Non-pharmacological interventions in cognitively impaired and demented patients: a comparison with cholinesterase inhibitors

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CRD summary
The review investigated the effects of non-pharmacological interventions in cognitively impaired and demented elderly patients. The authors concluded that it was likely that these interventions have beneficial effects. The conclusion is reliable, but most of the reported treatment effects were small and most of the included studies were of limited quality.

Authors' objectives
To review the effects of the non-pharmacological interventions bright light, physical activity and tactile stimulation on cognition and behaviour (including sleep-wake rhythm) in cognitively impaired and demented elderly persons.

Searching
PubMed, ISI Web of Science, ERIC, PsycINFO, PSYNDEX, CINAHL, Biological Abstracts and REHABDATA were searched up to August 2002.

Study selection
Study designs of evaluations included in the review
Studies with a control group, or studies comparing the effect of two interventions, were eligible for inclusion. Studies comparing the outcomes before and after an intervention and after discontinuation of the treatment for some time were also eligible. All studies had to provide sufficient data to calculate effect sizes.

Specific interventions included in the review
Bright light, physical activity and tactile stimulation interventions were eligible for inclusion. The included studies used bright light ranging from 790 to 10,000 lux, walking or other exercise programmes as physical activity, and tactile stimulation varying from a light touch on the forearm to a hand massage.

Participants included in the review
Studies with elderly, cognitive impaired and demented patients were eligible for inclusion in the review.

Outcomes assessed in the review
The review investigated cognitive functioning and behaviour, mainly affective behaviour. Behaviour was assessed through behavioural scales, or indirectly via pulse rate, nutritional intake or the sleep-wake rhythm. The outcomes in the included studies varied greatly: some used objective measures (e.g. actometer), while others used rating scales (e.g. agitation behaviour rating scale).

How were decisions on the relevance of primary studies made?
The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
The authors did not state that they assessed validity.

Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction. Effect sizes (Cohen's d) were calculated to compare the treatment effects investigated in the individual studies.
Methods of synthesis

How were the studies combined?
The studies were combined narratively, grouped by intervention and the outcomes cognition, (affective) behaviour and sleep-wake rhythm. Weighted mean effect-sizes (within and between subjects) were calculated for all non-pharmacological interventions and separately for the intervention types (i.e. bright light, physical activity and touch) using a random-effects model (DerSimonian and Laird). All effect were combined irrespective of treatment duration, intensity and group characteristics.

How were differences between studies investigated?
The studies were presented in detail, separated according to the outcomes cognition, (affective) behaviour and sleep-wake rhythm for each intervention in the text. Statistical heterogeneity was assessed within the statistical pooling process.

Results of the review

Twenty-three studies met the inclusion criteria; these provided information from 606 patients. There were 10 studies on bright light (n=217), 8 on physical activity (n=253) and 5 on tactile stimulation (n=136). The patients in 4 studies were randomised to treatment with bright light or to function as a control group (n=124).

Bright light: Cohen's d was 0.39 (95% confidence interval, CI: 0.20, 0.60) for various cognition outcomes (pooled across 18 effect size coefficients) and 0.30 (95% CI: 0.16, 0.44) for behaviour outcomes (51 effect sizes).

Physical activity: Cohen's d was 0.56 (95% CI: 0.21, 0.91) for cognition (6 effect sizes) and 0.10 (95% CI: -0.04, 0.24) for behaviour (29 effect sizes).

Touch: Cohen's d was 0.30 (95% CI: 0.04, 0.57) for cognition (11 effect sizes) and 0.80 (95% CI: 0.48, 1.12) for behaviour (10 effect sizes).

Overall, non-pharmacological interventions pooled across cognition and behaviour outcomes showed an effect (d) of 0.32 (95% CI: 0.21, 0.43; 69 effect sizes). These values were between group values; the review presented further results.

Authors' conclusions

The results indicate a considerable probability that non-pharmacological interventions have beneficial effects.

CRD commentary

The review addressed a wide intervention field and extensive searches of electronic databases were undertaken. No attempts to locate unpublished studies were reported; this leaves the results of the review vulnerable to publication bias, possibly overestimating the treatment effects. The review mixed weak and strong evidence and considered all the study designs that were eligible for inclusion. A justification for choosing the designs was given. Many study samples were very small (i.e. 5, 10 patients).

The studies were presented in detail, the underlying mechanisms of the interventions were explained, and a comparison with effects of pharmacological treatments was also made, although the pharmacological studies did not seem to have been searched for systematically. The diversity of the studies was ignored in the statistical meta-analysis, in favour of gaining overall effect size measures for the treatments. The interventions and the assessed outcomes varied greatly between the studies. Some of the studies seem to have been entered several times in the pooled analyses with different dependent variables (e.g. 51 effect sizes derived from 10 studies on bright light).

The conclusions are reliable, but the effects of the interventions on most outcomes were small when using the stronger between-group effect size measure. In addition, the evidence base was limited.

Implications of the review for practice and research
Practice: The authors stated that the use of non-pharmacological treatments to intervene cognitively, behaviourally, and functionally in the demented elderly should not be ruled out.

Research: The authors stated that the effects on neuropsychological measures (attention, memory, self-control) and quality of life of patients and their families need to be explored in multi-modal intervention studies with multicentre input.

Funding
Zorg Onderzoek Nederland (ZON); FONTIS Amsterdam.

Bibliographic details

PubMedID
14640320

Indexing Status
Subject indexing assigned by NLM

MeSH
Affect; Cholinesterase Inhibitors /therapeutic use; Circadian Rhythm; Cognition Disorders /therapy; Cognitive Therapy; Dementia /therapy; Humans; Light; Meta-Analysis as Topic; Neuropsychological Tests; Phototherapy; Physical Therapy Specialty; Sleep

AccessionNumber
12003006989

Date bibliographic record published
30/04/2005

Date abstract record published
30/04/2005

Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.