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Environmental Management to Control Behavioral and Emotional Problems in Elderly with Dementia

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Abstract

Negative behaviors are the main source of distress for caregivers for the elderly with dementia. Nurses should be trained in managing agitation and other negative behaviors, as well as caring for the emotions of affected patients. Previous studies have identified that various classified behavioral problems may stem from common causes. A universal treatment may be applied according to the features of the syndrome. Therefore, studies are required to highlight the most effective ways of managing behavioral and emotional problems in the elderly with dementia. This study identified research articles regarding the environmental management of behavioral and emotional problems in elderly patients with dementia. A non-systematic literature review was carried out using the PICO (Population, Intervention, Comparison, Outcome) framework utilizing ScienceDirect, ProQuest, SAGE databases in the last 5 years, searching with keywords "elderly, dementia, management, environment, AND caregiver." The results showed behavioral and psychological symptoms in dementia (BPSD) experienced by the elderly with dementia include agitation, depression, elation, delusions and hallucinations. Environmental characteristics such as light, sound, temperature, color, are important things to consider. Such features can have a positive impact on the dementia patients' physical health, activities of daily living, social relationships and cognitive functioning. A modified sensory room made the elderly have positive energy and raised awareness of the importance of interpersonal relationships. The modifications were fiber-optic lighting, music therapy, aromatherapy, and multisensory stimuli using tactile manipulatives and specific tools for daily live activities. Future research should seek to understand the trends of symptoms over the disease progression to provide proper environment modification and support the caregivers. It is important to identify the environmental modifications that make the most significant impact in reducing negative behaviors of the elderly with dementia.

Keywords*:* Dementia, Elderly, Environmental management, Negative behavior

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Introduction

The behavioral and psychological symptoms in dementia (BPSD) are signs and symptoms of disturbed behavior, mood, thoughts, or perceptions. The International Psychogeriatric Association defined Behavioral and Psychological Symptoms of Dementia (BPSD) as symptoms of disturbed perception, thought content, mood, and behavior frequently occurring in patients with dementia. The BPSD are common problems, which decrease of the quality of life for both patients with dementia and the caregivers. BPSD may include aggression, agitation, wandering, verbal outbursts, delusions, hallucinations, apathy and anxiety. These symptoms can be both problematic and costly. After the onset of disease, more than 80% of demented patients exhibit at least one behavioral and psychological symptom (Huang et al, 2011; Abraha et al, 2017).

Abraha and colleagues (2017) observed that five out of six demented patients, including those living at home, experienced behavioral and psychological symptoms due to their illness. An analysis by Kim and Park (2018) found that patients also had memory loss and reduced cognitive functions in addition to the behavioral problems of dementia. Disorders experienced by the elderly with dementia include agitation, depression, elation, delusions and hallucinations. These symptoms are highly correlated with each other. Twenty percent of people with dementia do not show these symptoms within 2 years of diagnosis of dementia. But 50–80% of patients with clinical symptoms experience agitation within a few months. In addition, at least 50% of patients with dementia present with significant BPSD on a monthly basis.

Agitation is the mismatch of verbal, vocal, and motor activities that are not based on clear necessity or confusion). Agitation may manifest as aggressive or non-aggressive behavior, as well as physical and verbal and vocal behavior. Of those, inappropriate verbal agitation refers to verbally non-aggressive behavior such as repetitive questions, complaining and attention-seeking behavior, and verbally aggressive behavior such as cursing and screaming. Kim and Park (2018) found that verbal agitation was reported to be more common than physical agitation. Furthermore, the study identified that verbal agitation was caused by hallucinations and physiological discomfort, and pain. These factors were significant predictors of verbal agitation, explaining 27. 8% of the variance in the model. Agitation with depression, hinder activities and relationships and cause feelings of helplessness and distress in families and formal care groups. Agitation and depression are strong predictors for poor quality of life as well as nursing home admission.

Approximately 40% of elderly with dementia display aggression due to several risk factors such as depression, pain, caregiver's burden. Aggression also decreases the quality of interaction between caregiver and elderly dementia patient. Hung and colleagues (2017) stated that the severity of BPSD often becomes exacerbated over the course of the disease, and are also associated with caregiver burden.

Dementia is a neurodegenerative syndrome caused by a chronic and progressive disorder accompanied by decreased brain function that affects emotions, memory, decision making, behavior and other brain functions that interfere with daily activities. Dementia is a chronic disease that affects the community. The incidence of Alzheimer's dementia worldwide is increasing rapidly. It is currently estimated that about 50 million people are diagnosed with dementia worldwide, of which 20. 9 million live in the Asia Pacific region (Alzheimer’s Disease International, 2017).

It is predicted that this number of dementia diagnoses will almost double every 20 years. Around the world, there will be 9,9 million new cases of dementia in 2015. This means that every 3 seconds someone in the world develops dementia.

Indonesia is experiencing an aging population, which projected population is estimated to increase by 10% in 2020, 15.8% in 2035 and 18.4% in 2050. The increase of the elderly population correlates with an increase in life expectancy and improvements in the quality of health services over time. Life expectancy for Indonesians in 2018 was 73.19 years for women and 69.30 years for men, an increase compared to 2017, which was 69.16 years for men while women at age 73.06 year. This shows the success of the national development (Ministry of Health RI, 2018) . Life expectancy and increasing number of elderly people also results in an increase in the incidence of geriatric diseases. There is expected to be a rise in conditions like dementia which lead to decreased cognitive function and productivity in the elderly. . With no known cure on the horizon, and with a global aging population, every part of society should play an active role in helping to achieve a world where people can live well with dignity with dementia. The prevalence of dementia increases by 1% at the age of 60 years and doubles every 5 years, reaching 30% -50% by the age of 85 years (Soni et al, 2014). Much of the increase will take place in low and middle income countries 58% in 2015, rising to 63% in 2030 and 68% in 2050. The prevalence of dementia in Indonesia reached 1.2 million cases in 2015 and is predicted to increase to 4 million in 2050 (Alzi, 2019).

Increasing prevalence and progression of dementia requires an urgency to develop effective treatments in the management of the elderly with dementia. Impaired cognitive function is usually accompanied by worsening emotional control, behavior, and also motivation experienced by patients (WHO & ADI, 2012) . Prevention of negative behaviors associated with dementia is important. Moreover, the elderly population in Indonesia continues to increase from year to year, which will result in a population structure. Several strategies have been attempted to improve mood, reduce depression, and reduce behavioral disorders. Negative behaviors in the elderly with dementia are triggered by environmental conditions related to the sense of smell, touch, vision. There is no “ one size fits all solution” to manage complex symptoms in elderly with dementia. Therefore, the non-pharmacological management approach should be considered (Kales, 2015).

Elderly dementia is often neglected in decision-making efforts for self-care. An environment that provides comfort for the elderly with dementia, especially an environment that supports patients in participating independently in their self-care has many advantages (Handley et al 2015) . Handley and colleagues described that environments that are dementia friendly promote independence by being safe to walk around and navigate. We should design environments that are not confusing to elderly with dementia by avoiding shiny floors that can be perceived as water, and by using patterns and colour contrast effectively. Besides that, the environment should minimize distress. One can change or redesign existing physical spaces, add of physical objects to environment, and modify the type of living environment. This intervention decreases behavioural and psychological symptoms of dementia (Soril et al, 2014) . Environmental aspects greatly impact the caregivers who accompany the elderly with dementia. Families and caregivers need to be involved in designing comfortable spaces that minimizing the pressure in caring for the elderly with dementia.

This literature review aims to provide an overview of the effectiveness of environmental management to control negative behaviors that might arise in the elderly with dementia.

Research Methodology

Briefly, to obtain the evidence regarding the environment modification, we first identified published, peer-reviewed research articles using a non-systematic search across several databases. After processing eligible studies, we identified and obtained primary studies from these published research papers to generate the compendium of papers about environment management of behavioral symptoms of elderly dementia patients. . We developed a narrative summary and a thematic synthesis to synthesize the quantitative and qualitative data, respectively. We conducted third synthesis to combine the previous two syntheses. No protocol existed for this non-systematic review. This research did not involve participation of human subjects, thus research ethics board review was not required, nor was informed consent.

Search strategy and inclusion criteria for systematic reviews

The literature review was performed using the PICO Literature Review (Table 1) framework within ScienceDirect, ProQuest, SAGE, DOAJ (Directory of Open Access Journals) databases in the last 5 years, with keywords elderly, dementia, agitation, management, AND environment, caregiver. The keywords were also changed to synonym keywords such as ageing, senile dementia, negative behavior. Reviews were also carried out on abstracts and references from articles collected.

Titles and abstract of manuscript were assessed for relevance to the topic using the following inclusion criteria:

1) Empirical quantitative, qualitative, or mixed-methods studies published in peer-review journals between 2015-2019, written in English;
2) Study participants were clinically diagnosed with dementia
3) Intervention approaches were within the scope of environment stimulation
4) The impact of environmental management on negative behaviors of people with dementia was measured;

Table 1. Description of PICO Literature Review

P	Patient, Population, Problem	Dementia, Elderly
I	Intervention	Environment modifications
C	Comparison Intervention (if appropriate)	NA
O	Outcome to Measure or Achieve	Patient's Negative Behavior

If relevance was not clearly evident based on the initial review, the full article was read to determine whether it should be included. Once the initial group of articles was gathered, the full texts were read to ascertain final inclusion in the review. Eight articles met the inclusion criteria. Data were extracted into a Journal Citation Report to review study characteristics and rate levels of evidence for each article. We conducted an analysis of the research articles identified using the PICO framework.

Study Selection, Data Extraction and Management

From each full-text, we collected the data about the publication year, the databases searched, the study population, the environment modifications. The authors independently screened titles, abstract, and full texts of articles. The authors retrieved full-text versions of potential articles and determined final inclusion in the review on the basis of relevance to the question, study quality, level of evidence, and inclusion and exclusion criteria. Disagreements were resolved by discussion or by consulting another author if necessary.

Each retained article was appraised and key information extracted to an evidence table that provide a summary of the methods and findings of the article. Supplemental table summarizes the characteristics, including methodology, environmental modification assessed, result, and recommendation.

Risk of bias assessment and grading the quality of evidence

The risk of bias of each study was not evaluated. The overall quality of evidence was not assessed. Results regarding the risk of bias and grading the quality were resolved through discussion.

Outcome measures

We focused on articles that considered negative behaviors in-patient with dementia as a primary outcome.

Results

Study Selection

A total of 802 citations and abstracts were screened during the initial search. 171 records were excluded in the abstract review and 16 were assessed in full-text. Eight articles were excluded following full-text review and ultimately, eight studies were included in the final analysis. (Figure 2)

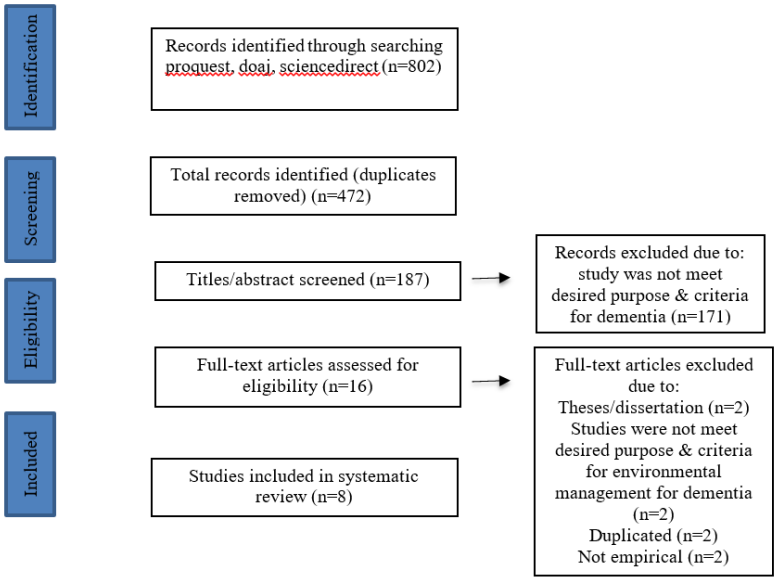

Figure 2. PRISMA Flow Diagram of Included Studies

Characteristics of Included Studies

Five studies used quantitative study designs including cross sectional, survey, and quasi non-experimental study designs (Houston, 2015; Morante, 2017; Evan et all, 2019; Bautrant et al, 2018; Lee et al, 2016). Two studies used descriptive phenomenological study designs (Brooke & Semlyen, 2019; Tsai and Hong, 2019) and one study used mixed method design (Leung et al, 2019).

Negative Behavior of the Elderly with Dementia

Agitation and negative behaviors including aggressive and perseverative types occur in up to 50% of patients with advanced dementia and 36% of patients with newly manifested disease. Dementia patients in the final phase experience some agitation behavior every week, including 18% experiencing anxiety and 10% of displaying verbal aggression. Agitation in elderly patients with dementia is a major problem that causes distress to families, nurses, and direct caregivers (Houston, 2015; Morante, 2017). For people living with dementia, the symptoms they experience can have a significant impact on their confidence and ability to continue to lead an independent and full life (Evan et all, 2019). Thus, it was important to increase the skills and confidence of professionals involved in the patients' care. People with dementia who live in their own homes also face multiple challenges due to a deterioration in their physical and cognitive abilities.

Environmental management

Evan and colleagues (2019) suggested that relatively inexpensive aids could contribute towards the maintenance of wellbeing for people with dementia in domestic settings. These aids help to minimize disruption and anxiety for people living with dementia. The five aids that were reported to be the most beneficial were dementia clock, noticeboard/whiteboard, touch-activated beside light, key locator and memo minder. These helped people with dementia continue to live at home with a good quality of life. The study stated the

benefits of these aids spanned three main areas: (1) Promoting independence and quality of life for people with dementia and their family caregivers; (2) The skills and confidence of professionals involved in the project; (3) Strengthening partnerships between the collaborating organizations across health, housing, and social care.

In their study, Bautrant and colleagues (2018) found that Behavioural and Psychological Symptoms of Dementia (BPSD) prevalence can be reduced by making simple environmental rearrangements to improve spatial and temporal orientation. The rearrangements were sky-like ceiling tiles in part of the shared premises, progressive decrease of the illuminance at night together with soothing streaming music, reinforcement of the illuminance during the day. Environmental modificationss also included painting the walls light beige, placing oversized clocks in corridors, and wearing different colors based on time of day (ie. Dark blue at night time and sky blue during the day).

The environmental changes were also studied by Brooke & Semlyen (2019) across three wards within a District General Hospital (DGH) in England. The hospital made extensive changes in each ward to make the environment less clinical, appear more warm and friendly, and to support interactions with both patients and their families.The environmental changes impacted on the care staff in two ways. First, the changes provided hospital staff with more options to care for people with dementia. Second, the changes created an environment where hospital staff were closer to their patients throughout their working shift. Dementia friendly wards are an important and impactful way to improve care and the lived experience of people with dementia in the acute hospital setting. These changes can reduce confusion and create a supportive space. The implementation leads to increased contact with patients, and increased patient-centered care, and possibly a reduction in harm. The busy and noisy environment with a large number of healthcare professionals caring for a patient has negative impacts on patients with dementia. This environment may increase agitation, confusion and distress, reduce patient mobility and social interactions, and could lead to higher risk of further health complications.

In another study, Lee and colleagues (2016) had suggested that a smaller, home-like environment supports eating and drinking, makes dining more enjoyable, and thereby promotes favorable nutrition outcomes. Elderly with dementia can more socially active and more engaged with others in an optimal environment. A smaller home-like environment may also offer a sense of comfort, security, and belonging. This study found that a smaller home-like environment was associated with a higher level of positive mood, social engagement, physical functioning, and better health status compared with residents with dementia living in the traditional large-scale unit. The home-like environment included a relatively short corridor (approximately 14 m long), all single bedrooms, and a single-loaded floor plan. The number of staff working in the daytime in this environment was 1.5 nurses and two care aides.

Houston (2015) found that a Multisensory Stimulation Environment (MSSE) was mildly effective for agitation and negative behavior. In this study, the MSSE was created from a room approximately 12 feet x 12 feet that was previously used as an office. The research was conducted in an assisted living facility

with a secure residential dementia care unit referred to as Dementia Care Unit (DCU) for elderly patients with moderate to severe dementia in Vermont, United States. The room contained a range of features for multisensory stimulation including visual, auditory, olfactory and tactile needs. The visual stimulation included handheld toys of colored bubbles and moving sand; simple abstract artwork; soft indirect lighting provided by floor lamps; and a deep forest green wall color different from the creamy yellow color of the rest of the unit. Olfactory stimulation was provided by eucalyptus stalks. Tactile stimulation was provided by soft, furry fabric swatches on the arms of the overstuffed chair and sofa. Auditory stimulation was provided by a sound machine playing a variety of sounds from nature such as waterfall and ocean waves. Another study by Morante (2017) found that group music therapy for eight weeks had the potential to decrease agitation of dementia patients lived in nursing home. After patients in the DCU visited the MSSE for approximately 10 weeks, the caregiving staff gave their appraisal about the MSSE with MSSE Staff Appraisal Survey (MSSE-SAS). The MSSE appeared to be more effective for anxiety type behaviors and less effective for psychotic symptoms and physical needs such as pain relief and sleep disturbance.

The multisensory stimulation environments were also studied by Tsai and Hong (2019) in their qualitative study. In their study, multisensory-stimulated environments were effective in slowing cognitive deterioration and achieve physical and mental recovery. Many empirical studies have shown that a positive design for those with dementia can be assisted by a pleasant physical environmental design, and supportive spatial features, such as a direct moving line system. The physical environment should be visually accessible, that is, meaningful integration should be implemented. Environmental characteristics such as lighting, sound, temperature, color, and mode are all important. The sensory room in this study made the elderly people with dementia feel positive emotions on the psychological level. It also helped elderly people with dementia realize the importance of interpersonal friendship and environment. This study believed that multisensory environmental characteristics could alleviate the symptoms of the elderly. It pointed out that one could add playing games and learning. It also noted that the most important indicators are safety and personality. One of the most basic concepts is that safety should reflected in indoor planning and design. Space configuration should be further discussed with relevant experts in the planning process.

The unique personality or individuality of each elderly person with dementia should be considered when designing the environment. The patient should be given the autonomy to choose the sensory environmental stimuli they need. The appropriate sensory stimulation also needs to be managed by the caregiver based on the needs and background of each senior patient. So different sensory stimuli may given to each patient. To create a healing environment, indoor spatial planning should not only be physiologically safe for the elderly, but also promote a psychologically stable existence. This kind of environment was also studied by Leung and colleagues (2019). This study investigated the effects of indoor built environment (IBE) on the quality of life (QoL) of the demented elderly. The model confirmed that the building services factors, such as lighting,

temperature, lifts and water supply, predicted demented elderly residents' physical health, psychological health, independence, activities of daily living and social relationships. Besides that, supporting facilities factors such as signage, finishes and furniture, also exert a positive impact on the residents' physical health, activities of daily living, social relationships and cognitive functioning. Practical recommendations were made, including that homes provide access to a sky garden on each floor, label water taps with hot and cold signs, provide signage with iconic information at different strategic locations, employ color contrasting finishes in different rooms, use historical furniture, and so on. This study's results provide valuable insight into improving C&A homes' IBE in order to enhance the QoL of the demented elderly.

Discussion and Conclusions

A caregiver's attitude towards the elderly with dementia has an impact on the condition of the elderly patient. An essential phenomenon to consider is that the family member who is the elderly dementia patient's caregiver fears losing self-identity. There are six components of this phenomenon including: 1) feeling of the effects of aging due to memory deficit, 2) continuous comparison of the family member's behaviour with that of the participant's, 3) finding it painful to see a family member with dementia as he/she does not know how this will end, 4) not knowing the conclusion of the disease process, 5) reducing the risk of dementia, and 6) trying to change one's lifestyle from what it used to be in the past (Kim et al, 2016).

Environmental characteristics such as light, sound, temperature, and colour are important things to consider. Indoor built environment gave a positive impact on the residents' physical health, activities of daily living, social relationships and cognitive functioning (Leung, Wang, & Chan, 2019). The study showed that some indoor BE components can enhance the QoL of the elderly. Furniture and fixtures affected all the personal QoL domains (physical and psychological health, the social relationship and overall QoL). For example, a wardrobe that is too high or too deep made it difficult for the elderly patient to perform their daily activities (e.g. picking dresses). This obstacle induced negative feelings and subsequently affected their self-esteem.

Color and lighting significantly and positively affected on the patients' social relationships. The functionality of elderly patient's eyesight declined normally due to ageing. This loss of vision increased the risk of falling and collision within their residence. The windows are normally allocated on the one side of the unit flat, which limits uniform illumination of the elderly residence and affected daytime lighting. Thus, installation of artificial lighting played an essential role for assisting elderly impaired vision and creating a pleasant environment for social interaction. Color was also an important component significantly influencing social relationships among the elderly. Poor combination of colors in the environment of elderly further compounded their visual impairment, and consequently led to personal detachment and reduced participation in the neighborhood. Thus, the color designs helped the patient to overcome sensory deprivation and provided visual stimulation for social interactions. The right mix and combination of colors with good luminous contrast or density couldd prevent eye fatigue, raise visual acuity and also created a warm environment and pleasurable atmosphere for neighbors or visiting

friends. Warm colors with high illumination encouraged alertness and aided the orientation of the elderly. Some colors were useful in alerting the elderly to their surroundings. The preferred colors were blue, red, green, and yellow.

Modified rooms made the elderly have positive energy and raised awareness of the importance of interpersonal relationships. Tsai and Hong (2019) stated that the process of interaction between the elderly and the sensory environment changed the attitudes of the elderly from being passive to being active participants. The multisensory environment can be developed as a method of healing. Sensory room includes six indicators namely accessibility, environmental support, diversity, safety, interactivity, and autonomy.

Multisensory stimulation is based on the principle that dementia patients suffer from an imbalance of sensory stimulation. MSSE is an alternative sensory experience from the usual environment (Kim et al, 2016). Care for the elderly requires a comfortable and relaxed environment to prevent social isolation and strengthen self-resilience. This can be created with the design of a physical environment and supporting spaces such as moving line systems and improving visually accessibility.

A sensory room is an environmental modification for the elderly with dementia that provides psychological support to improve interpersonal relationships. Modifications in sensory rooms include aspects of light, sound, temperature, and color. Sensory activity in the sensory space creates softer communication and closeness between the elderly and caregivers. The sensory room supports the elderly patients to explore the sensory environment freely and adjusts to the mood and physical strength of the elderly.

Dementia patients who live in small-scale care units, such as home care, will show a more positive mood, social involvement, physical function, and better health status compared to residents with dementia who live in large-scale units. Overall, current research findings indicate that small-scale facilities have a positive effect on the health and behaviour of patients (Lee, Chaudhury, & Hung, 2016). Research showed that building facility factors (lighting, temperature, elevators and water supply) predicted the physical health of the elderly, psychological health, independence, activities of daily living and social relations.

In addition, supporting facilities such as signage, finishes and furniture also have a positive impact on the physical health of the elderly with dementia, daily life activities, social relationships and cognitive functions (Leung, Wang, & Chan, 2019). Morante (2017) also revealed that music therapy in the home nursing has the potential to decrease agitation among dementia elderly patients suffering agitation. It is a cost effective approach in managing dementia symptoms of elderly patients.

This literature review provides a detail and up-to-date picture of the negative behavior of the elderly with dementia. Hallucinations, physiological discomforts, and pain need to be a concern when providing interventions to control verbal agitation in patients with dementia. This review also looks at current evidence about the effects of environmental modification to control or reduce the negative behaviors of the elderly with dementia. Experts believe that environmental modification with multisensory characteristics can relieve symptoms in the elderly. These

modifications can solve negative behavioral problems for experienced by both the patients and the caregiver. Therefore, sensory stimulation is not only about feelings, but also about what makes the elderly and the caregiver learn new things and agree on a sense of achievement.

Recommendation

Future research needs to understand the trends of symptoms over the disease progression to provide proper environment modifications to aid the patients and caregivers. It is necessary to continue to examine which environmental modifications have the most significant impact on controlling specific negative behavior of the elderly with dementia.

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