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**Supporting Cognitive Functional Capacity in Elderly
with Dementia**

A Literature Review

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Thesis Abstract

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Dementia is a chronic and irreversible impairment with gradual depletion in cognitive functions which includes loss of memory and troubles with language. These cognitive functions are affected by aging and structural changes in the brain.

The aim of the thesis is to find out how cognitive functions are supported in elderly with dementia. The purpose of this thesis is to find useful methods for patients, their relatives and health care workers in helping to maintain cognitive functions which are necessary for independent living.

The research question of the thesis is: How can cognitive functions be supported in elderly with dementia?

The data collection method was literature review. Inclusive and exclusive criteria were set, keywords chosen and CINAHL, MEDLINE and SAGE databases used.

The collected data were analyzed following inductive content analysis. The chosen material was read through several times, findings were grouped and categories were formed to discover results.

The results of the thesis suggested that different recreational activities, music, diet modification, physical activity, treating co-occurring problems, different group activities and social support could improve the cognitive functions in elderly with dementia.

Suggestions on how to support cognitive functions in elderly with dementia are presented from the aspect of nurses since they deal with demented patients and their families continuously.

Keywords: support, cognitive function, cognitive functional capacity, elderly, dementia

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Abbreviations

ICF International Classification of Functioning, Disability and Health

MMSE Mini Mental State Examination

WHO World Health Organization

1 INTRODUCTION

Population of the whole world is getting older and living longer thus it is obvious that memory problems are increasing (Sulkava 2005). People suffering from dementia experience number of problems including physical and cognitive disability. The number of people suffering from dementia is growing rapidly. (WHO, 2014.)

Health care professionals along with the nurses deal with patients suffering from dementia. People with dementia spend most of the time with nurses. Therefore, nurses need to have high knowledge about how to support the cognitive functions of people with dementia as it is growing challenge in the present world.(Williams & Kemper 2010.) The authors recognize nurses as one group of people taking care of people with dementia.

The goal of the thesis is to find methods to support elderly suffering from dementia to maintain their cognitive functional capacity. New information is sought to pass for nurses dealing with these patients so that they could better help their patients and patients' relatives. If a person with dementia could communicate well with others and could have better memory it would make his or her daily living better.

The thesis explains how cognitive functions can be maintained with people suffering from dementia and it will also present the possible means to improve the cognitive functions. The authors encourage the nurses and health care providers to apply the new interventions in action for the improvement of people suffering from dementia.

As the results of this thesis, several methods were found essential in supporting and maintaining cognitive functions when an individual is aging and starting to present symptoms of impairment in cognitive functions or an elderly has already diagnosis of dementia. In everyday life physical activity and nutrition have been found important, as well as, to maintain good relationships with family members and friends thus these activities help to be social and maintain communication skills. Coping with behavioral problems is important and memory enhancement is essential. Recreational activities, like music, dance and art are useful methods for

elderly to maintain cognitive functions. The last result presented in this thesis is treating co-occurring issues meaning treating different diseases affecting for example vision and hearing.

2 COGNITION

Intellectual, knowledge-based acquisition of information, storing the information and utilizing the acquired information are considered as cognitive activity (Tuulio-Henriksson 2011). Generally, memories, perceptions, concepts beliefs, learning and knowledge are arranged in human mind with a certain manner. Later that information, which is stored in the brain, can be represented, because active representation creates a findable memory into the brain. (Streri, de Hevia, Izard & Coubart 2013.)

Haselager, De Root & Van Rappard (2003) argued that cognitive system is more than representation of memories. They stated that even though human cognitive system is placed in the brain, our bodies deliver special action possibilities that modify our cognitive processes. Their other statement included the fact that there is interaction between cognitive system and its immediate environment and those together form cognition and behavior. Thus both cognition and behavior are parts of causal network involving brain, body and environment. Barandiaran & Moreno (2006) came to the same conclusion providing term *cognitive organization* after studying previously made researches of different dynamic phenomena which fall into the domain of cognitive science. They stated that the dependencies between the nervous system and individual's metabolic body and environment together form an adaptive network where internal neural dynamics retain and regulate the appearing of cognition.

Cognition is often understood as intellectual thinking or knowing. However, from the perspective of science, especially neuroscience, cognition consists of complex mental processes in different parts of the brain. Together with knowledge acquired through attention, perception and learning the processes in the brain enable thinking, judging, reasoning, remembering, problem solving, comprehension, decision making, computation and language production. The existing knowledge creates new knowledge by using cognitive processing. Although human cognition usually is conscious it may also occur unconsciously, hence cognition allows human thinking to be real and concrete, abstract, intuitive and conceptual. (Cognition 23.8.2014.)

2.1 Cognitive functions

Cognitive functions are individual's skills to produce and process thoughts. They include person's memory and ability to learn new things, to speak and understand the language, to be able to judge behavior and to trust intuition. (Strout & Howard 2012.) These functions are important to cope with everyday life, like remembering one's medication or finding your way to nearby supermarket by driving your car and even succeeding to find right ingredients for a delicious new recipe or learning to play video games with your grandchildren (Drag & Bieliauskas 2010). Therefore, it is sensible to maintain cognitive functions effective since they seem to raise quality of life for aging population. Society is also benefitting by reduced costs of long-term care when older population is able to live in their homes much longer. (Hertzog, Kramer, Wilson & Lindenberger 2009.)

Cognitive functions are usually examined with neuropsychological research and tests. The research is useful tool to assess effects of a variety of neurological diseases and brain injuries although comprehensive examination by clinical neuropsychology specialist psychologist is broader. However, neuropsychological research can be used to screening for the need for more detailed research (Tuulio-Henriksson 2011.) In different sources the main areas of cognitive functions are divided in slightly different ways. In this thesis cognitive functions are divided as attention, perception, memory, language and learning, visuospatial functions and executive control.

2.1.1 Attention

Attention has an essential impact on cognition. It is at the same time basic cognitive function and a complex cognitive process having numerous specialized sub-processes. Unlike tasks that are customary or automatic, all other cognitive areas are affected by some kind of attention process. Tasks like cooking while having phone conversation or doing shopping in the grocery shop according to a list both requires several aspects of attention. Therefore, researchers and theorists of different cognitive science scopes divide attention into different sub-groups as

sustained attention, selective attention, divided attention and attention- or task-switching. (Drag & Bieliauskas 2010; Glisky 2007.)

Sustained attention is deemed to be simple attention process. It means the ability to keep concentration on one task for longer period of time. Vigilance tasks, like task where a person is asked to monitor the environment and spot an unusual signal, are used to measure sustained attention. This kind of attention is needed e.g. over a 10-minute drive in an unfamiliar location. **Selective attention** means that an individual is able to attend to some stimuli although simultaneously there are other irrelevant stimuli interfering concentration. E.g. during that short drive, selective attention helps to ignore the road side advertisements. One test to measure selective attention is the Stroop task, in which a person is shown printed inconsistent color words and asked to name the color (e.g. the color red printed in green). **Divided attention** is used when a person needs to process information from various sources or he is multi-tasking. So, for instance, a person has to monitor appearance of a number delivered by auditory way and at the same time give sensible explanation of a visually delivered word. Then the results are compared with the results of the tasks carried out separately. **Attention or task switching**, in turn, needs a person's ability for rapid switch from one task or skill to another. (Drag & Bieliauskas 2010; Glisky 2007.)

2.1.2 Perception

Perception is in close relation to attention, sensory activity and motor skills. It is often viewed as a set of precognitive processes causing unclear line between perception and cognition. Still evidence show interaction between cognitive and perceptual processing, both have impact on each other. What happens is that central nervous system receives and processes information conveyed from sensors and produces the appropriate motor responses to ensure the adequate functioning in each situation. Good examples of this highly automated and unconscious functioning are maintaining balance, reaction speed and management of movements. (Glisky 2007; Heiskanen 2012.)

2.1.3 Memory

Purves et al (2004) state, that human brain has a fascinating ability to store and retrieve information that has been acquired through experiences in life. That complex function allows the processes of other cognitive functions. New information is then gathered into the brain via nervous system by learning. Thus memory means encoding, storage and retrieval of that learned information. Drag & Bieliaukas (2010) and Glisky (2007) explained that memory consists of several separable subcomponents including working memory and long-term memory.

Short-term or primary memory represents the shortest actual memory, in which information remains only a short period of time. An individual is for example able to maintain a phone number in primary memory by repetition of the number. Another form of short-term memory is **working memory** which is slightly broader concept. With its finite capacity, working memory is able to shortly store, process and combine new information to previously acquired information before part of it is transferred to long-term memory. These manipulation and information updating processes of working memory are confirmed to be placed in prefrontal cortex by recent neuroimaging research. (Glisky 2007; Heiskanen 2012.)

In contrast to short-term and working memory, retrieval of information that has already been stored or has become passive is required when using long-term memory. **Long-term memory** is divided into various subdivisions. (Glisky 2007.)

Episodic memory, as its name suggest, indicates memory of events that have been experienced personally in a certain place at a certain time, like a birthday party. This kind of memory develops last and is the most advanced form of memory. Neuroimaging shows that episodic memory processes happen in the inner parts of the temporal lobe, hippocampus and thalamus. **Semantic memory** is often considered as *crystallized intelligence*, because it is the actual storage of one's general knowledge about e.g. historical facts, definitions of words or capital cities of Europe. The storage of this kind of memories is believed to be in different areas in posterior neocortex. **Autobiographical memory** includes both semantic and episodic kind of personal memories. Although autobiographical and episodic memory both contain conscious recollection of person's own experiences from life

events, autobiographical memory is more emotionally involved to the content of the memory and the person oneself is actually involved in the memory. A special type of autobiographic memory is **flashbulb memory** which means memory of an emotional public event, such as the death of Princess Diana. **Implicit memory**, in turn, is a result of previous experience that unconsciously influences person's behavior; hence it is easier to identify a stimulus when it has been seen before although its occurrence has been forgotten. Such unintended preparation can be seen everywhere in daily life without being aware of it. **Procedural memory**, which includes knowledge of highly skilled activities, like cycling or reading is a type of implicit memory. These memories are mostly unconscious and automated, acquired slower than episodic memories by comprehensive practice. "Once learnt skill does not disappear." Among several other parts of brain, the basal ganglia and the cerebellum are involved with procedural memory. **Prospective memory** is needed to remember to do something in the future e.g. paying bills in time or returning book to the library. To carry out tasks in the future some special self-initiated cues are required so that a person is able to remember what one has to remember. Thereby prospective memory can be associated on time (take medication at same time every day) or event (take medication always with lunch). In order to remember tasks in the future some part of working memory and divided attention are involved in processing prospective memory. Both episodic and prospective memories depend on several different areas of the prefrontal cortex. (Drag & Bieliauskas 2010; Glisky 2007.)

2.1.4 Language and learning

In daily lives we read, write and speak continuously, so language skills are necessary to humans to understand, communicate and express themselves. Interaction across cognitive functions is needed to make sense of written or spoken text. (Language 2014.) Among other things, verbal fluency, verbal memory, and verbal reasoning ability are included in language functions (Heiskanen 2012).

Learning is closely linked to memory and new things are often learnt with the contribution of working memory, episodic memory and semantic memory. Thus learning includes, inter alia, understanding the thing to remember and connecting it to the prior learnt knowledge. (Heiskanen 2012.)

2.1.5 Visuospatial functions

Abstract reasoning, memorizing, problem-solving, orientation in space and recognizing are skills among those that visuospatial functions allow humans to experience. This activity allows people to imagine things that do not exist. (Language 2014.) Visuospatial abilities, like visuospatial orientation, memory and attention can be measured. One task to evaluate visuomotor abilities and planning is clock-drawing test where a person has to place numbers and hands on the clock correctly. (Drag & Bieliauskas 2010.)

2.1.6 Executive control

Executive control connects all other cognitive functions to a complex goal-oriented controlled activity. Processes that are not routine activities, like planning, organizing, coordination, implementation and evaluation, are involved. It is in control of all elements of cognition: attention resources, interference of working memory, encoding and retrieval, problem-solving, decision-making etc. It is the salient instigator for new task. Any trouble in instigation can have major effects on other cognitive functions. Prefrontal cortex is the base for executive control. (Drag & Bieliauskas 2010; Glisky 2007.)

2.2 Cognitive functional capacity

Cognitive functional capacity gives person abilities to survive independently in everyday situations at work, home and free time activities by intellectual way (Muistisairaan toimintakyky 2009). International Classification of Functioning, Disability and Health (ICF) is one of the World Health Organization's (WHO)

international classifications. It describes the bio psychosocial functional status through body/bodily functions, performance and participation in the thematic areas. The certification states that individual's functional capacity is determined by the individual's medical state of health and environmental and individual factors resulting of their interaction. The interaction is dynamic, so it can be assumed that intervention allocated to one element has an impact to the others, as well. According to ICF Classification, elements of cognitive functional capacity are the following: specific mental functions, attention functions, memory functions, psychomotor functions, emotional functions, perceptual functions, thinking activities, high-level cognitive functions, language-related mental functions, computation, coordination activities of complex movements, self and time experiences, other specified and unspecified particular mental functions, as well as, other well-defined and unspecified mental functions. (ICF 2004.)

2.3 Aging effects on cognition

Human brain begins to build up cognitive functions during childhood and that development continues into adolescence as indicated in several studies (Lebel & Beaulieu 2011). However, normal aging brings along some structural and functional changes in our brain. **Structural changes** include reduction in certain parts of brain at faster rates, for instance in the frontal cortex. There are also studies showing age-related changes both in white and grey matter especially in anterior parts of the brain. Cross-sectional studies, in turn, show link between hippocampal atrophy and impaired memory in normal aging. **Changes in cerebrovascular system** diminish blood flow while a person is resting, complicate oxygen consumption and effect on reactions between cerebral vessels and some chemical modulators. Neuroimaging findings show, for example, increase in activity in bilateral prefrontal areas due to changes in functional blood flow when older adults are compared to younger. Task-specific behavior is suggested to suffer from the **decrease in neural integrity**, because neural specificity is unable to engage specialized neural mechanisms. These biological changes during normal aging affect mostly attention, executive functioning and memory, but also

information transmission and representation of information. (Drag & Bieliauskas 2010.)

Overall, aging effects on elderly vary from one another. However, in general, older people have difficulties when performing tasks that require divided attention or ability to select relevant information from irrelevant. Perception is affected by changes in vision and hearing. The most age-affected memory area is episodic memory causing elderly problems in encoding and retrieving information. Decline in working memory functions interfere reorganizing, manipulating and integrating information in working memory. Language skills are rather well maintained during aging, in contrast, visuospatial functions show decline. (Drag & Bieliauskas 2010; Glisky 2007.)

3 DEMENTIA

Dementia is a chronic and irreversible impairment which consists of loss of intellectual and emotional ability which alters quality of life. Dementia advances with age and affects cognitive and physical ability of a person. There is alteration in memory along with personality and behavioural changes. Because of these changes it is difficult for demented person to live alone at home. (Larsson & Thorslund 2006.)

According to Enck (2010), dementia is defined as a gradual depletion in cognitive function which includes loss in memory and troubles with language. As the disease progresses the person with dementia will face problems in doing simple daily activities, for example, eating, dressing up and toileting.

Dementia declines ones cognitive function without altering consciousness. People with dementia are unable to learn new things and they will even loose the power of judgement. It will grossly affect the memory and thinking. It slows down the level of intelligence and they will be very weak with calculation as well. In the whole world, dementia is the dominant cause for aging people to become disable and dependent. Dementia is the result of different kinds of diseases and injuries which may have affected the brain directly or auxiliary. (WHO 2012.)

WHO (2012) has determined that 35.6 million are diagnosed with dementia globally and each year the number of new cases will be 7.7 million. In every 20 years the number of people suffering from dementia is predicted to be almost double. It is presumed that most of them among this number will be from poor and developing countries.

There will be deterioration in memory with people suffering from dementia. Blood circulation will be depleted in some areas of the brain. Because of this it will be hard for them to communicate with other people. They will say one thing instead of other. Even simple things will be hard to understand for them. They might use improper word which leads to miscommunication. (Veselinova 2014.)

Various researches presents that people with hypertension have higher chances of suffering from dementia. Some other risk factors are genetic predisposition, aging and people with only primary education. (Larsson & Thorslund 2006.)

3.1 Types of dementia

According to WHO (2012), there are four most common types of dementia which are Alzheimer's disease, Vascular dementia, Dementia with Lewy bodies and Frontotemporal dementia. Yeaworth (2002) has mentioned alcohol-related dementia and Acquired Immunodeficiency Syndrome dementia as more uncommon forms of dementia.

3.1.1 Alzheimer's disease

Tozlu et al. (2014) has defined Alzheimer's disease as incurable escalating neurodegenerative disease which constitute of gradual loss in cognitive function and memory. It is also evident by behavioural and neuropsychiatric changes. Because of deterioration in these functions it is difficult to do daily activities by themselves.

Bhat (2011) has divided Alzheimer's disease further to three stages, mild, moderate and severe. People suffering from Alzheimer's disease slowly lose the power to do daily activities and finally in the end they will not be able do anything and will be incapacitated in the bed (Yeaworth 2002).

Mild stage: The first and foremost symptom of Alzheimer's disease is amnesia. Generally this stage lasts from 2 to 4 years. It starts from very slight memory loss. Those with diagnosis of Alzheimer's disease start to become confused and a bit withdrawn, mood swings are often present. Moreover the patients tend to lose themselves and misplace their own things. People who are diagnosed with Alzheimer's disease prefer to be in places which are very familiar to them. Their intellectual level decreases. It is not easy to learn new things for them. It is hard for

them to understand written information and starts to face problems with communication as well. As people with Alzheimer's will have short term memory loss, they tend to ask same questions again and again and will have very poor judgement power. (Bhat 2011.)

Moderate stage: The patients with Alzheimer's disease typically face this stage from 2 to 10 years. The symptoms become more severe in this stage. Dementia patients are still capable of doing simple tasks although the amnesia becomes worse. It is difficult to recall own past clearly in moderate stage of Alzheimer's disease. Sometimes they think that the past events are happening at present state and will start to get far from reality. Disorientation to time and place will start to appear. There will be more problems with communication, causing extreme difficulties in reading, writing and remembering right words. As there will be communication problem, people with Alzheimer's disease intend to make their own words. It is dangerous to leave them alone as they start to wander a lot. Irritability and depression also persists at this stage. There will be problem in dressing up and maintaining hygiene. (Bhat 2011.)

Severe stage: This stage persists 1 to 3 years. At this stage the patient needs continuous care. The condition worsens severely and they will start to lose almost all the functions slowly. People with severe Alzheimer's disease are unable to eat, speak and lose bowel and bladder control. These people tend to sleep most of the time and are unable to recognize any person. Alzheimer's patients in the final stage are prone to other diseases and are very weak physically. (Bhat 2011.)

3.1.2 Vascular dementia

Vascular dementia is the result of many small strokes in the brain. Person suffering from some kind of vascular disease has higher chances of having lack of oxygen in some parts of the body. If the brain is not well oxygenated then the cells in the brain might die resulting in mini strokes. (Alzheimer's disease 2014.)

Vascular dementia is the second most common type of dementia. The patients suffering from vascular dementia are at higher risk of mortality and morbidity. Average years of life after being diagnosed with vascular dementia are about 3.3 years. (Goldberg 2005.)

According to Margaret (2012) vascular dementia can be divided into four different types. **Acute or single stroke** which generally occurs after stroke. **Multi infarct dementia** which occurs after multiple transient ischaemic attacks. **Subcortical vascular dementia** which occurs due to demyelination of the nerve sheaths in the inner brain. Finally **mixed dementia** in which the symptoms overlap between Alzheimer's disease and vascular dementia.

The symptoms of vascular dementia differ from patient to patient as it depends upon which area of the brain is affected or damaged. The damage done by cerebrovascular events result in cognitive impairment. There is wide range of symptoms which may consist of; swing-mood and the family may think that the patient is having a bad day. They may encounter visual problems. There will be decrease in psychomotor performance and may start to have problems while walking, difficult to balance their body. Some patient may develop urinary incontinence. People with vascular dementia will have problems with planning and arranging. (Goldberg 2005.)

3.1.3 Lewy body dementia

There is aggregation of alpha-synuclein protein in part of the brain which controls memory, movement and behaviour in Lewy body dementia. It is the second most prevalent progressive dementia. It is more common in male than in female. (Canadian nursing Home 2014.)

According to Canadian Nursing Home (2014) Lewy body dementia includes two kinds of diseases: dementia with Lewy body and Parkinson's disease dementia. If a patient develops any kind of movement disorder at least one year before arousal

of cognitive symptoms then it is known as Parkinson's disease dementia. But if a patient presents different order it is known as dementia with Lewy body.

A person is said to have Lewy body dementia if he/she presents cognitive decline along with at least two of other features which are: sleep disorder, problems with concentration and attention, visual hallucinations and gait disturbance along with stiffness, tremor and slow movement. There are some common symptoms of Lewy's body dementia. 57% of patients suffering from this dementia present memory disturbances. They have difficulty remembering the old memories. They have visual hallucinations. It occurs especially during the early stage. Generally they see their family members or animals. They even talk with them and have false beliefs. They may be depressed up to some extent as they partially realise that they are not able to do all things on their own and the cognitive function is degrading. They will not be able to do daily activities and their problem solving abilities are also affected because of which they are unable to do complex tasks. Postural instability and gait difficulties are also prominently seen. As the autonomic nervous system also degrades they will have constipation and hypotension. (Canadian Nursing Home 2014.)

3.1.4 Frontotemporal dementia

In the initial stage of frontotemporal dementia there is no loss of memory but it persists of other symptoms (Banks & Weintraub 2008). Frontotemporal dementia is rather rare form of dementia. The prefrontal and anterolateral temporal areas are affected mostly in patient with frontotemporal dementia (Alzheimer's Disease 2014). Frontotemporal dementia presents neuropsychiatric symptoms which comprises of anxiety, agitation, psychoses and mood disturbances (Banks & Weintraub 2008).

Frontotemporal dementia can be divided into two different groups: behavioural variant frontotemporal dementia and primary progressive aphasia. Aphasia is the first and prominent symptom in patients with primary progressive aphasia. Primary progressive aphasia can be further divided into three different classes: nonfluent,

semantic dementia and logopenic. Patient with primary progressive aphasia presents with very minimal or no neuropsychiatric symptoms but, however, will develop as the disease progresses. (Banks & Weintraub 2008.)

Generally semantic dementia patient has depression and emotional changes. There is absence of any kind of interest to do any form of activity. In the other hand, nonfluent patient persists irritability and has very less behavioural problems. (Banks & Weintraub 2008.)

Patient with behavioural variant frontotemporal dementia has various behavioural problems. There is change in personality and has irrelevant behaviour. They even have compulsive and repetitive behaviour. They lack any kind of initiation and do not care about others. They may appear to be selfish as they do not want to change their behaviour. (Banks & Weintraub 2008.)

3.1.5 Clinical features in general

According to Alzheimer's Disease (2014), dementia is presented in different way in different people. Most common symptoms of dementia are: impairment in memory and judgement, problem with communication, unable to perform daily task, behavioural changes, state of confusion and inactivity. It is difficult for them to concentrate in one thing for a long time. People with dementia get confused inside their own house and do not remember what things are placed where. They do not remember where they are living and they find it hard to recognize people around them.

People with dementia may take long day naps and they walk very slowly (Canadian Nursing Home 2014). The ability for judgement also declines slowly along with perception and they start to hallucinate, become suspicious and agitated (Enck 2010). As those suffering from dementia will gradually lose functional ability, they will become dependent in others and they have to move to some care homes (Tozlu et al. 2014).

4 THE GOALS AND THE PURPOSE OF THE THESIS

4.1 Goals

There's a need to guide nurses to teach patients and their relatives how to maintain cognitive functions when ageing with memory diseases. Therefore, the main goal of this thesis is to find out how cognitive functions are supported in elderly with dementia. To reach the main goal, two other goals were set: to discover evidence based practice that supports cognitive functional capacity while aging and to uncover good practices on how cognitive functions are supported in elderly with dementia.

Since people age differently and face decline in cognitive functions individually it is important for nurses and family members to recognize any changes in the behavior of their aging relatives. If memory problems become unbearable, early diagnose of dementia facilitate planning the supportive care, rehabilitation and medication which will then continue throughout life. That formed one more goal, how to enhance cognitive functional capacity for the years which are still left. For that reason it is essential to understand how to support those patients and help them to live enjoyable life.

4.2 Purpose

The purpose of the thesis is to find good and useful methods and tools for dementia patients themselves, their relatives and health care workers to help the patient maintain their cognitive functions as long as possible.

4.3 Research question

How can cognitive functions be supported in elderly with dementia?

5 LITERATURE REVIEW AS DATA COLLECTION METHOD

5.1 Literature review

Data collection method of the thesis is the literature review. By literature review is meant the process of selecting topic, finding relevant research and non-research material, reading the material, choosing and analyzing it. After evaluation the material it is combined and summarized to the thesis. (Literature review 2012.) Aveyard (2010) explains that literature review summaries all the literature which is available on the topic. According to Ridley (2012) it is long process which begins when you get the first book or article concerning your topic and goes on until you finish it.

Literature review is a kind of review in which many previous literatures are reviewed related to a definitive topic (Cronin et al 2008). The main aim of literature review is to incorporate results of various studies done related to same topic (Ridley 2012). In a literature review the time frame should be mentioned about when the literature was selected (Parahoo 2006).

Literature review was selected as the data collecting method for the thesis since this kind of literature review provides evidence-based information which then can be further implied on practice (Ridley 2012). Cronin et al (2008) mention that at first the reviewer should form a research question and then mention clear inclusive and exclusive criteria. The reviewer should find out good articles which answer the research question. Finally, the material should be analyzed and the findings mentioned distinctly.

Cronin et al (2008) have mentioned five steps in doing literature review. At first the reviewer should select a topic which is followed by searching for the literature related to the topic. Thirdly, all the articles should be gathered, gone through all the selected articles and analyze them. The reviewer should then write the review and finally reference should be mentioned.

5.2 Data collecting process

The process of collecting data for this thesis included five different stages. At first the topic was selected according to the interest of the authors. Then the inclusion and exclusion criteria were set, deciding what kind of the material will be accepted for the thesis. After that keywords were formed trying to keep in mind the chosen topic. Keywords were used to search the material through databases CINAHL, SAGE and MEDLINE. The final stage was to go through the material and choose relevant articles, at first by reading the titles, then by reading the abstracts of the chosen ones and finally by reading the entire contents of the articles which were left.

5.2.1 Selecting a review topic

According to Timmins and McCabe (2005), it can be very hard for a student to select a topic for review. A topic with a very large area is not a very good idea. The reviewer should choose such a topic which interests him/her. The reviewer can have some discussion with other person or go through different topics to find out which interests him/her the most.

Cronin et al (2008) mention that the reviewer should choose such a topic where there are enough number of literature. A literature review with very vast topic will be difficult to handle. Precise and focused topic should always be preferred first.

The authors of the thesis were interested in cognitive function and elderly. Therefore the authors decided to have 'Supporting cognitive function capacity in elderly with dementia' as the review topic.

5.2.2 Inclusion and exclusion criteria

Databases that were used offer articles in different languages but those written in English were chosen. Literature that was published after 2003 and found full text in

the databases with free access for students of Seinäjoki University of Applied Sciences were used.

The reviewer should have an inclusion and exclusion criteria. By the help of the criteria the reviewer will never lose the focus and will not step outside the path. (Aveyard, 2010). The criteria of inclusion and exclusion of the articles chosen is found in the Table 1.

TABLE 1. Criteria of inclusion and exclusion of the literature

Inclusion Criteria	Exclusion Criteria
<ul style="list-style-type: none"> • Articles related to dementia and cognitive functions. • Published literature only. • Literature published in English language. • Full text articles. • Free literature. • Published in year 2003 or later. • Peer reviewed article. • Scientific research articles. 	<ul style="list-style-type: none"> • Unpublished literature. • Literature published in other language than English. • Articles with only abstract available. • Published before the year 2003. • Non-peer reviewed articles.

5.2.3 Keywords

Several keywords and combinations of words were used for the search of the material. Literature and articles containing variables of cognitive function and

dementia were included. Since the review targeted on elderly those words were used in the search. Word support was used in order to find ways of supporting cognitive functions of the demented patients in the age group chosen.

Support: This thesis understands the word support as an act of providing assistance and encouragement for someone to fulfill a function (Support 2013).

Cognitive function: It is a mental process which involves learning, reasoning, memorizing, decision making, and orientation (Cognition 17.10.2013). In other words, when someone is thinking, trying to remember or learn new things, talking to someone or understanding written material, he or she is using cognitive functions of brain (Hill, 2013).

Cognitive functional capacity: Cognitive functional capacity means person's ability to survive independently in everyday situations as well as working life and free time by intellectual way. Impaired memory weakens person's normal functional capacity thus affecting cognitive and physical functions. It is harder to solve problems or connect thoughts to doing things in action. Some experience language problems and problems to recognize things and people. (Muistisairaan toimintakyky 2009.)

Elderly: The authors of this thesis decided to focus on age group over 65 years of age in this thesis.

Dementia: Dementia can be defined as a general term describing a group of symptoms resulting from a number of different diseases of the brain. Dementia has many forms which all seem to cause problems with cognitive and intellectual functions, such as, memory and language skills or understanding and processing information. (The Dementia Timebomb 2013.)

5.2.4 Searching the literature

Searching the literature is very essential step while doing a literature review (Ridley, 2012). The reviewer must establish a systematic strategy in order to get as much material as possible to get the answer of the research question. Once a

strategy is made the reviewer should follow the steps and search for the material in a systematic approach. By making a strategy the reviewer will be able to get relevant material. (Aveyard, 2010.)

Literature search is conducted generally in computers using different databases. Nowadays there are many different databases from where the reviewer can have access to plenty of materials (Younger 2004). Aveyard (2010) believes that journal articles are much better than textbooks. The research material for this thesis was collected from different online sources. Since students of Seinäjoki University of Applied Sciences have free access through EBSCO to databases like Academic Search Elite, CINAHL and CINAHL Full Text, those were used in the search with SAGE and MEDLINE databases. Books, journals and other literature related to the topic were added when necessary.

According to Aveyard (2010) the reviewer should at first develop keywords which can be extracted from the research question. If the mentioned keyword does not give required materials then the reviewer can also use synonyms of the keyword (Hek & Moule 2006). Furthermore the reviewer can even combine the search terms. The reviewers can combine the search terms by the help of command known as 'Boolean operators' (for example, AND, OR, NOT) (Ely and Scott 2007). In addition, * asterisk can also be used. By using this you can get result of variations of the word by using the root word. (Ridley 2012.)

The search process of the thesis was started systematically. CINAHL, SAGE JOURNALS and MEDLINE databases were used to search for relevant articles using keywords. Inclusion and exclusion criteria were also followed in order to keep the focus.

After searching for articles using the keywords in different databases separately, they showed number of articles. At first all the titles were read through, after which there were only handful of articles left. The articles which looked promising were then printed. The abstracts were read of all those printed articles. There were many articles whose topic were related to the material which were being searched but after reading the abstract there were many articles which needed to be excluded as it did not present enough information. All those articles were excluded

after reading the abstract which was unrelated. Later on all the remaining articles were read in detail and only those articles were selected which were relevant to the topic.

There were many articles which focused not only in cognitive performances but on all the aspect of dementia. In the same way there were many articles which explained about different kinds of therapies for improving the cognitive function. On the other hand there were few articles which presented about nurses supporting the cognitive function. There were some articles which explained about how the therapy can be conducted whereas in some they only mentioned the name and its importance.

5.2.5 Data found as search result

In the process to search for relevant articles CINAHL with full text, SAGE JOURNALS and MEDLINE databases were used. In order to receive relevant articles different keywords were used in databases and certain number of articles were excluded according to the mentioned inclusive and exclusive criteria. Finally, 8 articles were selected for the literature review.

CINAHL with full text

During the search process in CINAHL with full text the keywords dementia, cognitive, function and support were used. Different kinds of Boolean operators were used for example, AND and OR. The basic criteria were marked beforehand for example, full text, articles in English and published from year 2003. At first CINAHL with full text showed 114 articles. All the titles were read through and then only 11 articles were included in this step. Furthermore, the abstract were read of those 11 articles and then 8 articles were included and 3 were excluded. At the end all the 8 articles were read through using critical appraisal tool and 5 were included and 3 were excluded. Therefore the final numbers of relevant articles were 5 in this database. The search process from CINAHL with full text is presented in figure 1.

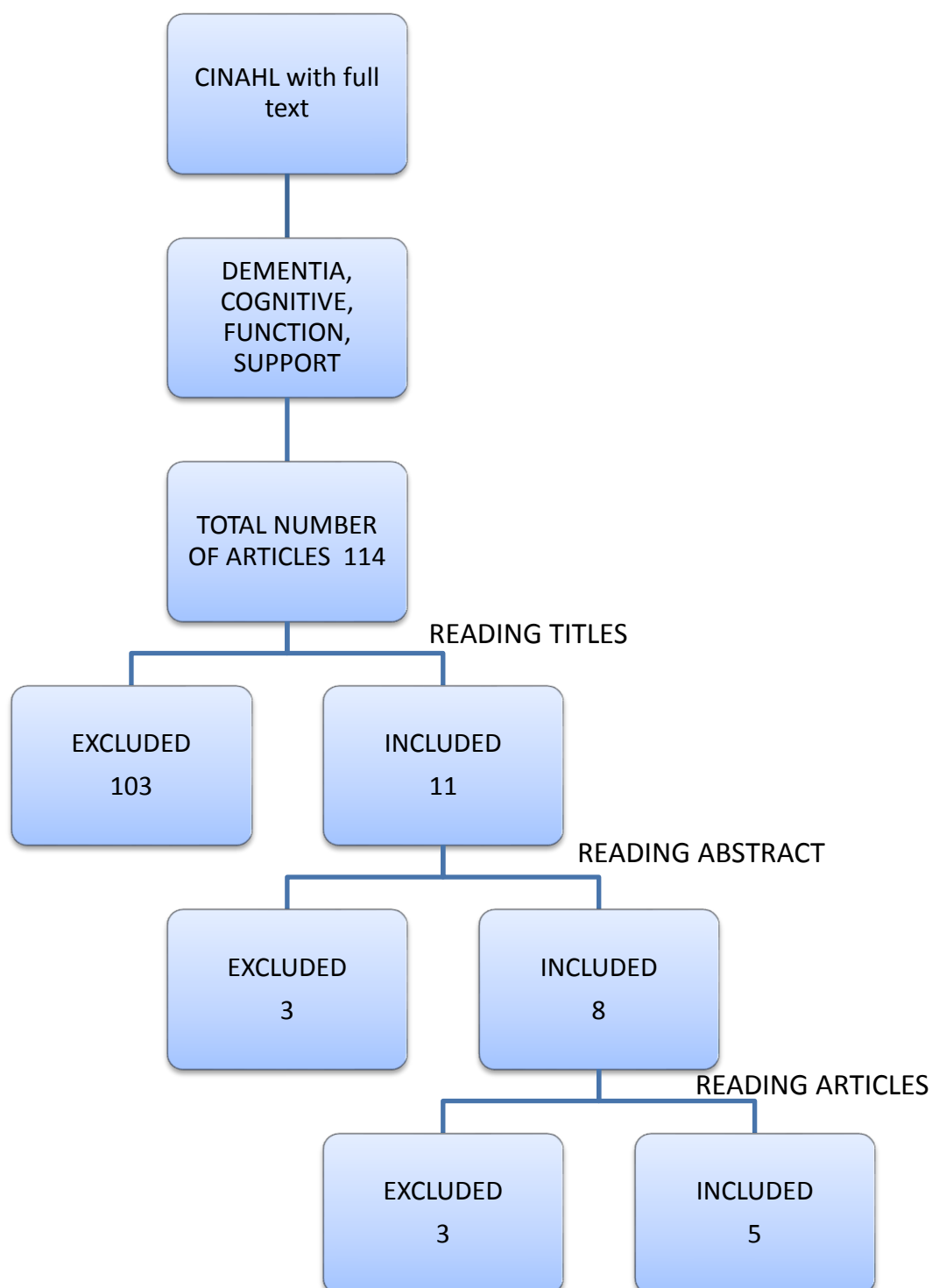


Figure 1: Search process of articles in CINAHL with full text.

SAGE JOURNALS

The keywords used in SAGE JOURNALS to search for articles were cognitive, dementia, support and aged. The synonyms of these words were also used in the process. There were 36 total results shown. After going through the titles of all those articles, 8 articles were included and 28 were excluded. After that the abstract of all the included articles were read. Following that 5 articles were included and 3 were excluded. All those 5 articles were read through and only 3 articles were relevant to the topic of the literature review. So, 3 articles were chosen from SAGE JOURNALS. The search process from SAGE JOURNALS is presented in figure 2.

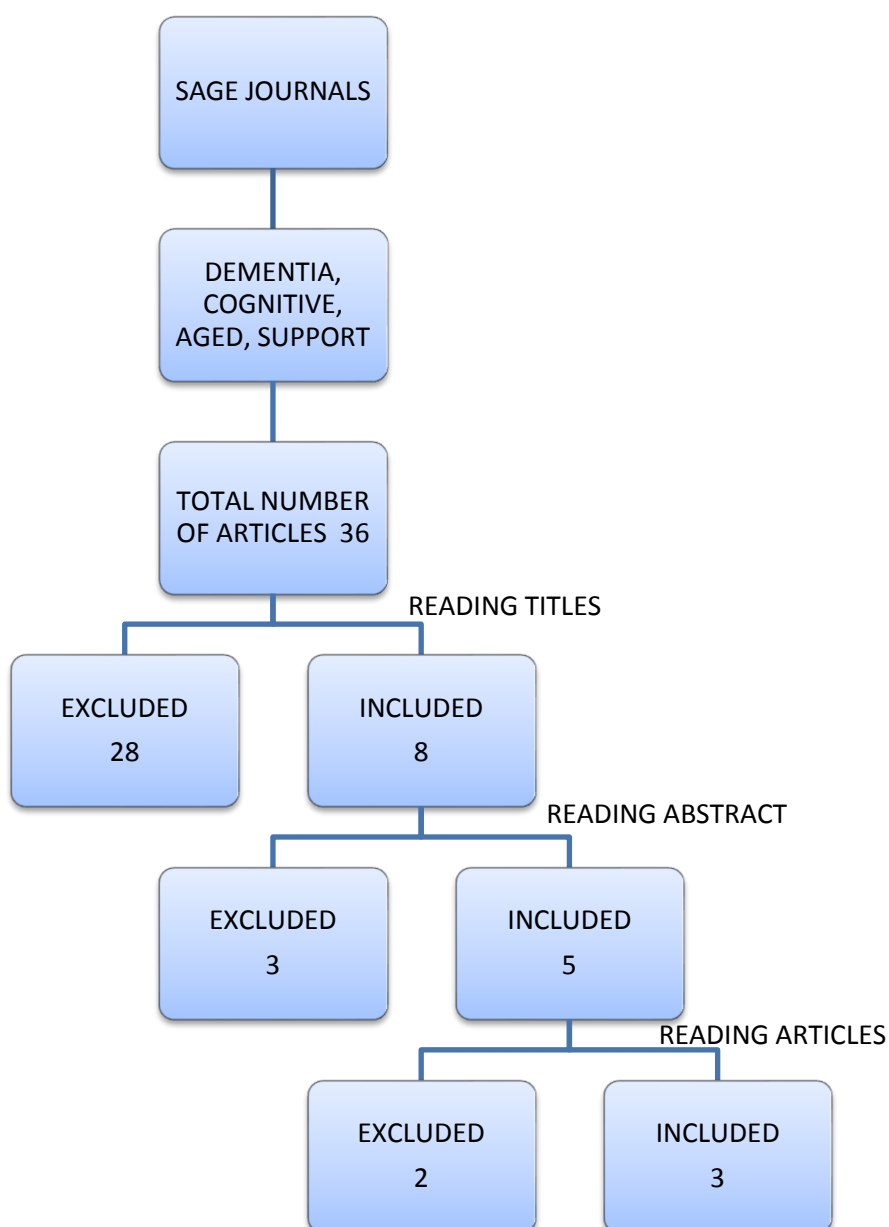


Figure 2: Search process of articles in SAGE JOURNALS.

MEDLINE

In MEDLINE cognitive, dementia and support were used as search words. There were 4 numbers of articles at first. After reading through the titles of the articles 1 article was included and 3 were excluded. In another step the abstract of that 1 article was read and that was also excluded after that. So, in MEDLINE there were not any relevant articles. The search process from MEDLINE is presented in figure 3.

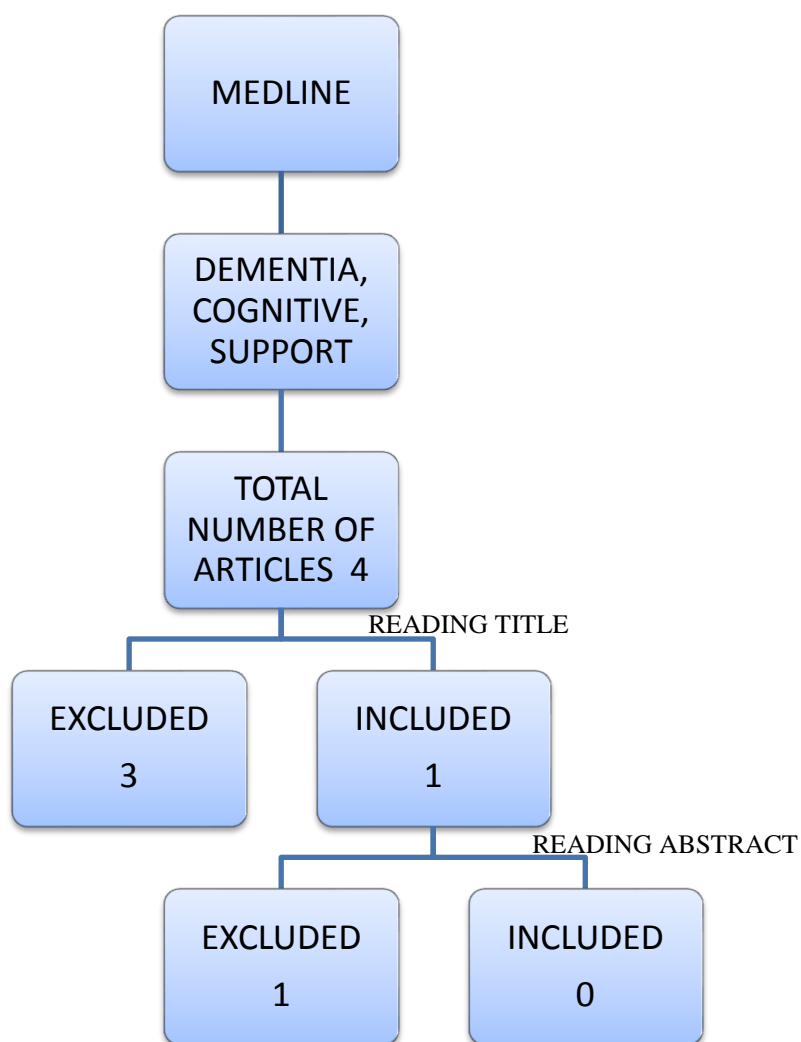


Figure 3: Search process of articles in MEDLINE.

6 CONTENT ANALYSIS AS DATA ANALYZING METHOD

6.1 Content analysis

Data will be analyzed following the **content analysis** method. It is a method by which a document is analyzed in a systematic manner and can be used in both qualitative and quantitative research. It can be done in inductive or deductive way. (Elo and Kyngäs 2013.)

6.2 Analyzing process

The analyzing process can be first divided in three different steps: preparation, organizing and reporting. Preparation phase starts with selecting the unit of analysis. (McCain 1998; Cavanagh 1997; Guthrie et al 2004.) According to Polit & Beck (2004) the selection can be a word, sentence or a theme. It relies on the type of research question. Morse & Field (1995) say that the reviewer should first understand the data presented and should understand what it says.

The next phase includes various steps which are open coding, coding sheets, grouping, categorization and abstraction (Elo and Kyngäs 2008). The reviewer should go through the materials several times. The reviewer should write the notes and heading so that all the aspects are presented. (Burnard,1996.) All the description is then collected to the coding sheets (Cole 1988, Downe-Wamboldt 1992; Dey 1993). Similar descriptions are then grouped in together and form categories or themes (Burnard 1996). Subcategories with related ideas are combined together to make a category and finally main category emerges combining all the categories (Dey 1993). In this way abstraction is developed which gives answer to the research question (Burnard 1996; Polit & Beck 2004).

In this thesis, at first the authors read all eight articles. All the information which was related to the thesis was first highlighted in the article. The materials were read through again and again to understand it very well. All the coded points were then written down on the paper. The one with similar description were then

grouped together which formed a category. Later on the one which gave similar view were united together to form a category. And finally three themes emerged from those categories. A part of analyzing process is described below in the table 2.

SUBCATEGORY	GENERIC CATEGORY	MAIN CATEGORY
Cerebral blood flow increases during physical activity.	Physical activity.	Everyday life.
Positive impact on cognitive performance.		
Increased blood circulation to the brain.		
Light hand movements.		
Diet modification.	Nutrition.	
Add vitamins B, D, E and other vitamins in diet.		
Decreases the process of memory decline.		

Table 2: An example of analysis process of this thesis.

7 RESULTS

During the process of answering the research question three themes stood out clearly. They were everyday life, recreational activities and treating co- occurring issues.

7.1 Everyday Life

The things which can be done and are needed in everyday life to support cognitive functions can be described under six sub themes: physical activity, nutrition, communication skills, enhancement in memory, socialization and coping behavioral problems.

7.1.1 Physical Activity

There is a relation between physical exercise and cognitive performances. Cerebral blood flow is increased when a person is doing an activity which has positive influence on cognitive performances. When a person is doing physical activity there is increased blood flow to the brain which in turn increases the amount of oxygen and nutrients in the brain. (Bragin et al 2005.)

According to Bragin et al (2005), for the patients with dementia there is no need to do very heavy exercise. Only simple hand exercises are also enough. There is no need of very hard physical work. This activity increases the cerebral blood flow which in turn improves the cognitive performances of patient with dementia.

Strout et al (2012) mention that women who have been physically active at teenage years or took up physical activity at the age of 30 or 50 proved to have substantially less probability of cognitive impairment than those physically inactive. Thus regular exercise can reduce the risk of dementia and decline in cognitive functions, as well.

7.1.2 Nutrition

Nutritional factors are also important in order to improve the condition of people suffering from dementia. Some kind of diet modification can be made. (McCann & Ames 2009.) Remington, Chan, Paskavitz & Shea (2009) have mentioned that adding different kinds of vitamins in the diet help to decrease the process of memory decline in Alzheimer's disease. These different vitamins are Vitamin B, D, E and other vitamins. There will even be positive result when the patient takes any one of the vitamins in addition to the diet.

7.1.3 Communication skill

When a group of demented people are kept together and have the opportunity to talk with each other, they felt comfortable to express themselves and had a feeling of being understood (Mason et al 2005, according to Spector, Gardner & Orrell 2011). When people with dementia were grouped together they found pleasure in talking and were willing to have conversation (Spector et al 2011).

One of the interventions, where a group of people with dementia are given the opportunity to be familiar with each other, is cognitive stimulation therapy. It can significantly improve and stimulate communication skills of demented patients. They find it easier to talk after being in such kind of intervention. This intervention notably improves the language skills. (Spector et al 2011.)

Cognitive stimulation therapy is a small group intervention which is held for people suffering from dementia (Spector et al 2011). It mainly deals with learning and improving memory and improves executive functions. This kind of therapy is more effective in mild to moderate Alzheimer's disease. This stimulation therapy helps in orienting the patient with the reality which helps in controlling the behavioral problems. Verbal fluency task which is a part of cognitive stimulation therapy helps the patients to tell as many words as they know from a specific category or starting from specific alphabets. (Niu et al 2010.)

7.1.4 Enhancement in Memory

Different kind of activities and interventions can be done in order to improve the memory of patients with dementia. Some of the techniques are: different pictures and photos can be shown to the patient and the patient can tell stories about them. They could also tell simple things about pictures like what they see in there. If the patient is unable to explain about the picture then the one who is leading the group could give some hints. (Niu et al 2010.) After participating in these kind of interventions there will be increment in the memory of dementia patient. These patients are also able to learn new things. These kinds of group interventions also help the demented person to concentrate more and orientation of time. (Spector et al 2011.)

7.1.5 Socialization

There is an indirect link between social relationship and cognition. People who have large amount of social support have positive impact on the cognitive function. When people are highly active in social life they can approach to different kinds of services easily and also maintain healthy and lively behavior which delays the brain's degeneration and has a positive effect in cognitive performances. (Crooks et al 2008.) According to Seeman et al (2001), the cognitive abilities are better in people who have high emotional support. In the study of Zhu, Hu & Efirid (2012) is stated that those older persons who live alone have higher risk for dementia than elders living with family members, caretakers or friends. They also mentioned that due to less social support, especially psychological support from the family, elderly have weaker cognitive abilities.

7.1.6 Coping Behavioral Problems

There are various coping mechanisms for behavioral problems. Among them doll therapy is one. Dolls can be used in different ways, for example feeding, hugging, changing and caring the doll. This intervention improves the total wellbeing of the demented people. When the people with dementia participate in Doll therapy,

there will be increased social relationship and better food intake. They will even have better communication skills. They will talk better with people around them. These people with dementia will be less aggressive than before and will not be agitated. When a doll is given to people with dementia, it is always good to give a cheerful looking doll. (Mitchell 2014.)

7.2 Recreational Activities

Different recreational activities can be considered in order to support the cognitive function. The two different categories are stimulated oriented intervention and music.

7.2.1 Stimulated Oriented Intervention

There are various kinds of creativity or art based approach which a nurse could use to take care of patient with dementia. There are different ways for approaching these kinds of interventions such as music, dance, drama and physical activity. These kinds of approaches enhance the remaining skill and even help the patients to learn new things. Creative activity helps the patient to express themselves and leads to improvement in communication. They even initiate themselves to do certain kind of things. These kinds of activities even lead to improvement in social skills. Recreational activities help to balance the mood and behavior which in turn enhances the cognitive functions. (Rylatt 2012)

Rylatt (2012) conducted a creative therapy session which was conducted by nurses and support workers. This session was implemented for the duration of 8 weeks. There was session period of about 30 minutes, three times in a week. During the introduction period in the sessions they had music, breathing exercise, stretching, shaking each other's hands and moving around in a circle. The vital part of the sessions included dance and using different kinds of instruments for stimulating memory. And finally at the end of the session there would be gentle movement, breathing exercises and singing. Rylatt (2012) upholds the importance of recreational activity sessions in care services for dementia patients.

7.2.2 Music

Different kinds of music can be used for various purposes. Larkin (2001) states that music helps in the improvement of short and long term memory. When a dementia patient participates regularly in a music therapy, it holds the declination of cognitive functions. There are many positive impacts for a patient with dementia after participating in a music therapy. It helps to increase the cognitive performances, especially short term recall function. Singing can also be included in these interventions. Music helps to stimulate various cognitive functions as rhythm of the music helps to drive and maintain temporal order. (Chu et al 2014)

Chu et al (2014) had conducted music intervention sessions. There were 12 sessions of therapy which were conducted in six weeks. Each session lasted for 30 minutes and was conducted twice a week. Different kinds of movements were performed during the session with the music, playing different kinds of rhythm, listening to famous music, playing different instruments and singing. In the first two sessions different kinds of instruments were played by a therapist. In the next two weeks songs were sang. In the following two weeks the participants listened to music, after that in the next two weeks different kinds of hand functions were conducted. In the 9th and 10th session different kinds of music related to some festivals were played. In the final two sessions the participants created their own music and were asked to choose instrument which personifies them. After the session it showed that the MMSE score was increased.

7.3 Treating co-occurring issues

If the patient is suffering from vitamin B12, D2 and D3 deficiency then there will be more declines in cognitive functions. So the patient with dementia must be treated for these deficiencies. Furthermore, if the patient has hearing or vision problem it must also be corrected. When these comorbidities are treated it has positive result in the cognitive performance. Therefore the patient with dementia should have a thorough examination and if there is any kind of problem then it should be taken care of at time. (Aliev et al 2013)

8 DISCUSSION AND CONCLUSION

8.1 Reflecting the results

The number of demented people is increasing day by day in the whole world. It is a very big issue in the present day. There are many problems when a patient suffers from dementia.

This literature review presented several ways to support the cognitive performances. Limited amount of physical exercise can also help people with dementia. It increases the blood circulation and the cerebral blood flow also increases as a result of exercise. As there is sufficient amount of blood in the brain the cognitive functions could be reserved. A nurse can always encourage the patient to do some kind of exercise and the nurse can motivate the patient by doing it with them.

There are even possibilities to learn new things after suffering from dementia. Memory power can also be improved. Different pictures can be used as a medium in order to enhance the memory. Patients can see the pictures and later they can tell about what they could see in the picture and the nurses could also ask abstract questions related to the picture as well. The power of concentrating in one subject is also improved.

When there are behavioral problems the cognitive abilities are also decreased. Therefore, if the people with dementia develop coping mechanism in order to control the behavioral problems then the cognitive performances can also be enhanced.

Various kinds of programs can be organized for people suffering from dementia. They can have different kinds of activity sessions, for example music, art, dance and more. Demented people who are interested in music can take part in music activity and the one more interested in art can have that. These are other ways of expressing their feelings. It will help people with dementia to communicate more easily after doing these kinds of activities. Communication skills can be improved remarkably.

The people suffering from dementia should have regular physical examination. If he/she is having some problems with vision or hearing then it can be identified during the examination which might not have been noticed by anyone. A nurse should monitor the patients and should notice if there is some changes in the patient. Diet containing all the nutrients is also equally important.

Nurses can always try to focus on above mentioned points in order to improve the cognitive functional ability of people suffering from dementia. Nurses need to be educated more in these subjects as demented people living in care homes spend most of the time with the nurses.

8.2 Conclusion

In summary, it can be said that there are various ways to support the cognitive functional ability. Different kinds of interventions can be done in order to benefit the people suffering from dementia. The findings of this literature review presented that proper physical activity, various kinds of activities like music or art, having better social connections and coping with behavioral problems can improve the cognitive functional activity.

8.3 Ethical and authenticity issues

Ethics is considered. The original authors of the original literature are mentioned in the text and bibliography. Since the thesis is a literature review there is no need for patient identification or approval from ethics committee.

Research is done by two students without any noteworthy prior research background. Therefore, some significant material may be undiscovered. All used material is collected from trusted data bases of free access. It is critically read through, discussed and decided its importance to the research. Language accepted to the study is English. There was limited time frame and the sources were also limited. There was no financial support. Therefore articles with free access were only studied.

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