

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 behaviour<sup>1</sup>. Clinically significant NPS are found in about a third of dementia patients (DP) with mild impairment, two thirds with more severe impairment<sup>2,3</sup> and even more in residential care<sup>4,5</sup>. NPS contributes significantly to caregiver burden, institutionalisation,<sup>6</sup> and decreased quality of life (QOL) for DP.<sup>7</sup>

Psychotropic medications are often prescribed for NPS but there are concerns about their safety and efficacy<sup>8-10</sup>. 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<sup>11</sup>. 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<sup>12-16</sup>. 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<sup>17</sup>; the second used 5 patients as their own controls and reported similar results<sup>18</sup>. An RCT compared VCT to usual care or a social contact group in 88 DP<sup>19</sup>. 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<sup>20-26;26;27;27;28;28;29;29;30</sup>. The strongest RCT with 57 participants showed no immediate benefit when compared to active ward orientation<sup>25</sup>. 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<sup>20</sup>. 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<sup>31-34</sup> 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<sup>33;34</sup>. 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<sup>35;36</sup>. 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 DP<sup>37-61</sup>(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<sup>44</sup>. 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<sup>38;43</sup>. 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)<sup>37</sup>. The second used token economy (TE) in severe dementia and was ineffective in reducing "bizarre"

behaviour<sup>41</sup>. 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<sup>62;63;63-73;74-80</sup>. Seven involve training the caregiver to use BMT (Table 5). The first RCT<sup>72;73</sup> 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<sup>64</sup>. The second RCT reported that exercise and BMT led to significant improvements in depression at 3 months but not at 2 years<sup>73</sup>. 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<sup>70</sup>. 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<sup>63;69;79</sup>. 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<sup>77</sup>. 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<sup>75</sup>. 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<sup>76</sup>. Finally a level 1 study of a comprehensive support and counselling intervention for spouse caregivers<sup>80</sup> 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<sup>67;78</sup>. **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<sup>66</sup>. A family support group in a non-RCT showed decrease in problem behaviour but not in depression<sup>65</sup>.

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<sup>74</sup>. **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<sup>15;15;81-91;91-103</sup>, six were RCTs<sup>85;15;89;91;94;99</sup>. 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<sup>85;94</sup>. In three studies, behavioural change was observed outside the MT session. In the first,<sup>91</sup> 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<sup>89</sup>. 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<sup>99</sup>. All but one of the other studies<sup>101</sup> were controlled. Most of them found a benefit although some did not<sup>84</sup>. **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<sup>104</sup>. 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<sup>105;106</sup>. The other reports were a series of single case study RCTs<sup>105;107;108</sup> and an uncontrolled trial which reported improvements but gave no statistics<sup>109</sup>. **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<sup>99</sup>. 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<sup>110</sup>. Similarly, a small RCT of white noise for sleep disturbance and nocturnal wandering found no effect<sup>111</sup>. 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<sup>112</sup>. White noise tapes led to immediate decrease in agitation<sup>113</sup>. 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<sup>114</sup>. The other single case study found no difference in agitation before and after using therapeutic touch or massage<sup>115</sup>. The final two studies used several forms of sensory stimulation involving touch, smell and taste; a small RCT reported no change<sup>116</sup> while the other study found the intervention helpful<sup>117</sup>. 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 behaviours<sup>118</sup>. Staff observations suggested reduced agitation compared to placebo but not compared to usual care<sup>118</sup>. A small study found improved social interaction and attention<sup>119</sup>. When SPT was used for agitation it led to significant decreases in agitation, improved social interaction, but no change in aggressive behaviours<sup>120</sup>. When SPT was used regularly, problem behaviours were reduced by 91%. Finally in a series of single case studies, Peak et al<sup>121</sup> 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<sup>122</sup>. **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<sup>123</sup>. Another reported that discussion and being carried on a bicycle pedalled by volunteers alleviated depression, but not agitation at 10 weeks<sup>124</sup>. The third of puzzle-play found no change in social interaction and mood<sup>89</sup>. Similarly, a comparison of games and puzzle play with Snoezelen, and another of structured activity, found that mood and behaviour was not improved<sup>105;125</sup>. The other studies of TA were non-RCTs. Ishizaki<sup>126</sup> 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<sup>127</sup>. A controlled non-RCT of weekly activity groups run by nursing assistants, reported no behavioural changes<sup>128</sup>. 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<sup>30</sup>. Rocking people on a swing did not decrease aggression<sup>129</sup>. Three case studies of diverse group activities (games, music, exercise, socialising) found equivocal effects on behaviour<sup>130</sup>. Two studies used reading

sessions as an intervention and found that, in the first, some improvement in wandering was seen<sup>87</sup>; in the second, it decreased disruptive behaviours in two people both during and one week after the intervention<sup>88</sup>. 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<sup>131-133</sup>. 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<sup>134</sup>. An RCT of a psychomotor activation programme found that no behavioural effect<sup>135</sup>. The other two studies were non-RCTs. One, comparing 11 patients with themselves, found a significant reduction in aggressive behaviours on walking group days<sup>136</sup>. The second was a small matched controlled group of exercise groups and led to no significant reduction in agitated behaviours<sup>137</sup>. **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<sup>138</sup>. **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<sup>131</sup>. 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<sup>139</sup>. **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<sup>140</sup>. Two studies using a horizontal grid pattern, however, reported a significant decrease in attempts to open doors and reduced ambulation<sup>141,142</sup>. Similar results were found using a mural painted over doorways<sup>143</sup>. 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<sup>144,145;146</sup>. Enhancing the visual environment in a selected area of a residential home was associated with decreased agitated behaviours although this was not significant<sup>147</sup>. 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<sup>148</sup>. Placing a full-length mirror over the doorway led to a significant decrease in exiting during the intervention for 9 patients<sup>149</sup>. 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<sup>25;25;150;151</sup>. Signposts used alongside prompts to draw attention to them led to a reduction in NPS in all 5 residents<sup>146</sup>. **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<sup>152</sup> 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<sup>153;154</sup>. 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<sup>155</sup>. However, in another study NPS significantly *increased* with GL compared to controls at 6 months and one year<sup>156</sup>. 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<sup>157</sup>. **GR is D**.

### Staff education in managing behavioural problems (Table 11)

Nine studies investigated staff education for NPS. Three were RCTs<sup>158;158-160</sup>. 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<sup>158</sup>. Education of staff to implement an emotion-focused care programme (validation, reminiscence, sensory stimulation) led to no change in any NPS<sup>159</sup>. Staff education programmes, focusing on knowledge of dementia and potential management strategies, reduced physical restraint use<sup>160</sup> and (a non- RCT) decreased aggressive behaviours towards staff<sup>161</sup>. Specialised care programmes for individuals in a residential home plus staff education improved emotional status and QOL for residents 12 months later<sup>162</sup>. A similar approach in a controlled trial with only 11 people in each arm, led to non-significant differences favouring the intervention group<sup>163</sup>. 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<sup>164</sup>. 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<sup>165</sup>. 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 behaviour<sup>166</sup>. **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<sup>167</sup>. 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<sup>168;168</sup>. SCU care was associated with decreased NPS, especially agitation and depression and with reduction in neuroleptic medication usage<sup>169;170</sup>. Aggression

and activity disturbances were improved in a small controlled trial of SCU care<sup>171</sup>. However, three other studies found no effect<sup>172-174</sup>. **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 <sup>11</sup>    |      | No            | Yes     | 25                                    | ?                                  | Reminiscence Therapy                      | RT, Group activities or unstructured time                         | RT group ↑wellbeing (?immediately)  | 4                              |
| Baines <sup>13</sup>     | 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 <sup>14</sup> | 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 <sup>16</sup>     | No   | Yes           | 11      | 11                                    | Reminiscence therapy               | Reminiscence by life review               | improvement in carer rated mood in intervention group at 2 months | 4   | Sig                            |
| Korb <sup>15</sup>       | Yes  | Yes           | 10      | 10 (own control)                      | 8 sessions of reminiscence therapy | Reminiscence Therapy                      | Reminiscence had no effect on mood                                | 2b  |                                |
| Morton <sup>18</sup>     | 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 <sup>19</sup>   | 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 <sup>17</sup>     | No   | Yes           | 5       | ?                                     | Validation Therapy                 | 22 VT sessions                            | slowing of deterioration  | 4   | ↑ irritability scores, general |

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 <sup>20</sup>  |      | No            | Yes            | 23 (half control)? |                | depression in RO group   |                    | 4       | Reality orientation RO group ↓   |
| Brook <sup>21</sup>     | No   | Yes           | 9              | 9                  |                | showed ↑ on non- standard social functioning scale.                        |                    | 3b      | Reality Orientation RO group sessions experimental groups  |
| Greene <sup>23</sup>    | No   | Yes           | 20             | N/a                |                | week Significant ↑ in mood of patients at the end of the orientation phase |                    | 4       | Reality Orientation RO, 2 x 30 min sessions 2-3 days a week  |
| Greene <sup>22</sup>    | No   | Yes           | 3 single cases | N/a                |                | behaviour (type not specified)   |                    | 5       | Reality Orientation RO sessions some ↑ in  |
| Hanley <sup>24</sup>    | Yes  | Yes           | 28             | 29                 |                | behavioural change in either group   |                    | 2b      | Reality Orientation Classroom RO, ward orientation training No   |
| Ishizaki <sup>25</sup>  | No   | No            | 6              | 0                  |                | for 3 months ↑ in conversation,  |                    | 4       | Reality Orientation RO group sessions, 3 hours/week  |
| Johnson <sup>26</sup>   | No   | Yes           | 75             | 23                 |                | classroom RO, individual RO  |                    | 4       | Reality Orientation standard classroom RO, 2x daily  |
| Metitieri <sup>27</sup> | No   | Yes           | 46             | 28                 |                | pts remained at home significantly longer.                                 |                    | 4       | Reality Orientation RO sessions (8 - 40 weeks) RO  |
| Reeve <sup>28</sup>     | No   | Yes           | 10             | 8                  |                | environmental manipulation   |                    | 4       | 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 |

RO= reality orientation



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

| Author Year<br>number<br>evidence     | Randomisation<br>Type of intervention    | Control<br>Therapeutic regime   | Patient number<br>Outcome   | Control<br>Level of                                   |
|---------------------------------------|--|---|---|---|
| Mitchell <sup>29</sup><br>Instruction | Yes<br>5 half hour sessions              | Yes<br>No sig deterioration in intervention group   | 15<br>15  | Individualised Special<br>4                           |
| Quayhagen <sup>30</sup>               | Yes<br>Cognitive Stimulation Therapy     | Yes<br>Experimental and placebo group had ↓behavioural problems at all time points than control group. Return to baseline by 9 month FU | 25<br>28 (placebo - passive activity)                                     | 25 (control)<br>12 weekly in-home sessions. CST<br>2b |
| Quayhagen <sup>31</sup><br>(day care) | Yes<br>15                                | Yes<br>Cognitive Stimulation  | 88 total = 21 (CS), 29 (counselling), 22 (seminar)<br>8 week RO programme | 16<br>? No  |
| Romero <sup>35</sup>                  | No<br>week inpatient programme           | Yes<br>Significant ↓ in depression and behavioural symptoms   | 43  | N/A<br>Self- maintenance therapy<br>3                 |
| Spector <sup>32</sup>                 | Yes<br>15 sessions cognitive stimulation | Yes<br>significant ↓ in depression  | 17  | 10<br>Cognitive Stimulation Therapy<br>2b             |
| Spector <sup>33</sup>                 | Yes<br>14 cognitive stimulation sessions | Yes<br>↑ QoL (more in women than men)   | 115   | 86<br>Cognitive Stimulation Therapy<br>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         | CONTROL            |
|------------------------|---|---------|--------------------|-------------------------------------|-----------------|--------------------|
|                        | TYPE OF INTERVENTION  |         | THERAPEUTIC REGIME | OUTCOME                             |                 |                    |
|                        | LEVEL OF EVIDENCE   |         |                    |                                     |                 |                    |
| Beck <sup>36</sup>     | Yes   | Yes     | 89                 | 54 (30 placebo, 24 no intervention) |                 |                    |
|                        | BMT Behavioural intervention during ADL or activity or both<br>No reduction in disruptive behaviour. 2b   |         |                    |                                     |                 |                    |
| Benedict <sup>37</sup> | Yes   | Yes     | 8                  | 7                                   | BMT/ Supportive |                    |
| psychotherapy          | Education, social skills training, identification of abnormal behaviour<br>BMT ↓ social aggression and disinhibition. No effect on depression<br>2b |         |                    |                                     |                 |                    |
| DeYoung <sup>38</sup>  | No  | Yes     | 32 own control     | N/A                                 | BMT             |                    |
|                        | Behaviour management unit with behaviour management programme<br>↓ aggressive, agitated or disruptive behaviours at 6/12. 4                         |         |                    |                                     |                 |                    |
| Hoeffler <sup>39</sup> | No  | Yes     | 10 own control     | N/A                                 | BMT             |                    |
|                        | Functional analysis of bathing and person centred bathing ↓ aggression<br>4   |         |                    |                                     |                 |                    |
| Mishara <sup>40</sup>  | Partial   | Yes     | 40                 | 40                                  | BMT             | 1 ward token       |
|                        | economy system, 1 general milieu ↓ bizarre behaviours after 6 months in non-BMT group<br>2b   |         |                    |                                     |                 |                    |
| Rogers <sup>41</sup>   | No  | Yes     | 84                 | N/a                                 | BMT             | Usual care, skill  |
|                        | elicitation, habit training for ADL tasks (dressing) Significant ↓ in agitation scores<br>compared to usual care 4                                  |         |                    |                                     |                 |                    |
| Suhr <sup>42</sup>     | Yes   | Yes     | 17                 | 17                                  | BMT             | Progressive        |
|                        | muscle relaxation Significant ↓ behavioural symptoms compared to usual care<br>2b   |         |                    |                                     |                 |                    |
| Teri <sup>43,44</sup>  | Yes   | Yes     | 42                 | 30                                  | BMT             | BT pleasant events |
|                        | (pt & carer, manualised), or BT problem-solving (carer only) Significant ↓ depression for<br>both groups immediately and at 6 month follow-up. 1b   |         |                    |                                     |                 |                    |
| Welden <sup>45</sup>   | 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 <sup>46</sup> | No   | No            | 1              | N/A own control  | BMT            | Sexually disinhibited behaviour disappeared   | Written cue with spaced retrieval                  | 5       |                   |
| Bakke <sup>47</sup>       | No   | Yes           | 1              | N/A own control  | CBT            | reinforcement ↓ agitation during intervention period.   | Functional analysis of behaviour, then behavioural | 5       |                   |
| Birchmore <sup>48</sup>   | No   | Yes           | 1              | N/a own control  | BMT            | ↓ time spent vocalising during treatment  | behavioural programme to reduce shouting           | 5       |                   |
| Bird <sup>49</sup>        | No   | Yes           | 5 single cases | N/A own control  | BMT            | cues & spaced retrieval 4 out of 5 showed "adaptive behaviour change". Effects not long-lasting | Individualised programmes using fading             | 5       |                   |
| Boehm <sup>50</sup>       | No   | Yes           | 2 single cases | N/A own control  | BMT            | aggressive behaviours   | Behavioural reinforcement                          | 5       | ↓                 |
| Buchanan <sup>51</sup>    | No   | Yes           | 2 single cases | N/A own control  | BMT            | vocalisations followed by NCR   | Functional assessment of disruptive                | 5       |                   |
| Carpenter <sup>52</sup>   | No   | Yes           | 3              | N/A- own control | BMT            | mobilise REM/ psychotherapy   | 16 sessions of Restore-empower-                    | 5       |                   |
| Doyle <sup>53</sup>       | No   | Yes           | 7 single case  | N/A-own control  | BMT            | stimulation 3/7 improved  | Reinforcement of quiet behaviour and               | 5       |                   |
| Hear <sup>54</sup>        | No   | Yes           | 4 single cases | N/A- own control | BMT            | programmes Individualised interventions ↓ wandering   | Individual behavioural intervention                | 5       |                   |
| Jozsvaj <sup>55</sup>     | No   | Yes           | 1 single case  | N/A              | BMT            | but did not extinguish  | Token economy ↓ target behaviours                  | 5       |                   |
| Kipling <sup>56</sup>     | No   | Yes           | 3 own control  | N/A              | CBT            | Group CBT   | ↓ anxiety in all 3, ↑ mood in 2                    | 5       |                   |
| Koder <sup>57</sup>       | No   | No            | 2 single cases | N/A              | CBT            | behavioural change in both.   | Anxiety management using CBT techniques            | 5       | Mild              |
| Lundervold <sup>58</sup>  | No   | No            | 1              | N/A              | BMT            | aggressive episodes per month, restraint free 99% of time                                       | applied behaviour analysis (using staff)           | 5       | ↓                 |
| Moniz- Cook <sup>59</sup> | No   | No            | 5 single cases | N/A              | BMT            | patient's earlier superstitions ↓ agitation/ aggression/refusal in all cases                    | Individualised functional analysis based on        | 5       |                   |
| Wisner <sup>60</sup>      | No   | Yes           | 1 own control  | N/A              | CBT            | monitoring by pt) ↓ "outbursts" during intervention.  | CBT (time out, anger management, self-             | 5       |                   |

| AUTHOR                  | YEAR | RANDOMISATION | CONTROL NUMBER | PATIENT/ CARER NUMBER | THERAPEUTIC REGIME            | OUTCOME   | LEVEL OF EVIDENCE      |
|-------------------------|------|---------------|----------------|-----------------------|-------------------------------|---|------------------------|
| Bourgeois <sup>61</sup> |      | Yes           | Yes            | 7                     | 7                             | caregiver Intervention group ↓ repetitive verbalisations compared to baseline.  | BMT by training 4      |
| Gormley <sup>67</sup>   |      | Yes           | Yes            | 43                    | 28                            | caregiver No difference in aggression between groups post-intervention. Trend towards ↓ in behaviour management group                         | BMT by training 2b     |
| Huang <sup>69</sup>     |      | Yes           | Yes            | 24                    | 24                            | training programme Intervention group had lower agitation scores  | BMT by caregiver 2b    |
| Teri <sup>70</sup>      |      | No            | No             | 4                     | 0                             | pleasant activity by caregiver 2 patients improved in depression scores. Increased pleasant events was associated with ↓ depression.          | BMT - and increasing 5 |
| Teri <sup>71</sup>      |      | Yes           | Yes            | 41                    | 36 on placebo and 71 on drugs | placebo. BMT by training caregivers. Controls given haloperidol or trazodone or No difference in global outcome or agitation between groups.. | 1b                     |
| Teri <sup>72</sup>      |      | Yes           | Yes            | 76                    | 77                            | caregiver plus exercise years. Participants * depression vs control group No better at 2  | BMT by training 1b     |
| Weiner <sup>63</sup>    |      | Yes           | Yes            | 17                    | 21                            | caregiver psychotropic drugs* symptom frequency* after 12 months.   | BMT by training 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 <sup>74</sup>         | Yes           | Yes            | 35                    | 12           | Education re dementia and teaching to change interaction  | Disruptive behaviour* at 6 months   | 2b  |   |
| Marriot <sup>78</sup>          | Yes           | Yes            | 14                    | 28           | BMT- by training caregiver  | behaviour vs. control immediately but not at 3 months.  | Significantly 2b  |   |
| Eloniemi-Sulkava <sup>76</sup> | Yes           | Yes            | 43                    | 43           | and carers (counselling, advocacy, training)  | decreased with time.  | 1b  |   |
| Ghatak <sup>66</sup>           | 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 <sup>77</sup>            | No            | Yes            | 14                    | own controls | N/a   | intervention with carers (CBT, modelling, knowledge financial and social advice)                            | Manualised group NPS* during intervention. Significant ↓ in pt anxiety and agitation pre- and post-intervention.      | 4 |
| Herbert <sup>68</sup>          | Yes           | Yes            | 79                    | 79           | Psychoeducational group programme   | Frequency of behaviour problems ↓ (trend toward sig)  | 2b  |   |
| McCallion <sup>62</sup>        | 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 <sup>64</sup>            | No            | Yes            | 33                    | 23           | Integrated family support programme   | behavioural problems in family support group after 7 months. No effects on mood.                            | ↓ 4   |   |
| Ferris <sup>65</sup>           | No            | No             | 41                    | 0            | Family counselling sessions   | behavioural problems in patients.   | ↓ 4   |   |
| Wells <sup>75</sup>            | Yes           | Yes            | 12                    | 20           | Educational programme on abilities- focused morning care  | ↓ agitation in intervention group at 6 months   | 2b  |   |
| Mittleman <sup>80</sup>        | 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 <sup>73</sup>            | No            | Yes            | 55                    | 73           | Specialist Admiral Nurse service  | differences between groups  | 2c  |   |

Table 7 Music Therapy

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

|                           |     |     |                  |               |   |  |
|---------------------------|-----|-----|------------------|---------------|---|--|
| Groene <sup>93</sup>      | Yes | Yes | ? 30 in total    | ? 30 in total | 2 reading + 5 music sessions or vica-versa  | 2b   |
| Jennings <sup>94</sup>    | No  | Yes | 17               | N/a           | Group music 30 mins weekly  | ↓Agitation after class   |
| Korb <sup>15</sup>        | 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 <sup>95</sup>  | No  | Yes | 10               | 10            | Played relaxing music as participants went to sleep   | Improved sleep 4   |
| Lord <sup>88</sup>        | 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 <sup>96</sup>     | No  | Yes | 10               | N/a           | 10 singing sessions (30 mins) discussion  | x2 for 5 weeks vs 4  |
| Ragneskog <sup>97</sup>   | No  | Yes | 20               | N/a           | Music during mealtimes  | ↓irritability and depression 4   |
| Remington <sup>98</sup>   | Yes | Yes | 51               | 17            | 10 mins of calming music or hand massage/ another/ simultaneously   | All ↓ agitation compared to control for 1 hour. 2b   |
| Runci <sup>99</sup>       | No  | Yes | 1                | N/a           | Language relevant intervention (music therapy and interaction in Italian)                                     | ↓ Disruptive vocalisations and ↑ talking when intervention in Italian 5  |
| Sambandham <sup>100</sup> | No  | No  | 19               | 0             | Group music sessions, 1 hour  | X2 for 3 weeks ↑ quieter and more interaction. 5   |
| Tabloski <sup>101</sup>   | No  | Yes | 20               | N/a           | 15 minutes of calming music following period of agitation   | Significantly ↓ agitated behaviour during and post-music sessions 4  |
| Thomas <sup>102</sup>     | No  | Yes | 14               | N/a           | Individualised music played prior and during bathing  | No ↓aggression 4   |
|                           |     |     |                  |               |   |  |
| Baker <sup>105</sup>      | 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 <sup>104</sup>      | 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 <sup>112</sup>     | No  | Yes | 13               |               | own controls  | Exposure to white noise audiotapes during agitation Sig ↓ agitation during white noise tapes 4                         |
| Hope <sup>108</sup>       | No  | No  | 29               | 0             | Exposure to multi-sensory environment   | Positive mood when in room (no stats). 4   |
| Kempenaar <sup>115</sup>  | Yes | Yes | 16               | 19            | 20 x 2 weekly therapist facilitated sensory stimulation-presentation of sounds, smells, taste, touch, sights. | No changes 4   |
| Kim <sup>111</sup>        | 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 <sup>98</sup>   | 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 <sup>109</sup>  | Yes | Yes | 84               | 18            | 3 X 45 minute sessions of sensory integration for 10 weeks  | No immediate significant ↓ disruptive behaviours 2b  |
| Snyder <sup>114</sup>     | 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 <sup>106</sup>     | No  | Yes | 4                |               | N/a own controls  | Snoezelen ↓ challenging behaviours after sessions. No difference in wellbeing scores 5                                 |
| Van Diepen <sup>103</sup> | Yes | Yes | 5                | 5             | 8 x 1:1 , twice weekly snoezelen  | Tendency for agitation scores to be lower in Snoezelen group 2b  |
| Young <sup>110</sup>      | 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 <sup>107</sup>    | 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 <sup>113</sup>   | 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 <sup>116</sup>   | No                 | Yes     | 15                | N/a            | own controls  | Sensory stimulation activities (touch, smell, music) ↑ psychological well-being                      | 4  |
| <b>Table 8 Sensory stimulation</b>   |                    |         |                   |                |   |  |  |
| Author and year  | Randomised         | Control | Patient number    | Control        |   |  |  |
| number   | Therapeutic Regime | Outcome | Level of evidence |                |   |  |  |
| Camberg <sup>117</sup>   | Yes                | Yes     | 19                | 18 placebo     | 18 usual  |  |  |
| simulated presence therapy (SPT) for 17 days   |                    |         |                   |                |   |  | No   |
| difference in agitated or withdrawn behaviours.  |                    |         |                   |                |   |  | 2b   |
| Miller <sup>118</sup>  | 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 <sup>119</sup>   | No                 | No      | 27                | N/a            | SPT tapes played when pt displayed agitation  | improvements in social isolation, and agitation; no improvement in aggression                        | 4  |
| Woods <sup>119</sup>   | No                 | Yes     | 9                 | N/a            | SPT tapes played twice during day   | Problem behaviours improved 91% of time  | 4  |
| Peak <sup>120</sup>  | No                 | Yes     | 4                 | single cases   | N/a   | SPT tape played for 10 sessions  | Result for 4 cases inconsistent  |
|  |                    |         |                   |                |   |  | 5  |
| Hall <sup>121</sup>  | 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 <sup>123</sup>  | 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 <sup>122</sup>   | Yes                | Yes     | 29                | 30             | Therapeutic recreation activities   | Significantly less agitation in activities group.  | 2b   |
| Ishizaki <sup>124</sup>  | No                 | Yes     | 14                | 11             | Activity sessions at day centre   | once a week  | No change in depression  |
|  |                    |         |                   |                |   |  | 4  |
| Kim <sup>125</sup>   | No                 | No      | 13                | 0              | Day care programme (individualised and group interventions) for 10 weeks              | Increase in agitation over 10 week period  | 4  |
| Martichuski <sup>126</sup>   | 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 <sup>128</sup>   | No                 | Yes     | 3                 | N/a            | Wide variety of activities  | 1 better, 1 worse, 1 same  | 5  |
| Snyder <sup>127</sup>  | 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 <sup>124</sup>  | Yes                | Yes     | 49                | 48             | Activity programming, staff training, interdisciplinary care planning, family support | No significant effects on behaviour.   | 2b   |
| Panella <sup>29</sup>  | No                 | No      | 69                | 0              | RO, VT, family support, recreation therapy  | Reduced institutionalisation   | 4  |
| Fitzgerald-Cloutier <sup>86</sup>  | No                 | Yes     | 1                 | N/a            |   | music therapy or reading activity sessions   | Less time spent in repetitive motor activities   |
|  |                    |         |                   |                |   |  | 5  |
| Gardiner <sup>87</sup>   | No                 | Yes     | 2                 | N/a            | Music therapy or reading/book exploration sessions                                    | 1 improved, 1 did not  | 5  |
| Lord <sup>88</sup>   | Yes                | Yes     | 20                | (puzzle-play)  | 20  | therapy, puzzle-play sessions, standard treatment  | No effect of puzzle play on behaviour.   |
|  |                    |         |                   |                |   |  | 2b   |
| Baker <sup>105</sup>   | 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 <sup>138</sup>   | No         | Yes             | 11             |                | N/a-own control   |  | Reduced   |
| stimulation unit, staff education No ↓ agitation/ change in medication, but decreased restraint use. 4  |            |                 |                |                |   |  |   |
| Cott <sup>133</sup>   | Yes        | Yes             | 90             | 30             | Walking/talking programme                               |  | No  |
| significant behaviour changes 1b  |            |                 |                |                |   |  |   |
| Gorzelle <sup>131</sup>   | No         | Yes             | 10             |                | N/a- own control  |  | Carers  |
| trained in Montessori activities Significantly constructive engagement and pleasure. No change in NPS 4                                       |            |                 |                |                |   |  |   |
| Hopman-Rock <sup>134</sup>  | Yes        | Yes             | 72             | 62             |   |  |   |
| Psychomotor activation programme No overall effect on behaviour 2b  |            |                 |                |                |   |  |   |
| Holmberg <sup>135</sup>   | No         | Yes             | 11             |                | own control   |  | 90  |
| minutes volunteer led outdoor walking No difference in aggressive incidents 4   |            |                 |                |                |   |  |   |
| Martichuski <sup>127</sup>  | 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 <sup>130</sup>  | No         | Yes             | 11             |                | N/A   | Quiet week intervention  | ↓agitation  |
| during week 4   |            |                 |                |                |   |  |   |
| Namazi <sup>144</sup>   | No         | Yes             | 11             | 11             | Exercise/movement program daily for 40 mins for 4 weeks | Significant ↓ in agitation in exercise group.                                  | 4   |
| Okawa <sup>137</sup>  | No         | No              | 24             | 8              | Enforced social activity with nurses, 3hrs a day        | ↓ behavioural problems in 30% of sample  | 5   |
| Orsulic-Jeras <sup>133b</sup>   | Partial    | Yes             | 13             | 12             | Montessori activities (group and individual)            | No differences in depression or agitation.                                     | 4   |
| Cohen-Mansfield <sup>146</sup>  | No         | Yes             | 27             |                | N/A   |  | Design of internal corridors in NH No significant ↓ aggression/agitation 4              |
| Dickinson <sup>143</sup>  | No         | Yes             | 7              |                | N/a   | Blinds and cloth barriers used to cover doors/windows ↓number of exit attempts | 4   |
| Hanley <sup>149</sup>   | 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 <sup>139</sup>  | 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 <sup>145</sup>  | 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 <sup>141</sup>  | 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 <sup>142</sup>  | No         | Yes             | 12             |                | N/a   | Wall mural painted over walls/doors of ward                                    | Significantly* door testings with mural. 4  |
| Kittur <sup>147</sup>   | No         | Yes             | 2              |                | N/a   | Removing mirrors   | ↓agitation for 1 week in 1. 5   |
| Mayer <sup>148</sup>  | No         | Yes             | 9              |                | N/a   | Full-length mirror placed in front of door                                     | Significant ↓ in door contacts when mirror used. 4                                      |
| Namazi <sup>144</sup>   | No         | Yes             | 9              |                | N/a   | 9 visual barriers tried (grids, door knob cover, barriers)                     | Cloth covering door/ door handle was most effective 4                                   |
| Williams <sup>150</sup>   | 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 <sup>153</sup> | 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 <sup>154</sup> | No         | Yes     | 28             | 28             | Designed environment (Group Living)    | ↓institutionalisation, slight ↓in anxiety/depression. GL. ↑aggression but less than control group           | 4                 |



|                                |     |     |              |                       |  |  |    |
|--------------------------------|-----|-----|--------------|-----------------------|--|--|----|
| Bianchetti <sup>155</sup>      | No  | No  | 17           | 0                     | Designed environment   | Significant ↓ in behavioural problems, psychotropics, physical restraints at 6/12  | 4  |
| Namazi <sup>157</sup>          | No  | No  | 32           | 0                     | Doors unlocked for 3 hour periods  | ↓ negative, aggressive behaviours, wandering when door unlocked  | 4  |
| Wells <sup>152</sup>           | Yes | Yes | 12           | 10                    | Specialised design   | No differences in problem behaviours in pts.   | 2b |
| Wimo <sup>156</sup>            | 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 <sup>162</sup>          | 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 <sup>165</sup>           | No  | Yes | 17           | 19                    | Staff training in integrity promoting care   | Improved anxiety and depressed mood in treatment group   | 4  |
| Cohen-Mansfield <sup>166</sup> | 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 <sup>163</sup>          | No  | Yes | 11           | 11                    | Staff training, individualised care plans, clinical supervision                        | No difference between control and experimental group   | 4  |
| Hagen <sup>161</sup>           | No  | Yes | 171 (carers) | N/a                   | Staff education programme  | Significant ↓ aggression directed towards staff 2 weeks after programme  | 4  |
| Matthews <sup>164</sup>        | 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 <sup>168</sup>       | 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 <sup>159</sup> | Yes | Yes | 77           | 74                    | Training in emotion focussed care  | No difference between groups at 3, 6 and 12/12.  | 2b |
| Testad <sup>160</sup>          | 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 <sup>168</sup> | No         | Yes     | 28             | 31                | designed environment and staff training<br>6 months emotional functioning ↑, no difference at 12 months. ↑ medication in control group. Less costly   |
| Bellelli <sup>169</sup>   | No         | No      | 55             | 0                 | designed environment, staff training, activity provision<br>↓behavioural disturbance (NPI), especially agitation and aberrant motor behaviour in SCU care at 6/12 follow-up. ↓neuroleptic medication usage. |
| Chafetz <sup>174</sup>    | No         | Yes     | 12             | 8                 | SCU care with designed environment, staff training, family involvement<br>No difference in problem behaviour at 15 month follow-up  |
| Frisoni <sup>170</sup>    | No         | Yes     | 31             | 35                | SCU care with designed environment, staff training, family involvement<br>*NPS in both groups after 3 months. ↓depression in SCU, improvement in psychotic symptoms. Physical restraints* (↑in control)     |
| Kovach <sup>171</sup>     | No         | Yes     | 22             | N/a               | Lived in a specialist dementia care unit, staff training<br>Significantly ↓in behavioural problems at time 2 (not clear when). Biggest ↓ was in activity disturbance and aggression.                        |
| Morgan <sup>168</sup>     | No         | Yes     | 52             | 11                | Low density SCU<br>↓ in disruptive behaviour in low density group at one year   |
| Warren <sup>173</sup>     | No         | Yes     | 44             | 36                | Admission to SCU<br>Behavioural and depression scores did not significantly change for SCU residents at 18 months   |
| Webber <sup>172</sup>     | No         | Yes     | 22             | ?                 | Specialised design, staffing and activity programming<br>No significant differences between SCU and standard care in terms of neuropsychiatric symptoms at 6/12   |

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