailty in elderly people. *CMAJ : Canadian Medical Association Journal = Journal de l'Association Medicale Canadienne, 173*(5), 489—495. https://doi.org/10.1503/cmaj.050051

Strumpf, N., & Evans, L. (1988). Physical restraint of the hospitalized elderly: Perceptions of patients and nurses. *Nursing Research, 37*(3), 132–137. PubMed. van der Doef, M., & Maes, S. (1999). The Leiden Quality of Work Questionnaire: Its Construction, Factor Structure, and Psychometric Qualities. *Psychological Reports, 85*(3), 954–962. https://doi.org/10.2466/pr0.1999.85.3.954

Warden, V., Hurley, A. C., & Volicer, L. (2003). Development and Psychometric Evaluation of the Pain Assessment in Advanced Dementia (PAINAD) Scale. *Journal of the American Medical Directors Association, 4*(1), 9–15. https://doi.org/10.1097/01.JAM.0000043422.31640.F7

Waszynski, C. (2002). Confusion Assessment Method (CAM). *Journal of Gerontological Nursing, 28*(4), 4–5. https://doi.org/10.3928/0098-9134-20020401-04

## References

Aged Care Workforce Strategy Taskforce. (2018). *A matter of care: Australia's Aged Care Workforce Strategy*. Commonwealth of Australia. https://www.health.gov.au/resources/publications/a-matter-of-care-australias-aged-care-workforce-strategy.

AIHW National Aged Care Data Clearinghouse. (2015). *Residential aged care and home care 2014–15: Supporting data*. AIHW. https://www.gen-agedcaredata.gov.au/Resources/Access-data/2015/December/Residential-aged-care-and-Home-Care-2014%E2%80%9315-suppo.

Alexopoulos, G. S., Abrams, R. C., Young, R. C., & Shamoian, C. A. (1988). Cornell scale for depression in dementia. *Biological Psychiatry, 23*(3), 271–284. https://doi.org/10.1016/0006-3223(88)90038-8

Anderson, K., Bird, M., MacPherson, S., & Blair, A. (2016). How do staff influence the quality of long-term dementia care and the lives of residents? A systematic review of the evidence. *International Psychogeriatrics, 28*(8), 1263–1281. https://doi.org/10.1017/S1041610216000570

Anderson, K., & Blair, A. (2020). Why we need to care about the care: A longitudinal study linking the quality of residential dementia care to residents' quality of life. *Archives of Gerontology and Geriatrics, 91*. https://doi.org/10.1016/j.archger.2020.104226

Australian Institute of Health and Welfare. (2012). *Dementia in Australia. Cat. No. AGE 70*. AIHW. https://www.aihw.gov.au/reports/dementia/dementia-in-australia/contents/table-of-contents.

Australian Nursing and Midwifery Foundation. (2018). *Better staffing can stop the suffering in nursing homes*. Australian Nursing and Midwifery Federation. http://anmf.org.au/media-releases/entry/media_180916.

Beck, C., Ortigara, A., Mercer, S., & Shue, V. (1999). Enabling and empowering certified nursing assistants for quality dementia care. *International Journal of Geriatric Psychiatry, 14*(3), 197–211. https://doi.org/10.1002/(SICI)1099-1166(199903)14:3<197::AID-GPS972>3.0.CO;2-Q

Bird, M., Anderson, K., MacPherson, S., & Blair, A. (2016). Do interventions with staff in long-term residential facilities improve quality of care or quality of life for people with dementia? A systematic review of the evidence. *International Psychogeriatrics, 28*(12), 1937–1963. https://doi.org/10.1017/S1041610216001083

Chappell, N. L., & Reid, R. C. (2000). Dimensions of Care for Dementia Sufferers in Long-Term Care Institutions: Are They Related to Outcomes? *The Journals of Gerontology: Series B, 55*(4), S234–S244. https://doi.org/10.1093/geronb/55.4.S234

Charlson, M. E., Pompei, P., Ales, K. L., & MacKenzie, C. R. (1987). A new method of classifying prognostic comorbidity in longitudinal studies: Development and validation. *Journal of Chronic Diseases, 40*(5), 373–383. https://doi.org/10.1016/0021-9681(87)90171-8

Cicchetti, D. (1994). Guidelines, criteria, and rules of thumb for evaluating normed and standardized assessment instruments in psychology. *Psychological Assessment, 6*(4), 284–290. https://doi.org/10.1037/1040-3590.6.4.284

Daly, T., & Szebehely, M. (2012). Unheard voices, unmapped terrain: Care work in long-term residential care for older people in Canada and Sweden. *International Journal of Social Welfare, 21*(2), 139–148. https://doi.org/10.1111/j.1468-2397.2011.00806.x

Edberg, A.-K., Bird, M., Richards, D. A., Woods, R., Keeley, P., & Davis-Quarrell, V. (2008). Strain in nursing care of people with dementia: Nurses' experience in Australia, Sweden and United Kingdom. *Aging & Mental Health, 12*(2), 236–243. https://doi.org/10.1080/13607860701616374

Edvardsson, D., Fetherstonhaugh, D., Nay, R., & Gibson, S. (2010). Development and initial testing of the Person-centered Care Assessment Tool (P-CAT). *International Psychogeriatrics, 22*(1), 101–108. https://doi.org/10.1017/S1041610209990688

Fleming, R. (2011). An environmental audit tool suitable for use in homelike facilities for people with dementia. *Australasian Journal on Ageing, 30*(3), 108–112. https://doi.org/10.1111/j.1741-6612.2010.00444.x

Hallgren, K. A. (2012). Computing Inter-Rater Reliability for Observational Data: An Overview and Tutorial. *Tutorials in Quantitative Methods for Psychology, 8*(1), 23–34. https://doi.org/10.20982/tqmp.08.1.p023

Harrison, S. L., Bradley, C., Milte, R., Liu, E., Kouladjian O'Donnell, L., Hilmer, S. N., & Crotty, M. (2018). Psychotropic medications in older people in residential care facilities and associations with quality of life: A cross-sectional study. *BMC Geriatrics, 18*(60). https://doi.org/10.1186/s12877-018-0752-0

Heck, R. H., Thomas, S., & Tabata, L. N. (2012). *Multilevel Modeling of Categorical Outcomes Using IBM SPSS*. Routledge.

Hughes, L. J., Farina, N., Page, T. E., Tabet, N., & Banerjee, S. (2019). Psychometric properties and feasibility of use of dementia specific quality of life instruments for use in care settings: A systematic review. *International Psychogeriatrics, 1–15*. https://doi.org/10.1017/S1041610218002259

Jorm, A. F., MacKinnon, A. J., Henderson, A. S., Scott, R., Christensen, H., Korten, A. E., Cullen, J. S., & Mulligan, R. (1995). The Psychogeriatric Assessment Scales: A multidimensional alternative to categorical diagnoses of dementia and depression in the elderly. *Psychological Medicine, 25*(3), 447–460. https://doi.org/10.1017/S0033291700033377

Kurlowicz, L., & Greenberg, S. A. (2007). The Geriatric Depression Scale (GDS). *AJN The American Journal of Nursing, 107*(10). https://journals.lww.com/ajnonline/Fulltext/2007/10000/The_Geriatric_Depression_Scale_GDS_.35.aspx.

Lawton, M. P., Van Haitsma, K., & Klapper, J. (1996). Observed affect in nursing home residents with Alzheimer's disease. *The Journals of Gerontology: Series B: Psychological Sciences and Social Sciences, 51*(1), P3–P14. https://doi.org/10.1093/geronb/51B.1.P3

Logsdon, R. G., Gibbons, L. E., McCurry, S. M., & Teri, L. (1999). Quality of life in Alzheimer's disease: Patient and caregiver reports. *Journal of Mental Health and Aging, 5*(1), 21–32. https://doi.org/10.1097/00006842-200205000-00016

Logsdon, R. G., Gibbons, L. E., McCurry, S. M., & Teri, L. (2002). Assessing Quality of Life in Older Adults With Cognitive Impairment. *Psychosomatic Medicine, 64*(3). https://journals.lww.com/psychosomaticmedicine/Fulltext/2002/05000/Assessing_Quality_of_Life_in_Older_Adults_With.16.aspx.

Morgan-Brown, M., Newton, R., & Ormerod, M. (2013). Engaging life in two Irish nursing home units for people with dementia: Quantitative comparisons before and after implementing household environments. *Aging & Mental Health, 17*(1), 57–65. https://doi.org/10.1080/13607863.2012.717250

Phillips, L. R., Morrison, E. F., & Chae, Y. M. (1990). The QUALCARE Scale: Developing an instrument to measure quality of home care. *International Journal of Nursing Studies, 27*(1), 61–75. https://doi.org/10.1016/0020-7489(90)90024-D

Royal Commission into Aged Care Quality and Safety. (2019). *Interim Report (Vol.1): Neglect.* Commonwealth of Australia. https://agedcare.royalcommission.gov.au/publications/interim-report-volume-1.

Royal Commission into Aged Care Quality and Safety. (2020). *Royal Commission into Aged Care Quality and Safety*. Royal Commission into Aged Care Quality and Safety. https://www.agedcare.royalcommission.gov.au.

Song, M.-K., Lin, F.-C., Ward, S. E., & Fine, J. P. (2013). Composite variables: When and how. *Nursing Research, 62*(1), 45–49. https://doi.org/10.1097/NNR.0b013e3182741948

Tabachnick, B. G., & Fidell, L. S. (2007). *Using Multivariate Statistics*. Pearson Education. Inc.