Systematic review of psychological approaches to the management of neuropsychiatric symptoms of dementia

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Abstract

Objective: To review systematically the literature on psychological approaches to treating the neuropsychiatric symptoms (NPS) of dementia.

Method: The review included any therapy derived from a psychological approach that satisfied pre-specified criteria. We extracted data, then rated the quality of each study, and finally gave an overall rating according to the Centre for Evidence Based Medicine criteria.

Results: We identified 1632 papers of which 163 satisfied inclusion criteria. Cognitive stimulation and behavioural management techniques centred on individual patients' behaviour or on caregiver behaviour were effective treatments whose benefits lasted for months. Specific types of psychoeducation education for caregivers about managing NPS had similar benefits, but other caregiver interventions did not. Music therapy and snoezelen, and possibly sensory stimulation, were useful during the treatment session but had no longer-term effects. Changing the visual environment looked promising but more research is needed.

Discussion Only cognitive stimulation, selected behaviour management therapies, and specific types of caregiver and residential care staff education appear to have lasting effectiveness for the management of dementia-associated NPS. Lack of evidence regarding other therapies is not evidence of lack of efficacy. Conclusions are limited because of the paucity of high quality research (only 10 level 1 studies). More high quality investigation is needed.

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Background

The neuropsychiatric symptoms of dementia (NPS) include signs and symptoms of disturbed perception, thought, mood or behaviour[1]. Clinically significant NPS are found in about a third of dementia patients(DP) with mild impairment, two thirds with more severe impairment[2,3] and even more in residential care[4;5]. NPS contributes significantly to caregiver burden, institutionalisation,[6] and decreased quality of life (QOL) for DP.[7]

Psychotropic medications are often prescribed for NPS but there are concerns about their safety and efficacy[8-10]. Psychological approaches may have fewer risks, but little is known about their efficacy. This systematic review of psychological approaches to NPS aims to make evidence-based recommendations about their use. It included any therapy derived from a psychological/psychosocial model. We considered the effects of the interventions in terms of NPS and related outcomes, and assessed whether benefit was time limited or sustained.

Methods

Search Strategy

The search accessed electronic databases until July 2003, reference lists from individual and review articles, Cochrane Library, expert knowledge of additional studies, even if published post-July 2003 and handsearched three journals,.

We used search terms encompassing individual dementias and interventions. We included studies with quantitative outcome measures which were either a direct or proxy measure of NPS e.g. care costs, QOL, institutionalisation, decreased medication or restraint. Studies of people without dementia, dementia secondary to head injury or interventions either involving medication or not based on a psychological model (e.g. aromatherapy, homeopathy, occupational therapy, light therapy) were excluded.

Data extraction strategy

We used a tool adapted from a review of checklists [11]. Levels of evidence (LOE) were assigned to studies according to the Centre for Evidence Based Medicine (CEBM) guidelines. LOE grades range from 1-5 with lower numbers indicating higher quality. Each type of intervention was then given an overall “Grade of recommendation” (GR) according to the CEBM criteria. These range from A (consistent LOE 1) to D (LOE 5 or troublingly inconsistent

or inconclusive studies at any level).

Results

We identified 1632 references. 1419 were excluded and 163 included.

Reminiscence therapy (see table 1)

Reminiscence therapy (RT) uses materials like old newspapers and household items to stimulate memories and enable people to share and value their experiences. We identified five RT interventions[12-16]. Three were small RCTs. One had 10 participants and reported behavioural improvements when RT was preceded by reality orientation (RO), but not vice-versa. The improvement was not clearly significant. The other two found no benefit. Two level 4 studies had small numbers. One reported a significant improvement in mood although the raters were not masked to treatment. **The GR is thus D**.

Validation therapy (VT: table 1)

VT, rooted within the Rogerian humanistic psychology premise of individual uniqueness, aims to give an opportunity to resolve unfinished conflicts by encouraging and validating expression of feelings. We identified three VT studies. The first, a case series of 5 individuals indicated an increase in verbal interaction after VT[17]; the second used 5 patients as their own controls and reported similar results[18]. An RCT compared VCT to usual care or a social contact group in 88 DP[19]. Although at one-year follow-up the nursing staff thought the VT group improved, there was no difference in independent outcome ratings, in nursing time needed, or in use of psychotropic medication and restraint. The absence of conclusive evidence indicates **a GR of D**.

Reality orientation therapy (see table 2)

RO is based on the idea that impairment in orientating information (day, date, weather, time and use of names) prevents DP from functioning well, and that reminders can improve functioning. 10 papers assessed RO[20-26;26;27;27;28;28;29;29;30]. The strongest RCT with 57 participants showed no immediate benefit when compared to active ward orientation[25]. In a smaller RCT (n=10) patients who received RO followed by reminiscence therapy had fewer NPS but not if the treatments were given in reverse order[20]. The other smaller, non-RCTs mostly found benefits in the RO groups in terms of improved mood, decreased NPS or delayed institutionalisation. **The GR is D**.

Cognitive stimulation therapy (see table 3)

CST, derived from RO, uses information processing rather than factual knowledge. Three of

four RCTs of CST [31-34] showed some positive results, although they used different endpoints and time periods (immediately to 9 months). By 9 months there was no significant difference between groups. One study showed reduced depression, and another showed improvement in QOL but not in mood[33;34]. The final study did not report whether the differences in behaviour were significant. Given the mostly consistent evidence that CST improves aspects of NPS immediately and for some months afterwards **the GR is B**.

Other dementia specific therapies (see Table 3)

We identified two other dementia specific therapies[35;36]. The first, "Individualised Special Instruction", is a half-hour of focussed individual attention and participation in an activity appropriate for each individual. A pilot RCT reported participants were their own waiting list controls. During the intervention period their behaviour did not deteriorate, while prior to the intervention it had.

The second, "self maintenance therapy", aims to maintain the sense of personal identity, continuity and coherence, incorporating techniques from validation, reminiscence and psycho-therapy. A three week admission of patients and caregivers to a specialist unit led to a significant decrease in depression and problematic behaviour when compared to baseline. This may have been partially attributable to the environment. For both interventions, these level 4 studies support **a GR of C**.

Non-dementia specific therapies

24 papers described non-dementia specific psychological therapies in DP[37-61](Tables 4a and b). These were nearly all studies of behavioural management techniques (BMT). There was one large RCT in which participants had either a manualised treatment for patient and caregiver or a problem solving treatment for caregiver only. Both were equally successful in improving depressive symptoms immediately and at six month follow-up[44]. Two other small RCTs also found positive results. One reported significantly fewer NPS two months after teaching progressive muscle relaxation; the other was in patients with the dementia of multiple sclerosis[38;43]. Behaviour improved with "neuropsychological counselling" (a cognitive behavioural intervention). The two other RCTs of BMT were ineffective. The first used a complex difficult to classify intervention, applying a variety of techniques (e.g. life review, sensory stimulation, single word commands and problem orientated strategies)[37]. The second used token economy (TE) in severe dementia and was ineffective in reducing "bizarre"

behaviour[41]. Other single case studies are summarised in the table. If TE is excluded, then the **GR for standard BMT in dementia is B** as the larger RCTs were consistent and positive and the positive effect last for months.

Psychological interventions with caregivers

Tables 5 and 6 show 18 papers identified describing interventions with family caregivers designed to ameliorate NPS or frequency of institutionalisation in dementia[62;63;63-73;74-80]. Seven involve training the caregiver to use BMT (Table 5). The first RCT[72;73] found no difference in agitation or global outcome when comparing treatment with BMT, trazodone alone or placebo at 16 weeks. At one year follow-up teaching BMT to caregivers did not reduce psychotropic drugs usage or symptom frequency[64]. The second RCT reported that exercise and BMT led to significant improvements in depression at 3 months but not at 2 years[73]. A smaller RCT taught BMT to caregivers based on the progressive Lowered Stress Threshold Model with the aim of reducing stimulation in response to specific caregiver identified stressors[70]. Both groups received the intervention; one in written materials, the other a training programme. There was a positive effect for care recipients in the second group. The evidence that BMT with caregivers and exercise training with patients helps depression is strong but it is unclear which was the active component. As other studies are inconsistent, **the GR for teaching caregivers BMT to manage psychological symptoms is D**.

Table 6 shows eight studies (7 RCTS) involving psychoeducation/teaching caregivers how to change their interactions with the DP. One large trial showed a trend towards improvement in NPS at 16 weeks. A second, primarily powered to improve caregiver mental health and not in DP, showed an improvement in NPS immediately but not three months after 12 weeks of training in stress management, dementia education and coping skills. A third, smaller, intervention with individual families found significant improvements at 6 months in mood and ideational disturbance[63;69;79]. An RCT of an educational programme for family carers with supportive counselling, psychoeducation and training in management strategies, and home visits, decreased institutionalisation. The effect continued for three months but not 2 years[77]. A fifth RCT involved psychoeducation, teaching caregivers to change their interactions, or both. There was a trend towards improvement in behaviour at 6 months. The non significant result was attributed to the pilot nature and limited power of the study[75]. Another study involved psychoeducation about how to work with residents in social activities and self-care and

resulted in a decrease in agitation after 6 months [76]. Finally a level 1 study of a comprehensive support and counselling intervention for spouse caregivers[80] which included problem solving, management of troublesome behaviour, education and increased practical support, followed by long term support groups did not directly measure NPS but found that it delayed time to institutionalisation by nearly a year. The other studies are non-controlled and either show a trend towards improvement or significant improvement[67;78]. **The GR for BMT in the form of psychoeducation and teaching the caregiver how to change their interaction is A** as there is consistent evidence from level 1 and 2 studies as well as level 4 studies and the effect last months.

Family counselling seemed helpful in terms of behaviour in an uncontrolled study[66]. A family support group in a non-RCT showed decrease in problem behaviour but not in depression[65]. This intervention is supported by two level four studies so **GR is C**.

A single controlled study involving *admiral nurses*, specialist community dementia nurses working with carers of DP, compared to usual treatment showed no effect in terms of institutionalisation[74]. T**he GR is D**.

Psychosocial interventions

Sensory enhancement

Music/Music Therapy (see table 7)

Music/music therapy (MT) interventions included playing music from specific eras, or particular genres such as “Big Band” music, as part of MT activity sessions or during certain times of day e.g. mealtimes or bathtimes. Participants also played musical instruments, moved to music, or participated in composition and improvisation sessions. Of 24 MT interventions[15;15;81-91;91-103], six were RCTs[85,15;89,91;94;99]. All were small and showed improvements in disruptive behaviour. In two, behaviour was observed during the music sessions but there was no evidence that benefit carried over past the session[85;94]. In three studies, behavioural change was observed outside the MT session. In the first,[91] patients were significantly less agitated, both during and immediately after MT in which music was chosen to fit the individuals’ preference. The second study described similar results[89]. In the third study assessing music or hand massage or a combination of both for 10 minutes, decreased agitation was observed one hour after the intervention[99]. All but one of the other studies[101] were controlled. Most of them found a benefit although some did not[84]**. The GR for music**

therapy for immediate amelioration of disruptive behaviour is B as there is consistent level 2 evidence that it decreases agitation during sessions and immediately after. There is however **no** evidence that music therapy is useful for NPS in the longer term.

Snoezelen/Multi-sensory stimulation (Table 7)

Snoezelen therapy/multi-sensory stimulation (MSS) combines relaxation and exploration of sensory stimuli e.g. lights, sounds and tactile sensations based on the idea that NPS may result from periods of sensory deprivation. Interventions occurred in specially designed rooms and lasted 30- 60 minutes. Of six trials of MSS; three were RCTs. The first was very small with no clear results[104]. The other two, one being one of the few level 1 studies in this review, found that disruptive behaviour briefly improved outside the treatment setting but with no effect after the treatment had stopped[105;106]. The other reports were a series of single case study RCTs[105;107;108] and an uncontrolled trial which reported improvements but gave no statistics[109]. **The GR for Snoezelen to ameliorate disruptive behaviour immediately is B** as there are consistent level 2 studies and one level 1, but the effects are only apparent for a very short time after the session.

Other sensory stimulation (see table 8)

Of seven trials of other forms of sensory stimulation, three were RCTs. The first compared massage with control, or music or combined, it with music[99]. Decreased agitation was observed one hour after the intervention. The second was a sensory integration program (emphasising bodily responses, sensory stimulation and cognitive stimulation) and had no effect on behaviour[110]. Similarly, a small RCT of white noise for sleep disturbance and nocturnal wandering found no effect[111]. A study of "expressive physical touch" (10 days of 5.5 minutes of touching -gentle massage for 2.5 minutes and 3 minutes of intermittent touching with some talking) decreased disturbed behaviour from baseline immediately and for 5 days after the intervention[112]. White noise tapes led to immediate decrease in agitation[113]. A controlled trial of stimulation with "natural elements" while bathing, (sounds of birds, brooks and small animals were played and large bright pictures were displayed) found that agitation decreased significantly only during bathing[114]. The other single case study found no difference in agitation before and after using therapeutic touch or massage[115]. The final two studies used several forms of sensory stimulation involving touch, smell and taste; a small RCT reported no change [116] while the other study found the intervention helpful[117]. The GR for short term

benefits of sensory is C, but there is no evidence for sustained usefulness. As the overall results are contradictory, **the GR is D**.

Simulated Presence Therapy (See table 9)

There were six studies of Simulated Presence Therapy (SPT) when positive autobiographical memories are played to the patient in the format of a telephone conversation using continuous play audiotape made by family or surrogate. One RCT found no change in agitated or withdrawn behaviours[118]. Staff observations suggested reduced agitation compared to placebo but not compared to usual care[118]. A small study found improved social interaction and attention[119]. When SPT was used for agitation it led to significant decreases in agitation, improved social interaction, but no change in aggressive behaviours[120]. When SPT was used regularly, problem behaviours were reduced by 91%. Finally in a series of single case studies, Peak et al[121] reported mixed results, with increased ill-being in one participant and reduced anxiety and increased social interaction in other participants. When video respite was used, no significant changes in agitated behaviour were seen[122]. **The GR for SPT is D**.

Structured Activity

Therapeutic activity programmes (table 9)

There were five RCTs of therapeutic activities (TA). A small-scale RCT of TA at home found significant decreases in agitation[123]. Another reported that discussion and being carried on a bicycle pedalled by volunteers alleviated depression, but not agitation at 10 weeks[124].The third of puzzle-play found no change in social interaction and mood[89]. Similarly, a comparison of games and puzzle play with Snoezelen, and another of structured activity, found that mood and behaviour was not improved[105;125]. The other studies of TA were non-RCTs. Ishizaki[126] found no beneficial effects of weekly TA on depression. One study found that a combination of group and individualised activity sessions in day care significantly *increased* agitation over 10-weeks[127]. A controlled non-RCT of weekly activity groups run by nursing assistants, reported no behavioural changes[128]. There was however, less use of physical restraint generally and psychotropic medication was reduced in seven out of 20 participants. A specialist day care programme providing structured daily activities for DP led to decreased institutionalisation and was more cost effective than nursing home care[30]. Rocking people on a swing did not decrease aggression[129]. Three case studies of diverse group activities (games, music, exercise, socialising) found equivocal effects on behaviour[130]. Two studies used reading

sessions as an intervention and found that, in the first, some improvement in wandering was seen[87]; in the second, it decreased disruptive behaviours in two people both during and one week after the intervention[88]. Not all activities are alike, but overall, studies are inconsistent and inconclusive and **the GR is D**.

Montessori activities (Table 10)

Montessori activities use rehabilitation principles and make extensive use of external cues and progression in activities from simple to complex. Three non-RCTs, utilised Montessori-based activities and found no change in terms of depression and agitation[131-133]. The **GR is D**.

Exercise (Table 10)

Three studies used exercise/movement/walking as an intervention for NPS. A well conducted RCT found that a 'walk-talk' programme (where one caregiver walked up and down the corridor with two residents or walked and talked with two residents) had no effects on behaviour[134]. An RCT of a psychomotor activation programme found that no behavioural effect[135]. The other two studies were non-RCTs. One, comparing 11 patients with themselves, found a significant reduction in aggressive behaviours on walking group days[136]. The second was a small matched controlled group of exercise groups and led to no significant reduction in agitated behaviours[137]. **The GR is D**.

Social interaction

A small report of single cases studies of enforced social interaction with nurses for 1-2 months for three hours a day led to decreased NPS in a third of the sample[138]. **The GR is D**.

Decreased sensory stimulation (Table 10)

Two small studies investigated decreased sensory stimulation. A "quiet week" intervention (turning off the television, lowering voices and reducing fast movement by staff at a day centre) led to an immediate significant reduction in agitation on a non-standardised scale compared to before the intervention[131]. A specially designed reduced stimulation unit - without television, radio and telephones; with scheduled rest periods and limited access to visitors - led to no reduction in NPS on a standardised scale before and after the intervention but decreased restraint use[139]. **The GR is D**.

Environmental manipulation

Visually complex environments (Table 10)

Eight studies (no RCTs) changed the visual environment. Painting two dimensional grids on

the floor by doors led to no reduction in exiting behaviours[140]. Two studies using a horizontal grid pattern, however, reported a significant decrease in attempts to open doors and reduced ambulation[141],[142]. Similar results were found using a mural painted over doorways[143]. Placing blinds and cloth barriers over doors/door handles or focussing attention on signs was also effective in reducing time spent attempting to exit the ward[144],[145;146]. Enhancing the visual environment in a selected area of a residential home was associated with decreased agitated behaviours although this was not significant[147]. Consistent level 4 studies for changing the environment to obscure the exit indicates a **GR of C**.

The Use of Mirrors (Table 10)

Two small non-RCTs investigated the use of mirrors. In a single case design, one patient was less agitated following removal of mirrors from the ward environment[148]. Placing a full-length mirror over the doorway led to a significant decrease in exiting during the intervention for 9 patients[149]. The GR is D.

Signposting (Table 10)

Three non-RCTs investigated the effects of signposting on NPS. Two single case studies found that signposting alone was ineffective, but when used in combination with RO it led to improvements in ward orientation in 2 out of 4 and 5 out of 5 patients respectively[25;25;150;151]. Signposts used alongside prompts to draw attention to them led to a reduction in NPS in all 5 residents[146]. **The GR is D**.

Other environmental manipulations

Group living (see table 11)

Group living (GL) is the name given to a specially designed nursing home, which encourages a home-like atmosphere. One RCT of GL[152] found no change in NPS compared to community dwelling waiting-list controls. Two other RCTs showed decreased aggression, anxiety and depression in residents, and less use of neuroleptic medication for one year[153;154]. There were no differences between GL and controls 3-years later Both studies were limited, since residents were selected for admission and were ineligible if they had frontal lobe symptoms, severe dementia, or a severe physical morbidity. A smaller, uncontrolled trial of GL reported beneficial effects on NPS at six months, and reduced physical restraint use[155]. However, in another study NPS significantly *increased* with GL compared to controls at 6 months and one year[156]. In summary, studies show that GL may have beneficial, deleterious, or no effect on NPS. **GR is D**.

Unlocking doors

One small uncontrolled study of unlocking ward doors for 3 hour periods led to less NPS and decreased wandering when the door was open[157]. **GR is D**.

Staff education in managing behavioural problems (Table 11)

Nine studies investigated staff education for NPS. Three were RCTs[158;158-160]. An RCT of communication skills training for nursing and auxiliary staff led to significant reductions in patient aggression at three months and in patient depression at 6 months[158]. Education of staff to implement an emotion-focused care programme (validation, reminiscence, sensory stimulation) led to no change in any NPS[159]. Staff education programmes, focusing on knowledge of dementia and potential management strategies, reduced physical restraint use[160] and (a non- RCT) decreased aggressive behaviours towards staff[161]. Specialised care programmes for individuals in a residential home plus staff education improved emotional status and QOL for residents 12 months later[162]. A similar approach in a controlled tria,l with only 11 people in each arm, led to non-significant differences favouring the intervention group[163]. The result of a client-centred approach to agitation and sleep disturbance for 33 residents of a nursing home was equivocal. Verbal aggression decreased significantly but the (less frequent) episodes of non-verbal agitation increased[164]. Training staff in integrity-promoting care (staff gave more time, made the environment more homelike, encouraged patients to do more and wear their own clothes) improved anxiety and depressed mood in a small controlled trial[165]. A large uncontrolled trial of a training day for nursing staff using non-standardised observational outcomes led to an a increase in restraint use but had no effect on agitated behaviour[166]. **The GR for specific staff education programmes in managing NPS is B** (consistent level 1, 2 as well as level 4 supportive studies).

Other forms of staff education alone or combined with environmental manipulation (Table 12)

Eight non-RCTs investigated special care dementia units (SCU), designed for DP and staffed by specially trained workers who receive on-going training. A controlled trial of admission to a "low-density" SCU, with fewer residents and larger living areas, was associated with a decrease in disrupted behaviour[167]. Similarly, a controlled trial of a combination of GL and staff training was associated with improved emotional and physical outcomes and was less costly than standard care[168;168]. SCU care was associated with decreased NPS, especially agitation and depression and with reduction in neuroleptic medication usage[169;170]. Aggression

and activity disturbances were improved in a small controlled trial of SCU care[171]. However, three other studies found no effect[172-174]. **The GR is D**.

Discussion

We found numerous studies reporting psychological approaches to NPS. We have tried to summarise and classify these using evidence-based guidelines in order to help clinicians understand which are efficacious and over what time period. We have also tried to distinguish interventions that are ineffective from those for which there is too little evidence to judge. As some interventions are made up of several elements, we could have classified them in different ways. We have tried to use the best fit and, by describing the interventions, make our judgment transparent. Some therapies may require a huge amount of work for very little benefit; we have not measured this aspect. It may also be that some may provide pleasure (either for DP or staff), which may be worthwhile despite not altering NPS. We do not attempt to judge this. Similarly, we did not study cognition as an endpoint although some therapies aim to effect cognition.

Effective psychological therapies

BMT centred on individual patients' behaviour are generally successful for NPS. The interventions' effects (with the exception of TE) last for months, despite qualitative disparity. Psychoeducation for caregivers to change their caregiving behaviour worked, particularly individual rather than group education. Improvements in NPS were sustained for months. We therefore recommend these types of interventions.

Music therapy and snoezelen, and possibly some types of sensory stimulation, are useful treatments for NPS during the session but have no longer-term effects. The cost or complexity of snoezelen for such small benefit may be a barrier to its use.

Specific types of staff education are promising methods for improving NPS, leading to reduced behavioural symptoms and use of restraints and improved affective states. Staff education is however heterogeneous, teaching staff communication skills and about dementia may improve many NPS related outcomes. Teaching staff to use dementia specific psychological therapies for which there is limited evidence of efficacy may not.

What interventions need more evidence?

There is little evidence about reminiscence, but more positive evidence about CST. Training

the caregiver in BMT had inconsistent outcomes but merits further study. TA is very mixed, therefore studies were contradictory and inconclusive. Living in specialized dementia units, was not consistently of benefit. Changing the environment visually and unlocking doors were successful in reducing wandering in institutions. These promising interventions merit more study. There is no convincing evidence that SP interventions or reduced stimulation units are efficacious for NPS.

Which interventions were ineffective?

RO, VT, Admiral nurses and Montessori activities had no effect and are not useful for NPS. There is convincing evidence, that simple repetitive exercise does not work for NPS.

Conclusion

Overall our conclusions are limited because of the paucity of high quality research. We found only 10 level 1 studies. Lack of evidence of efficacy does not mean lack of efficacy. The system of rating research in which RCTs gain the highest ratings inevitably means that most published psychological intervention studies will not reach the highest quality. The behavioural literature places greater weight on experimental single case studies particularly . where there is a case-series because the interventions are individualised. The purpose of publication, however, is to provide evidence that can be generalised for future use. We have, therefore, used the CEBM's system for assessing evidence. Future research should aim to use standardised interventions (which can be individualised as long as adhering to their basic principles) so that if successful, they can be used in other populations.

Table 1 Dementia specific therapies- reminiscence therapy and validation therapy

Author Year	Randomisation		Control	Patient number	Control number	Type of intervention	Therapeutic regime	Outcome	Level of evidence
Brooker [11]	No	Yes	25	?	Reminiscence Therapy	RT, Group activities or unstructured time	RT group ↑wellbeing (?immediately)	4	
Baines [13]	Yes	Yes	10 (5, RO then RT, 5 RT then RO)		5	Reminiscence Therapy/ Reality Orientation	RO or RT therapy then RT vs other groups- sig not given.	Improved behaviour at 6 months follow up in group who received RO	2b
Goldwasser [14]	Yes	Yes	9(Group RT), 9 (support)		9	Reminiscence Therapy	Reminiscence group or supportive group therapy	↑in affect. No effect on behaviour at 5 weeks.	2b
Haight [16]	No	Yes	11	11	Reminiscence therapy	Reminiscence by life review	Sig improvement in carer rated mood in intervention group at 2 months		4
Korb [15]	Yes	Yes	10	10 (own control)	Reminiscence Therapy	8 sessions of reminiscence therapy or music therapy	Reminiscence had no effect on mood		2b
Morton[18]	No	Yes	5 single cases	N/a	Validation Therapy	20 weeks VT groups, then 10 weeks group work	↑verbal interaction post-VT group for 2/3 Ss. No change on behaviour rating scales		5
Toseland[19]	Yes	Yes	31	57 (28 social contact, 29 usual care)	Validation Therapy	VT group sessions	No change in depression, psychotropics or restraint use in VT.		2b
Babins[17]	No	Yes	5	?	Validation Therapy	22 VT sessions	↑ irritability scores, general slowing of deterioration		4

Table 2 Dementia specific therapies- reality orientation

Author Year	Randomisation	Control	Patient number	Control number	Type of intervention	Therapeutic regime	Outcome	Level of evidence
Baldelli[20]	No	Yes	23 (half control)	?	Reality orientation	RO group	↓ depression in RO group	4
Brook[21]	No	Yes	9	9	Reality Orientation	RO group sessions	experimental groups showed ↑ on non- standard social functioning scale.	3b
Greene [23]	No	Yes	20	N/a	Reality Orientation	RO, 2 x 30 min sessions 2-3 days a week	Significant ↑in mood of patients at the end of the orientation phase	4
Greene [22]	No	Yes	3 single cases	N/a	Reality Orientation	RO sessions	some ↑ in behaviour (type not specified)	5
Hanley[24]	Yes	Yes	28	29	Reality Orientation	Classroom RO, ward orientation training	No behavioural change in either group	2b
Ishizaki[25]	No	No	6	0	Reality Orientation	RO group sessions, 3 hours/week for 3 months	↑in conversation,	4
Johnson [26]	No	Yes	75	23	Reality Orientation	standard classroom RO, 2x daily classroom RO, individual RO	All groups showed same improved in non-standardised scores. Not clear what.	4
Metitieri[27]	No	Yes	46	28	Reality Orientation	RO sessions (8 - 40 weeks)	RO pts remained at home significantly longer.	4
Reeve[28]	No	Yes	10	8	Reality Orientation	classroom RO, modified informal RO, environmental manipulation	Combined environmental manipulation & informal RO improved behavioural symptoms, effects last up to 3 months with CRO	4

RO= reality orientation

Table 3- **Cognitive Stimulation and other dementia specific therapies**

Author Year	Randomisation	Control	Patient number	Control
number	Type of intervention	Therapeutic regime	Outcome	Level of evidence
Mitchell[29]	Yes	Yes	15	15	Individualised Special Instruction	4
5 half hour sessions	No sig deterioration in intervention group			
Quayhagen [30]	Yes	Yes	25	28 (placebo - passive activity)	25 (control)	2b
Cognitive Stimulation Therapy	12 weekly in-home sessions. CST Experimental and placebo group had ↓behavioural problems at all time points than control group. Return to baseline by 9 month FU			
Quayhagen [31]	Yes	Yes	88 total = 21 (CS), 29 (counselling), 22 (seminar)	16
(day care)	15	Cognitive Stimulation	8 week RO programme	? No significant differences in behavioural symptoms in any intervention (outcome does not seem to be reported)	4
Romero [35]	No	Yes	43	N/A	Self- maintanance therapy	3
week inpatient programme	Significant ↓ in depression and behavioural symptoms				4
Spector[32]	Yes	Yes	17	10	Cognitive Stimulation Therapy	
15 sessions cognitive stimulation	significant ↓ in depression				2b
Spector[33]	Yes	Yes	115	86	Cognitive Stimulation Therapy	
14 cognitive stimulation sessions	↑ QoL (more in women than men)				1b

BT = behaviour therapy
RO = reality orientation therapy
QoL = quality of life
CMAI = Cohen-Mansfield Agitation Inventory
DV = disruptive vocalisation
CS- Cognitive stimulation

Table 4a Non- dementia specific psychological therapies (Levels 1-4)

AUTHOR YEAR NUMBER	RANDOMISATION TYPE OF INTERVENTION LEVEL OF EVIDENCE	CONTROL	PATIENT NUMBER THERAPEUTIC REGIME		CONTROL OUTCOME	
Beck [36]	Yes	Yes	89	54 (30 placebo, 24 no intervention)		
	BMT Behavioural intervention during ADL or activity or both No reduction in disruptive behaviour. 2b					
Benedict[37]	Yes	Yes	8	7	BMT/ Supportive	
psychotherapy	Education, social skills training, identification of abnormal behaviour BMT ↓ social aggression and disinhibition. No effect on depression 2b					
DeYoung[38]	No	Yes	32 own control		N/A	BMT
	Behaviour management unit with behaviour management programme ↓ aggressive, agitated or disruptive behaviours at 6/12. 4					
Hoeffer [39]	No	Yes	10 own control		N/A	BMT
	Functional analysis of bathing and person centred bathing ↓ aggression 4					
Mishara[40]	Partial	Yes	40	40	BMT	1 ward token
economy system, 1 general milieu↓ bizarre behaviours after 6 months in non-BMT group 2b						
Rogers[41]	No	Yes	84	N/a	BMT	Usual care, skill
elicitation, habit training for ADL tasks (dressing) Significant ↓in agitation scores compared to usual care 4						
Suhr[42]	Yes	Yes	17	17	BMT	Progressive
muscle relaxation Significant ↓ behavioural symptoms compared to usual care 2b						
Teri [43,44]	Yes	Yes	42	30	BMT	BT pleasant events
(pt & carer, manualised), or BT problem-solving (carer only) Significant ↓depression for both groups immediately and at 6 month follow-up. 1b						
Welden [45]	No	Yes	24	24	BMT	Progressive
muscle relaxation and imaging Significant ↓ in behavioural symptoms 4						

BMT = behaviour management techniques, NCR= Non contingent reinforcement , ADL= Activities of Daily Living

Table 4b Non- dementia specific psychological therapies (Level 5 studies)

AUTHOR YEAR	RANDOMISATION	CONTROL	PATIENT NUMBER	CONTROL NUMBER	INTERVENTION	THERAPEUTIC REGIME	OUTCOME	LEVEL OF EVIDENCE
Alexopoulos[46]	No	No	1	N/A own control	BMT	Written cue with spaced retrieval	Sexually disinhibited behaviour disappeared	5
Bakke [47]	No	Yes	1	N/A own control	CBT	Functional analysis of behaviour, then behavioural reinforcement	↓agitation during intervention period.	5
Birchmore[48]	No	Yes	1	N/a own control	BMT	behavioural programme to reduce shouting	↓ time spent vocalising during treatment	5
Bird [49]	No	Yes	5 single cases	N/A own control	BMT	Individualised programmes using fading cues & spaced retrieval	4 out of 5 showed "adaptive behaviour change". Effects not long-lasting	5
Boehm[50]	No	Yes	2 single cases	N/A own control	BMT	Behavioural reinforcement	↓ aggressive behaviours	5
Buchanan [51]	No	Yes	2 single cases	N/A own control	BMT	Functional assessment of disruptive vocalisations followed by NCR	Significant ↓ in disruptive vocalisations	5
Carpenter [52]	No	Yes	3	N/A- own control	BMT	16 sessions of Restore-empower-mobilise REM/ psychotherapy	Depression ↓ immediately. ↑at FU	5
Doyle [53]	No	Yes	7 single case	N/A-own control	BMT	Reinforcement of quiet behaviour and stimulation	3/7 improved	5
Heard[54]	No	Yes	4 single cases	N/A- own control	BMT	Individual behavioural intervention programmes	Individualised interventions ↓wandering	5
Jozsvai[55]	No	Yes	1single case	N/A	BMT	Ttoken economy	↓ target behaviours but did not extinguish	5
Kipling [56]	No	Yes	3 own control	N/A	CBT	Group CBT	↓anxiety in all 3, ↑ mood in 2	5
Koder[57]	No	No	2 single cases	N/A	CBT	Anxiety management using CBT techniques	Mild behavioural change in both.	5
Lundervold [58]	No	No	1	N/A	BMT	applied behaviour analysis (using staff)	↓ aggressive episodes per month, restraint free 99% of time	5
Moniz- Cook [59]	No	No	5 single cases	N/A	BMT	Individualised functional analysis based on patient's earlier superstitions	↓ agitation/ aggression/refusal in all cases	5
Wisner [60]	No	Yes	1 own control	N/A	CBT	CBT (time out, anger management, self-monitoring by pt)	↓ "outbursts" during intervention. .	5

AUTHOR YEAR	RANDOMISATION	CONTROL	PATIENT/ CARER NUMBER	CONTROL NUMBER	THERAPEUTIC REGIME	OUTCOME	LEVEL OF EVIDENCE
Bourgeois[61]	Yes	Yes	7	7	BMT by training caregiver	Intervention group ↓ repetitive verbalisations compared to baseline.	4
Gormley[67]	Yes	Yes	43	28	BMT by training caregiver	No difference in aggression between groups post-intervention. Trend towards ↓ in behaviour management group	2b
Huang[69]	Yes	Yes	24	24	BMT by caregiver training programme	Intervention group had lower agitation scores	2b
Teri [70]	No	No	4	0	BMT - and increasing pleasant activity by caregiver	2 patients improved in depression scores. Increased pleasant events was associated with ↓ depression .	5
Teri [71]	Yes	Yes	41	36 on placebo and 71 on drugs	BMT by training caregivers. Controls given haloperidol or trazodone or placebo.	No difference in global outcome or agitation between groups..	1b
Teri[72]	Yes	Yes	76	77	BMT by training caregiver plus exercise	Participants ❋ depression vs control group No better at 2 years.	1b
Weiner[63]	Yes	Yes	17	21	BMT by training caregiver	psychotropic drugs✹ symptom frequency✹ after 12 months.	2b

Table 5 -Interventions with caregiver: Behavioural Management Therapy by training

Table 6 - Other interventions with caregivers

AUTHOR YEAR	RANDOMISATION	CONTROL	NUMBER		PATIENT/ CARER NUMBER	CONTROL	
THERAPEUTIC REGIME	OUTCOME	LEVEL OF EVIDENCE					
Burgener [74]	Yes	Yes	35	12	Education re dementia and teaching to change interaction	Disruptive behaviour✹ at 6 months	2b
Marriot [78]	Yes	Yes	14	28	BMT- by training caregiver	Significantly behaviour vs. control immediately but not at 3 months.	2b
Eloniemi-Sulkava [76]	Yes	Yes	43	43	Support for patients and carers (counselling, advocacy, training)	↓ institutionalisation during first three months. Benefit decreased with time.	1b
Ghatak[66]	No	Yes	20	20	Awareness, training problem solving intervention programme with carers	80% carers felt positive emotional outcomes on pt. Significant difference in patient behaviour (no figures reported).	4
Haupt[77]	No	Yes	14 -own controls		N/a	Manualised group intervention with carers (CBT, modelling, knowledge financial and social advice)	NPS ✹during intervention. Significant ↓ in pt anxiety and agitation pre- and post-intervention. 4
Herbert [68]	Yes	Yes	79	79	Psychoeducational group programme	Frequency of behaviour problems ↓ (trend toward sig)	2b
McCallion[62]	Yes	Yes	32	34	Family visit with feedback about interaction, education programme, carer groups and family conferences.	↓ depression, ideational disturbance and agitation during family visits and↓ pacing. Significant ↓ restraint use at 6/12	2b
Droes[64]	No	Yes	33	23	Integrated family support programme ↓ behavioural problems in family support group after 7 months. No effects on mood.		4
Ferris[65]	No	No	41	0	Family counselling sessions ↓ behavioural problems in patients.		4
Wells [75]	Yes	Yes	12	20	Educational programme on abilities-focused morning care	↓agitation in intervention group at 6 months	2b
Mittleman[80]	Yes	Yes	103	103	6 sessions psychoeducation, problem solving+ support groups	Time to placement was 329 days longer in treatment than control group	1b
Woods[73]	No	Yes	55	73	Specialist Admiral Nurse service	No differences between groups	2c

NPS- neuropsychiatric symptoms

Table 7 Music Therapy

[redacted]							
Ashida[79]	No	Yes	20	N/a	Group music therapy sessions	↓depressive symptoms during and after therapy. No lasting effect.	4
Brotons[81]	No	Yes	20	N/a	5 music therapy sessions	↓agitation during and after music therapy sessions.	5
Casby[82]	No	Yes	3	N/a	Classical or favourite music	↓disruptive vocalisation in 2.	4
Clair[83]	No	Yes	28	own control	No music, stimulating or sedative music	No significant ↓agitation	4
Clark[84]	Yes	Yes	19	own control	Preferred music during bathtime.	↓aggression during music	4
Denney[85]	No	Yes	9	N/a	Quiet music at mealtimes	↓Agitation during therapy.	4
Fitzgerald-Cloutier[86]	No	Yes	1	N/a	Either music therapy or reading sessions	↑ sitting time for singing vs reading (but no stats)	5
Gardiner[87]	No	Yes	2	N/a	Music therapy or reading sessions	↓ Disruptive behaviour during music session.	5
Gaebler[88]	No	Yes	6	N/a	reminiscence music therapy	Positive for 2/6	5
Gerdner[89]	No	Yes	5	N/a	Individual music therapy programme	↓agitation during, and in the hour after therapy	5
Gerdner[89]	Yes	Yes	39	39	Classical/ individualised music therapy for 6 weeks	Individualised therapy more↓ agitation(30 vs 10 mins)	2b
Goddaer[92]	No	Yes	29	N/a	Relaxing music followed by no intervention or vica-versa.	↓ agitated behaviours with music, ↑ when removed.	4

Groene[93]	Yes	Yes	? 30 in total	? 30 in total	2 reading + 5 music sessions or vica-versa	↑ sitting still during mostly music vs. mostly reading.	2b
Jennings [94]	No	Yes	17	N/a	Group music 30 mins weekly	↓Agitation after class	4
Korb [15]	Yes	Yes	10	N/a	30 minutes of music therapy- rhythm or singing x2 for 12 weeks or RT.	↑ mood for all music immediately after music compared to reminiscence	2b
Lindenmuth[95]	No	Yes	10	10	Played relaxing music as participants went to sleep	Improved sleep	4
Lord[88]	Yes	Yes	20	20/20	"Big Band" music, puzzle-play sessions, standard treatment	Music groups better in terms of mood and social interaction.	2b
Millard[96]	No	Yes	10	N/a	10 singing sessions (30 mins) x2 for 5 weeks vs discussion	↑talking in singing group during/immediately after group	4
Ragneskog[97]	No	Yes	20	N/a	Music during mealtimes	↓irritability and depression	4
Remington[98]	Yes	Yes	51	17	10 mins of calming music or hand massage/ one after another/ simultaneously	All ↓ agitation compared to control for 1 hour.	2b
Runci[99]	No	Yes	1	N/a	Language relevant intervention (music therapy and interaction in Italian)	↓ Disruptive vocalisations and ↑ talking when intervention in Italian	5
Sambandham[100]	No	No	19	0	Group music sessions, 1 hour X2 for 3 weeks	↑ quieter and more interaction.	5
Tabloski[101]	No	Yes	20	N/a	15 minutes of calming music following period of agitation	Significantly ↓ agitated behaviour during and post-music sessions	4
Thomas[102]	No	Yes	14	N/a	Individualised music played prior and during bathing	No ↓aggression	4

[redacted]

Baker[105]	Yes	Yes	31(half control)	?	8 x 1:1; twice weekly sessions of Snoezlen or general activity	↓ Socially disturbed behaviour in snoezelen group at home during period of treatment	2b
Baker [104]	Yes	Yes	25	25	Snoezlen or general activity sessions	Snoezelen group improved in mood and behaviour but did not last on one month follow-up	1b
Burgio [112]	No	Yes	13	own controls	Exposure to white noise audiotapes during agitation	Sig ↓ agitation during white noise tapes	4
Hope[108]	No	No	29	0	Exposure to multi-sensory environment	Positive mood when in room (no stats).	4
Kempenaar [115]	Yes	Yes	16	19	20 x 2 weekly therapist facilitated sensory stimulation-presentation of sounds, smells, taste, touch, sights.	No changes	4
Kim[111]	No	Yes	29	N/a own controls	Use of touch behaviour for 5.5 minutes for 10 days.	Improved behaviour during intervention and for 5 days afterwards	4
Remington [98]	Yes	Yes	51	17	Calming music or hand massage or one after another or both simultaneously for 10 minutes each	All experimental groups had ↓ agitation compared to control group. Effect lasted for one hour.	2b
Robichaud [109]	Yes	Yes	84	18	3 X 45 minute sessions of sensory integration for 10 weeks	No immediate significant ↓ disruptive behaviours	2b
Snyder [114]	No	Yes	19	N/a own controls	Hand massage, therapeutic touch or control in a cross-over design	No change in agitated behaviours	4
Spaull[106]	No	Yes	4	N/a own controls	Snoezelen	↓ challenging behaviours after sessions. No difference in wellbeing scores	5
Van Diepen[103]	Yes	Yes	5	5	8 x 1:1 , twice weekly snoezelen	Tendency for agitation scores to be lower in Snoezelen group	2b
Young [110]	Yes	Yes	8	N/a own controls	white noise played at night (either nights 5-8 or 9-12)	No immediate effect on sleep	2b
Wareing[107]	No	Yes	4	N/a own controls	3 x 3weekly		

Snoezelen session Behavioural rating improved for everyone and stayed improved for 3 weeks post-treatment. 5						
Whall [113]	No	Yes	15	16	Sounds of birds, brooks and small animals	
and large bright pictures during baths Agitation ↓significantly in treatment compared to control group 4						
Witucki[116]	No	Yes	15	N/a own controls	Sensory	
stimulation activities (touch, smell, music)↑ psychological well-being 4						

Table 8 Sensory stimulation

Author and year	Randomised	Control	Patient number	Control
number Therapeutic Regime	Outcome	Level of evidence		
Camberg [117]	Yes	Yes	19	18 placebo 18 usual
simulated presence therapy (SPT) for 17 days No difference in agitated or withdrawn behaviours. 2b				
Miller [118]	No	Yes	7	N/a Modification of simulated presence therapy. Audio tapes made by family members improved social interaction and attention-awareness following intervention during agitation. 4
Woods [119]	No	No	27	N/a SPT tapes played when pt displayed agitation improvements in social isolation, and agitation; no improvement in aggression 4
Woods [119]	No	Yes	9	N/a SPT tapes played twice during day Problem behaviours improved 91% of time 4
Peak [120]	No	Yes	4 single cases	N/a SPT tape played for 10 sessions Result for 4 cases inconsistent 5
Hall[121]	No	Yes	36	N/a Simulated presence using video tape Significant in positive behaviours during/ after video but no differences in agitated behaviour 4
Buettner [123]	Yes	Yes	?-35 (in total)	?-35 1 hour a day, 5 /7 small group discussion then 15 mins of biking. 10 week maintenance - accompanied biking twice a week Significant ↓ in depression at 10 week follow up group. No significant effects on agitation. 2b
Fitzsimmons[122]	Yes	Yes	29	30 Therapeutic recreation activities Significantly less agitation in activities group. 2b
Ishizaki[124]	No	Yes	14	11 Activity sessions at day centre once a week No change in depression 4
Kim[125]	No	No	13	0 Day care programme (individualised and group interventions) for 10 weeks Increase in agitation over 10 week period 4
Martichuski [126]	No	Yes	51	N/a Small group activities run by nurses assistants once a week No behaviour change. ↓ physical restraint use in all facilities.↓ psychotropic use in 7/20 patients 4
Sival[128]	No	Yes	3	N/a Wide variety of activities 1better, 1worse, 1 same 5
Snyder [127]	No	Yes	18	N/A-own control 20 minutes per day on the glider swing Immediate significant enjoyment. No change in aggression at 5 days 4
Lawton[124]	Yes	Yes	49	48 Activity programming, staff training, interdisciplinary care planning, family support No significant effects on behaviour. 2b
Panella[29]	No	No	69	0 RO, VT, family support, recreation therapy Reduced institutionalisation 4
Fitzgerald-Cloutier[86]	No	Yes	1	N/a Either music therapy or reading activity sessions Less time spent in repetitive motor activities 5
Gardiner[87]	No	Yes	2	N/a Music therapy or reading/book exploration sessions 1 improved, 1 did not 5
Lord[88]	Yes	Yes	20 (puzzle-play)	20 Music therapy, puzzle-play sessions, standard treatment No effect of puzzle play on behaviour. 2b
Baker[105]	Yes	Yes	31 (half control)	? MSS or general activity sessions No effect of activity on behaviour 2b

Table 9 Simulated presence therapy and therapeutic activities

Table 10 Other structured activity and alteration of visual environment

Author and year	Randomised	Control	Patient number	Control number	Therapeutic Regime	Outcome	Level of evidence
Cleary[138]	No	Yes	11	N/a-own control	Reduced stimulation unit, staff education	No ↓ agitation/ change in medication, but decreased restraint use.	4
Cott[133]	Yes	Yes	90	30	Walking/talking programme	No significant behaviour changes	1b
Gorzelle [131]	No	Yes	10	N/a- own control	Carers trained in Montessori activities	Significantly constructive engagement and pleasure. No change in NPS	**4**
Hopman-Rock [134]	Yes	Yes	72	62	Psychomotor activation programme	No overall effect on behaviour	2b
Holmberg [135]	No	Yes	11	own control	90 minutes volunteer led outdoor walking	No difference in aggressive incidents	4
Martichuski [127]	No	Yes	51	N/a- own control	Weekly small group activities run by nurses assistants	No behaviour changes. ↓ physical restraint in all facilities.↓ psychotropics 7/20 patients	4
Meyer[130]	No	Yes	11	N/A	Quiet week intervention	↓agitation during week	4
Namazi[144]	No	Yes	11	11	Exercise/movement program daily for 40 mins for 4 weeks	Significant ↓ in agitation in exercise group.	4
Okawa[137]	No	No	24	8	Enforced social activity with nurses, 3hrs a day	↓ behavioural problems in 30% of sample	5
Orsulic-Jeras[136]	Partial	Yes	13	12	Montessori activities (group and individual)	No differences in depression or agitation.	4
Cohen-Mansfield[146]	No	Yes	27	N/A	Design of internal corridors in NH	No significant↓ aggression/agitation	4
Dickinson[143]	No	Yes	7	N/a	Blinds and cloth barriers used to cover doors/windows	↓number of exit attempts	4
Hanley[149]	No	Yes-own control	6	N/a	signposting, signposting + training	Signposting not effective. Signposting +training, improvements for all pts. 2/4 continued at 3 month	5
Hewawasam [139]	No	Yes	10	N/a	2 dimensional grid pattern by door of ward	Horizontal grid pattern most effective. All patients ↓door contacts with use of grid.	4
Hussain[145]	No	Yes	5	N/a	Verbal/physical prompts to focus attention on cues/signposts	Problem behaviours were reduced in all patients during intervention period	5
Hussain[141]	No	Yes	8	N/a	2 dimensional grid pattern by door of ward	7/8 patients ↓ambulation when grids used. 8 horizontal lines was most effective	4
Kincaid[142]	No	Yes	12	N/a	Wall mural painted over walls/doors of ward	Significantly❋ door testings with mural.	4
Kittur[147]	No	Yes	2	N/a	Removing mirrors	↓agitation for 1 week in 1.	5
Mayer[148]	No	Yes	9	N/a	Full-length mirror placed in front of door	Significant ↓ in door contacts when mirror used.	4
Namazi[144]	No	Yes	9	N/a	9 visual barriers tried (grids, door knob cover, barriers)	Cloth covering door/ door handle was most effective	4
Williams[150]	No	Yes	5	5	Environmental changes in ward (e.g. signposting) and informal RO with staff	Significant in behaviour on intervention ward compared to control group	4

Table 11 Other environmental manipulation and staff education

Author and year	Randomised	Control	Patient number	Control number	Therapeutic Regime	Outcome	Level of evidence
Annerstedt[153]	No	Yes	28	29	Designed environment (Group Living-GL)	At 1 yr, ↓aggression, anxiety and depression in GL. Lower costs and ↓neuroleptics. No difference at 3 years	4
Annerstedt[154]	No	Yes	28	28	Designed environment (Group Living)	↓institutionalisation, slight ↓in anxiety/depression. GL.↑aggression but less than control group	4

Bianchetti[155]	No	No	17	0	Designed environment	Significant ↓ in behavioural problems, psychotropics, physical restraints at 6/12	4	
Namazi[157]	No	No	32	0	Doors unlocked for 3 hour periods	↓ negative, aggressive behaviours, wandering when door unlocked	4	
Wells[152]	Yes	Yes	12	10	Specialised design	No differences in problem behaviours in pts.	2b	
Wimo[156]	No	Yes	46	62	Group living	Significantly behavioural disturbances in GL group vs controls at 6 and 9 months. Aggression significantly ↑in GL group after 6 and 12 months)	4	
Benson[162]	No	Yes	32	N/a (own controls)	Specialised care plans for each pt, education for nurses, family support and education	Emotional and mental status significantly at 12 months. quality of life	4	
Brane[165]	No	Yes	17	19	Staff training in integrity promoting care	Improved anxiety and depressed mood in treatment group	4	
Cohen-Mansfield[166]	No	Yes	103 (staff)	N/a (own controls)	Training programme for nursing staff	No change in agitation or mood. Significant ↑ in restraint at FU	4	
Edberg[163]	No	Yes	11	11	Staff training, individualised care plans, clinical supervision	No difference between control and experimental group	4	
Hagen[161]	No	Yes	171 (carers)	N/a	Staff education programme	Significant ↓ aggression directed towards staff 2 weeks after programme	4	
Matthews [164]	No	Yes	33	N/a (own controls)	Staff educated to provide client centred care re agitation and sleep	Significantly ↓ verbal agitation 6-8 weeks post-intervention. Other agitated behaviours. Sleep✹	4	
McCallion [168]	Yes	Yes	49 NA	56 nursing assistants	Manualised course for nursing assistants	Significant ↓ disturbance and aggression at 3/12 and ↓ in depression at 6/12. Restraint use✹	1b	
Schrijnemaekers[159]	Yes	Yes	77	74	Training in emotion focussed care	No difference between groups at 3, 6 and 12/12.	2b	
Testad [160]	Yes	Yes	140	140	Staff education programme	↓ restraint use in treatment group. Agitation score✹ post-intervention	2b	

GL=group living

Table 12: Combined staff education and environmental interventions

Author and year	Randomised		Control	Patient number	Control number	
Therapeutic Regime			Outcome	Level of evidence		
Annerstedt [168]	No	Yes	28	31	designed environment and staff training	6 months emotional functioning ↑, no difference at 12 months. ↑ medication in control group. Less costly	3
Bellelli [169]	No	No	55	0	designed environment, staff training, activity provision	↓behavioural disturbance (NPI), especially agitation and aberrant motor behaviour in SCU care at 6/12 follow-up. ↓neuroleptic medication usage.	4
Chafetz [174]	No	Yes	12	8	SCU care with designed environment, staff training, family involvement	No difference in problem behaviour at 15 month follow-up	4
Frisoni [170]	No	Yes	31	35	SCU care with designed environment, staff training, family involvement	❋NPS in both groups after 3 months. ↓depression in SCU, improvement in psychotic symptoms. Physical restraints✹ (↑in control)	3
Kovach[171]	No	Yes	22	N/a	Lived in a specialist dementia care unit, staff training	Significantly ↓in behavioural problems at time 2 (not clear when). Biggest ↓ was in activity disturbance and aggression.	4
Morgan [168]	No	Yes	52	11	Low density SCU	↓ in disruptive behaviour in low density group at one year	3
Warren [173]	No	Yes	44	36	Admission to SCU	Behavioural and depression scores did not significantly change for SCU residents at 18 months	3
Webber [172]	No	Yes	22	?	Specialised design, staffing and activity programming	No significant differences between SCU and standard care in terms of neuropsychiatric symptoms at 6/12	4

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