

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.

Background

The neuropsychiatric symptoms of dementia (NPS) include signs and symptoms of disturbed perception, thought, mood or behaviour¹. 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 efficacy⁸⁻¹⁰. 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 checklists¹¹. 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 interventions¹²⁻¹⁶. 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 VT¹⁷; the second used 5 patients as their own controls and reported similar results¹⁸. An RCT compared VCT to usual care or a social contact group in 88 DP¹⁹. 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 orientation²⁵. 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 order²⁰. 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 CST³¹⁻³⁴ 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 psychotherapy. 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 DP³⁷⁻⁶¹(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-up⁴⁴. 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"

behaviour⁴¹. 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 frequency⁶⁴. The second RCT reported that exercise and BMT led to significant improvements in depression at 3 months but not at 2 years⁷³. 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 stressors⁷⁰. 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 years⁷⁷. 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 study⁷⁵. 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 months⁷⁶. Finally a level 1 study of a comprehensive support and counselling intervention for spouse caregivers⁸⁰ 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 study⁶⁶. A family support group in a non-RCT showed decrease in problem behaviour but not in depression⁶⁵.

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 institutionalisation⁷⁴. **The 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 results⁸⁹. 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 intervention⁹⁹. All but one of the other studies¹⁰¹ were controlled. Most of them found a benefit although some did not⁸⁴. **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 results¹⁰⁴. 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 statistics¹⁰⁹. **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 music⁹⁹. 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 behaviour¹¹⁰. Similarly, a small RCT of white noise for sleep disturbance and nocturnal wandering found no effect¹¹¹. 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 intervention¹¹². White noise tapes led to immediate decrease in agitation¹¹³. 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 bathing¹¹⁴. The other single case study found no difference in agitation before and after using therapeutic touch or massage¹¹⁵. The final two studies used several forms of sensory stimulation involving touch, smell and taste; a small RCT reported no change¹¹⁶ while the other study found the intervention helpful¹¹⁷. 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 audiotope made by family or surrogate. One RCT found no change in agitated or withdrawn behaviours¹¹⁸. Staff observations suggested reduced agitation compared to placebo but not compared to usual care¹¹⁸. A small study found improved social interaction and attention¹¹⁹. When SPT was used for agitation it led to significant decreases in agitation, improved social interaction, but no change in aggressive behaviours¹²⁰. When SPT was used regularly, problem behaviours were reduced by 91%. Finally in a series of single case studies, Peak et al¹²¹ 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 seen¹²². **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 agitation¹²³. Another reported that discussion and being carried on a bicycle pedalled by volunteers alleviated depression, but not agitation at 10 weeks¹²⁴. The third of puzzle-play found no change in social interaction and mood⁸⁹. 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. Ishizaki¹²⁶ 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-weeks¹²⁷. A controlled non-RCT of weekly activity groups run by nursing assistants, reported no behavioural changes¹²⁸. 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 care³⁰. Rocking people on a swing did not decrease aggression¹²⁹. Three case studies of diverse group activities (games, music, exercise, socialising) found equivocal effects on behaviour¹³⁰. Two studies used reading

sessions as an intervention and found that, in the first, some improvement in wandering was seen⁸⁷; in the second, it decreased disruptive behaviours in two people both during and one week after the intervention⁸⁸. 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 agitation¹³¹⁻¹³³. 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 behaviour¹³⁴. An RCT of a psychomotor activation programme found that no behavioural effect¹³⁵. The other two studies were non-RCTs. One, comparing 11 patients with themselves, found a significant reduction in aggressive behaviours on walking group days¹³⁶. The second was a small matched controlled group of exercise groups and led to no significant reduction in agitated behaviours¹³⁷. **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 sample¹³⁸. **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 intervention¹³¹. 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 use¹³⁹. **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 behaviours¹⁴⁰. 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 doorways¹⁴³. 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 significant¹⁴⁷. 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 environment¹⁴⁸. Placing a full-length mirror over the doorway led to a significant decrease in exiting during the intervention for 9 patients¹⁴⁹. 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 residents¹⁴⁶. **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 GL¹⁵² 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 use¹⁵⁵. However, in another study NPS significantly *increased* with GL compared to controls at 6 months and one year¹⁵⁶. 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 open¹⁵⁷. **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 months¹⁵⁸. Education of staff to implement an emotion-focused care programme (validation, reminiscence, sensory stimulation) led to no change in any NPS¹⁵⁹. Staff education programmes, focusing on knowledge of dementia and potential management strategies, reduced physical restraint use¹⁶⁰ and (a non- RCT) decreased aggressive behaviours towards staff¹⁶¹. Specialised care programmes for individuals in a residential home plus staff education improved emotional status and QOL for residents 12 months later¹⁶². A similar approach in a controlled trial with only 11 people in each arm, led to non-significant differences favouring the intervention group¹⁶³. 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 increased¹⁶⁴. 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 trial¹⁶⁵. A large uncontrolled trial of a training day for nursing staff using non-standardised observational outcomes led to an increase in restraint use but had no effect on agitated behaviour¹⁶⁶. **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 behaviour¹⁶⁷. 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 care¹⁷¹. However, three other studies found no effect¹⁷²⁻¹⁷⁴. **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	Improved behaviour at 6 months follow up in group who received RO then RT vs other groups- sig not given.	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	improvement in carer rated mood in intervention group at 2 months	4	Sig
Korb ¹⁵	Yes	Yes	10	10 (own control)	8 sessions of reminiscence therapy	Reminiscence Therapy	Reminiscence had no effect on mood	2b	
Morton ¹⁸	No	Yes	5	single cases	N/a	Validation Therapy	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	Validation Therapy	group sessions	No change in depression, psychotropics or restraint use in VT.	2b
Babins ¹⁷	No	Yes	5	?	Validation Therapy	Validation Therapy	group work	↑verbal interaction post-VT group for 2/3 Ss. No change on behaviour rating scales	5
								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)?		depression in RO group			Reality orientation RO group ↓
Brook ²¹		No	Yes	9	9	showed ↑ on non- standard social functioning scale.			Reality Orientation RO group sessions experimental groups 3b
Greene ²³		No	Yes	20	N/a	Significant ↑ in mood of patients at the end of the orientation phase			Reality Orientation RO, 2 x 30 min sessions 2-3 days a week 4
Greene ²²		No	Yes	3 single cases	N/a	behaviour (type not specified)			Reality Orientation RO sessions some ↑ in 5
Hanley ²⁴		Yes	Yes	28	29	behavioural change in either group			Reality Orientation Classroom RO, ward orientation training No 2b
Ishizaki ²⁵		No	No	6	0	for 3 months ↑ in conversation,			Reality Orientation RO group sessions, 3 hours/week 4
Johnson ²⁶		No	Yes	75	23	classroom RO, individual RO			Reality Orientation standard classroom RO, 2x daily All groups showed same improved in non-standardised scores. Not clear what. 4
Metitieri ²⁷		No	Yes	46	28	pts remained at home significantly longer.			Reality Orientation RO sessions (8 - 40 weeks) RO 4
Reeve ²⁸		No	Yes	10	8	environmental manipulation			Reality Orientation classroom RO, modified informal RO, 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	5 half hour sessions	No sig deterioration in intervention group				4
Quayhagen ³⁰	Yes	Yes	25	28 (placebo - passive activity)	25 (control)	
	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					2b
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-maintenance 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	CONTROL	PATIENT NUMBER	CONTROL	CONTROL	
	TYPE OF INTERVENTION		THERAPEUTIC REGIME	OUTCOME		
	LEVEL OF EVIDENCE					
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					
Hoeffler 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 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
Hear ⁵⁴	No	Yes	4 single cases	N/A	own control	BMT Individual behavioural intervention programmes	Individualised interventions ↓ wandering 5
Jozsvaj ⁵⁵	No	Yes	1 single case	N/A		BMT Token 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/ CAREGIVER NUMBER	CONTROL NUMBER	THERAPEUTIC REGIME	OUTCOME	LEVEL OF EVIDENCE
Bourgeois ⁶¹	Yes	Yes	7	7	BMT by training	Intervention group ↓ repetitive verbalisations compared to baseline.	4
Gormley ⁶⁷	Yes	Yes	43	28	BMT by training	No difference in aggression between groups post-intervention. Trend towards ↓ in behaviour management group	2b
Huang ⁶⁹	Yes	Yes	24	24	BMT by caregiver	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	Participants * depression vs control group	No better at 2 years. 1b
Weiner ⁶³	Yes	Yes	17	21	BMT by training	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	behaviour vs. control immediately but not at 3 months.	Significantly 2b
Eloniemi-Sulkava ⁷⁶	Yes	Yes	43	43	and carers (counselling, advocacy, training)	decreased with time.	↓ institutionalisation during first three months. Benefit 1b
Ghatak ⁶⁶	No	Yes	20	20	Awareness, training	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) 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.	ideational disturbance and agitation during family visits and ↓ pacing. Significant ↓ restraint use at 6/12	↓ depression, 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	differences between groups	2c No

Table 7 Music Therapy

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

Groene ⁹³	Yes	Yes	? 30 in total	? 30 in total	2 reading + 5 music sessions or vica-versa	2b	
Jennings ⁹⁴	No	Yes	17	N/a	Group music 30 mins weekly	↓Agitation after class	
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	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	↑
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	↓aggression	4
Baker ¹⁰⁵	Yes	Yes	31(half control)	?	twice weekly sessions of Snoezlen or general activity	8 x 1:1; ↓ 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
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
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
Spaull ¹⁰⁶	No	Yes	4		N/a own controls	Snoezelen	↓ challenging behaviours after sessions. No difference in wellbeing scores
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
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	1 better, 1 worse, 1 same	5
Snyder ¹²⁷	No	Yes	18	N/A	own control	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		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	therapy, puzzle-play sessions, standard treatment	No effect of puzzle play on behaviour.
							2b
Baker ¹⁰⁵	Yes	Yes	31	(half control)	?	general activity sessions	No effect of activity on behaviour
							MSS or 2b

Table 9 Simulated presence therapy and therapeutic activities

Table 10 Other structured activity and alteration of visual environment

Author and year number	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 ¹³⁸	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.	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	10	3 (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
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.
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
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)
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.
Morgan ¹⁶⁸	No	Yes	52	11	Low density SCU ↓ in disruptive behaviour in low density group at one year
Warren ¹⁷³	No	Yes	44	36	Admission to SCU Behavioural and depression scores did not significantly change for SCU residents at 18 months
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

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